

Training Manual

Leadership Development in Nutrition-Sensitive Agriculture



Nutrition Unit
Bangladesh Agricultural Research Council

Training Manual on Leadership Development in “Nutrition Sensitive Agriculture”

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Concept Note

Title: Leadership Development Training Program in Nutrition-Sensitive Agriculture.

Background:

Agriculture plays a critical role not only in food production but also in improving nutritional outcomes, especially, in low- and middle-income countries. The concept of **Nutrition-Sensitive Agriculture (NSA)** has emerged to integrate nutrition goals into agricultural policies, programs, and research. Scientists and extension workers are key stakeholders in promoting NSA through research, innovation, and direct engagement with farming communities.

However, there is a crucial need to **build leadership capacities** among these professionals to drive systemic change, facilitate multi-sectoral collaboration, and effectively implement nutrition-sensitive interventions on the ground. Leadership in this context involves influencing policy, managing teams, mobilizing communities, and ensuring that agricultural efforts translate into improved nutrition outcomes.

Objectives:

The overall objective of this training program is to **enhance leadership competencies** among scientists and extension workers to effectively plan, implement, monitor and advocate for **Nutrition-Sensitive Agriculture** interventions.

Specific objectives include:

- To extend understanding of NSA concepts, strategies, and pathways.
- To build capacity for planning, monitoring, and evaluating NSA interventions.
- To promote multi-stakeholder collaboration for nutrition-sensitive program implementation and upscaling
- To develop capacity for motivating, engaging institutional personnel in NSA.

Target Participants:

- Agricultural Scientists (Crop, Nutrition, Livestock & Fisheries, BIRTAN)
- Extension Officers

Duration:3 Days

Training Methodology:

The training will be conducted using a blend of:

- Expert-led technical lectures
- Case study analysis
- Interactive group work
- Action planning

Tentative Content Outline (Key Themes):

1. Concepts and Frameworks of Nutrition-Sensitive Agriculture
2. Agriculture-Nutrition Pathways
3. Role of Scientists and Extension Workers in NSA
4. Fundamentals of Leadership in Agricultural Development
5. Communication and Behavior Change Strategies
6. Gender and Equity in NSA
7. Monitoring, Evaluation, and Indicators
8. Multi-sectoral and Community Engagement
9. Resource Mobilization and Project Design
10. Personal and Institutional Action Planning

Expected Outcomes:

By the end of the training, participants will be able to:

- Enhanced knowledge in NSA concepts.
- developed leadership skills to manage teams, partnerships, and field programs.
- Promote NSA-integrated extension or research strategies.

Proposed Dates & Venue:

- **Dates:** October 13–15, 2025
- **Venue:** Conference Room 2, BARC

Organizing Institution:

Nutrition Unit, BARC

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Concepts of Nutrition-Sensitive Agriculture

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Introduction

- Nutrition-Sensitive Agriculture (NSA) is an approach that seeks to maximize agriculture's contribution to improving nutrition.
- It goes beyond just producing food and considers how agricultural practices, policies, and systems can be designed to improve the availability, access, and consumption of diverse, safe, and nutritious foods that contribute to a healthy diet.

Definition

- Nutrition-Sensitive Agriculture refers to agricultural interventions and strategies that aim to improve nutrition outcomes.
- It integrates nutrition objectives into agricultural development and food systems.

Key Concepts of NSA

a. Dietary Diversity

- Promotes the production and consumption of a variety of food groups (e.g., fruits, vegetables, legumes, animal-source foods).

b. Availability of Nutritious Foods

- Encourages growing crops that are high in vitamins and minerals.
- Focuses on biofortified and traditional nutrient-rich crops.

c. Access and Affordability

Ensures food is economically and physically accessible to all, especially vulnerable populations.

Key Concepts of NSA

d. Women's Empowerment

- Recognizes the role of women in agriculture and household nutrition.
- Promotes women's access to land, resources, education, and decision-making.

e. Seasonality and Food Security

- Addresses seasonal gaps in food availability.
- Supports storage, preservation, and market access to reduce seasonal malnutrition.

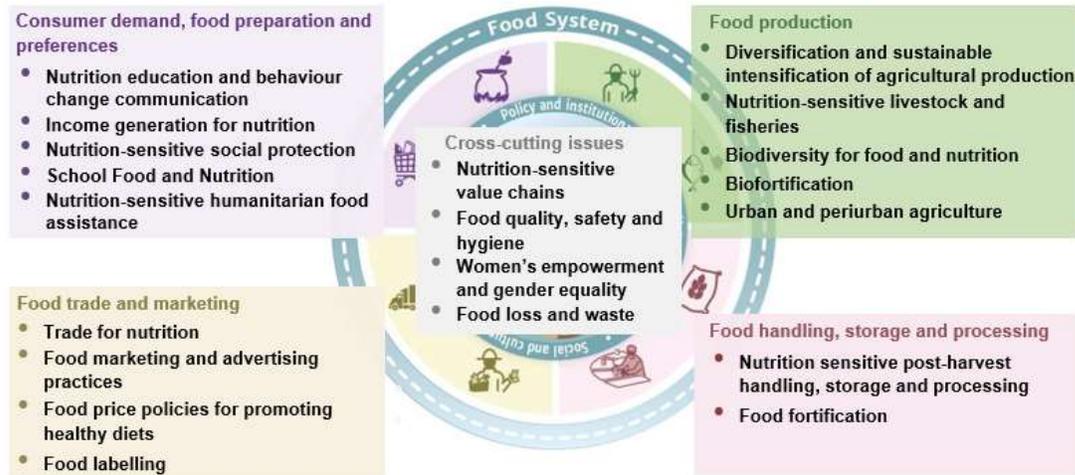
Nutrition-sensitive agriculture and food systems in practice - Options for intervention

For each intervention, information is provided on:

- WHAT are we talking about? (definition of the intervention area)
- WHY does it have the potential to improve nutrition?
- HOW do you make it more nutrition-sensitive?

- Which conditions are required to create an ENABLING ENVIRONMENT for this to work for nutrition?
- Key references to KNOW MORE ON THE TOPIC

Nutrition-sensitive food systems: Option for interventions

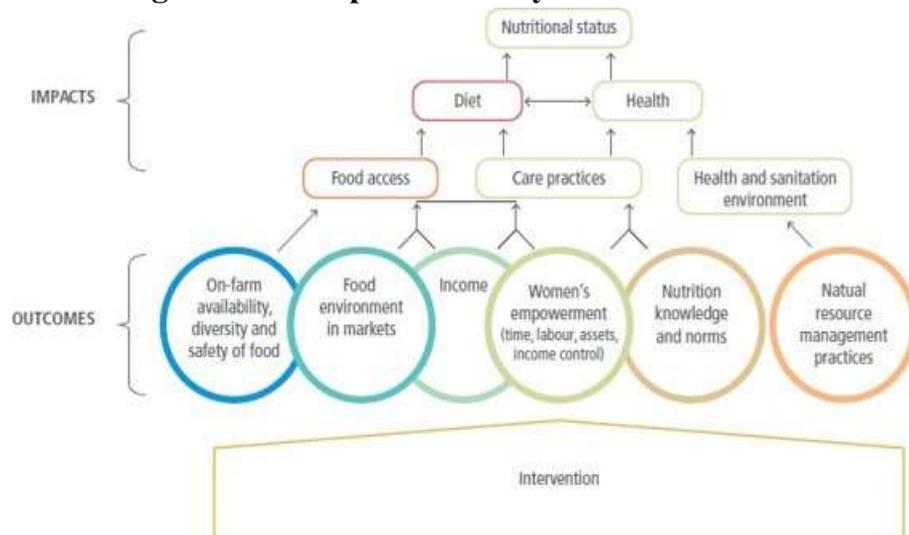


Interventions are organised according to the functions of the food system and as cross-cutting issues. However, many of them relate to several functions.

Pathways Linking Agriculture and Nutrition

- Food Production: Influences the type and quantity of food available.
- Income Generation: Affects the ability to purchase food, health care, and education.
- Women's Time and Resources: Impacts caregiving practices and intra-household food allocation.
- Food Prices and Markets: Influence dietary choices through affordability and access.

Nutrition Sensitive Agriculture Impact Pathway



Source: Herforth and Ballard, 2016

Possible Nutrition-Sensitive Agriculture and Food System Impact Pathways

Food System Domain	Examples of Agriculture-based interventions and their nutrition impact pathways
<p>Domain 1: Production: Innovating for climate resilience, productivity and sustainable resource use</p> <p>To improve productivity across the food system and promote more efficient and sustainable use of natural resources, using research and technical expertise.</p>	<ul style="list-style-type: none"> • Introduce agricultural labour-saving devices → decrease the amount time that women spend on agriculture → women have more time to feed and care for young children → improve childcare practices including nutrition • Introduce technologies that improve resilience of food crops to extreme weather events and changing climates → increase year-round availability of food → improve food access → improve diet • Support dry season production of nutrient-rich foods (e.g., through small scale irrigation) → increase year-round availability of food → improve food access → improve diet • Reduce post-harvest food loss and waste → increase year-round availability of food → increase consumption of nutrient-rich foods • Promote improved biofortified crops that are climate resilient → increases micronutrient availability → increased yield → improved consumption of nutrients

Source: DFAT.GOV.AU, 2023

Possible Nutrition-Sensitive Agriculture and Food System Impact Pathways

Food System Domain	Examples of Agriculture-based interventions and their nutrition impact pathways
<p>Domain 2: Markets</p> <p>To help increase small-scale farmers' participation in markets and address constraints to agri-food business, including by leveraging private-sector investment and innovation (with an emphasis on women's economic empowerment).</p> <p>Improve nutrient availability throughout the value chain at different parts (nutrition sensitive value chains)</p>	<ul style="list-style-type: none"> • Increase household incomes from agriculture-related activities (including cash cropping and agricultural labour) → increase purchasing power → improve food access or increase access to health services → improve diet or childcare practices • Improve production of nutrient-rich foods → increase the year-round availability and diversity of food in the household and in markets → increase food access → improve diet • Implement nutrition-sensitive value chains approach → Improve production of nutrient rich food → improve post harvest storage and processing to improve nutrient retention → improve cold chain storage to retain nutrients and reduce waste → Increased micro nutrient intake and diet quality • Invest in small/micro enterprises that sell value-added nutritious food (targeting women) → women's empowerment → increased income → increased purchase of nutritious foods in markets → availability of nutritious foods at households → improved diet quality and income generation

Possible Nutrition-Sensitive Agriculture and Food System Impact Pathways

Food System Domain	Examples of Agriculture-based interventions and their nutrition impact pathways
<p>Domain 3: Consumption: Increasing demand for nutritious foods</p> <p>To increase the consumer demand for nutritious foods to create incentive for households to allocate resources that improve availability and access to nutritious foods, and also for their consumption.</p> <p>Increased demand then supports market stability and market chain actors and farmers confidently re-invest in these nutrition-sensitive value chains.</p>	<ul style="list-style-type: none"> • Increase household incomes from agriculture-related activities (including cash cropping and agricultural labour) → increase purchasing power → improve food access or increase access to health services → improve diet or childcare practices • Improve production of nutrient-rich foods → increase the year-round availability and diversity of food in the household and in markets → increase food access → improve diet • Implement nutrition-sensitive value chains approach → Improve production of nutrient rich food → improve post harvest storage and processing to improve nutrient retention → improve cold chain storage to retain nutrients and reduce waste → Increased micro nutrient intake and diet quality • Invest in small/micro enterprises that sell value-added nutritious food (targeting women) → women’s empowerment → increased income → increased purchase of nutritious foods in markets → availability of nutritious foods at households → improved diet quality and income generation

Possible Nutrition-Sensitive Agriculture and Food System Impact Pathways

Food System Domain	Examples of Agriculture-based interventions and their nutrition impact pathways
<p>Domain 4: Improving food Environments</p> <p>To improve the availability of and accessibility to nutritious and healthy foods at the home, schools and other institutions and retail outlets and markets.</p>	<ul style="list-style-type: none"> • Invest in school gardens and nutrition education in schools → produce used to generate food and income to supply students with nutritious foods → student attitudes and knowledge improve → diet quality improved • Invest in smallholder agriculture to supply school feeding programs → households generate more nutritious foods for own consumption and additional income -> use to purchase nutritious foods → diet quality improved • Local market infrastructure improved including through providing ramps, providing adequate security and shelter from the elements → to facilitate accessibility by all, especially vulnerable people → improved access to nutritious foods → improved diet quality

Possible Nutrition-Sensitive Agriculture and Food System Impact Pathways

Food System Domain	Examples of Agriculture-based interventions and their nutrition impact pathways
<p>Domain 5: Enabling Environment: Promoting effective policy, governance, and reform</p> <p>To assist partner <u>countries</u> achieve more effective policy settings through: increasing incentives (and decreasing disincentives) for improving the availability, access and consumption of diverse, nutritious and safe foods; promoting environmentally sustainable production, trade and distribution with a focus on nutritious rich foods such as horticulture, legumes and small-scale livestock and fish.</p>	<ul style="list-style-type: none"> • Promote sustainable and efficient agriculture sector → contribute to macroeconomic growth → increased number of jobs in the sector → increase household incomes → increase purchasing power → improve food access → improve diet • Generate evidence to inform the development of, and promote policies that support <u>multisectoral</u> approaches to improve nutrition → build capacity in human resources and institutions to improve nutrition through the food and agriculture sector → facilitate multi-sector collaboration (especially between agriculture and health) → increase effectiveness of nutrition actions • Support safety nets during shocks or lean seasons → people can access nutritious foods → resilience maintained

Principles of Nutrition-Sensitive Agriculture

- Nutrition-focused planning in agriculture projects.
- Targeting the nutritionally vulnerable, especially women and children.
- Cross-sector collaboration (agriculture, health, education, etc.).
- Environmental sustainability to ensure long-term food and nutrition security.
- Monitoring and evaluation of nutrition outcomes and program impacts.

Challenges in Implementation

- Weak integration between agriculture and nutrition sectors.
- Lack of nutrition awareness among agricultural extension workers.
- Inadequate data on the impact of agriculture on nutrition.
- Limited funding and political will.

Opportunity for NSA

- Biofortification: Development of crops enriched with micronutrients.
- Agri-nutrition education: Teaching farmers and communities about nutrition.
- Value chain development: Focusing on nutrient-rich foods from production to consumption.
- Technology and innovation: Use of ICTs and modern methods to enhance impact.

Opportunity for NSA

- Nutrition-sensitive agriculture is a vital strategy to combat malnutrition in all its forms.
- By aligning agriculture with nutrition goals, countries can make significant progress toward food and nutrition security, especially, for the most vulnerable populations.
- Multi-sector collaboration and strong policy support are essential for the success of NSA initiatives

Agricultural Technologies Supporting Nutrition Outcomes

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1. Introduction: Agriculture-Nutrition Nexus in Bangladesh

Agriculture employs over 40% of the labour force, serving as a major source of rural livelihoods while providing food, income, women empowerment and dietary diversity. It is not only about increasing yields but also about producing safe, diverse and nutritious food. However, malnutrition remains a pressing challenge in many developing countries, including Bangladesh, where stunting affects 28% of children, wasting 9%, underweight 22%, alongside widespread micronutrient deficiencies (BDHS, 2022). Diets continue to be heavily rice based, with limited consumption of fruits, vegetables, pulses, milk and fish. Nutrition Sensitive Agriculture (NSA) integrates food systems, technology, and health to address these challenges, moving beyond calorie production to enhance dietary diversity and nutrition security.

2. Food Security and Nutrition Security

Food Security: Availability of a sufficient quantity of food. Herein, the traditional technology focus on high yielding varieties, irrigation, fertilizers.

Nutrition Security: Consistent access, availability and affordability of diverse, nutrient rich foods. Herein, the technologies that enhance dietary diversity, nutrient density and bioavailability.

Table 1: Difference between Food Security and Nutrition Security

Features	Food Security	Nutrition Security
Primary goal	Prevents hunger and addresses immediate caloric needs.	Prevents and treats diet related diseases by focusing on nutritional quality.
Focus	Access to adequate amounts of food.	Access to nutrient rich food and beverages that support overall well being.
Scope	A broader, more general concept that can include foods that are high in calories but low in nutritional value.	A more refined, specific concept that emphasizes a balanced and healthy diet.
Determinants	<i>Availability:</i> Sufficient food supplies. <i>Access:</i> Economic and physical ability to obtain food. <i>Stability:</i> Consistent access to food over time.	Builds on the food security dimensions and adds factors like availability of health services, proper sanitation and nutritional education.
Underlying problem	Often associated with hunger and malnutrition due to insufficient	Highlights the coexistence of food access issues and diet related diseases,

Features	Food Security	Nutrition Security
	calories or overall food scarcity.	such as diabetes and heart disease.
Indicator example	Measures like the Food Consumption Score, which track dietary energy intake.	Measurements of diet quality and health outcomes, including micronutrient deficiencies and prevalence of diet related chronic diseases.
Addressing the issue	Involves food assistance, food banks, and programs to increase the availability and affordability of basic food items.	Involves strengthening the food supply chain for nutritious foods, culturally grounded nutrition education and integrating “ <i>food as medicine</i> ” into healthcare.

3. Nutrition Sensitive Agriculture and its Principles

Nutrition Sensitive Agriculture (NSA): NSA is a food-based approach to agricultural development that prioritizes nutrient rich foods, dietary diversity and food fortification to address malnutrition and micronutrient deficiencies. It emphasizes the multiple benefits of consuming a variety of foods, recognizes the essential role of nutrition in health and well being, and highlights the social and economic importance of agriculture in sustaining rural livelihoods. The ultimate goal of NSA is to strengthen food systems so they are better able to deliver positive nutritional outcomes (Source: <http://www.fao.org/3/a-as601e.pdf>).

Table 2: From Traditional Agriculture to Nutrition Sensitive Agriculture (NSA)

Aspect	Traditional Agriculture	Nutrition Sensitive Agriculture (NSA)
Objective	Maximize yield and production (calories/income).	Improve nutritional outcomes.
Focus	Staple cereals (Rice, Wheat).	Diversified foods (Fruits, Vegetables, Legumes, Animal-Source Foods).
Measure of success	Tons/Hectare.	Dietary diversity, micronutrient intake, reduction in stunting/anemia.

Nutrition sensitive agricultural production can be advanced in three key areas:

- i) *Improving food availability and accessibility:* Expanding agricultural production increases the supply of food, making it more affordable and accessible. This not only enhances community health but also strengthens economic resilience. Sustained income growth has a significant impact on reducing malnutrition.
- ii) *Promoting food diversity and sustainable production:* Diversifying agricultural production and adopting sustainable practices, such as conservation agriculture, efficient water management, and integrated pest management, can improve nutrition while safeguarding natural resources. Family farming, home gardens and homestead food production projects further increase access to a wider range of nutrient rich foods at the local level.

- iii) *Enhancing the nutritional quality of food*: Food fortification, biofortification through plant breeding and improved soil fertility can help prevent micronutrient deficiencies by increasing the nutrient content of crops.

Beyond agricultural practices, governments can play a vital role by embedding nutrition-sensitive approaches into agricultural policies and programs to ensure long-term impact.

Key Principles of NSA

- a) **Increase production diversity**: Promote a variety of nutrient dense crops and livestock.
- b) **Improve processing and storage**: Reduce food and nutrient loss.
- c) **Empower women**: Women control resources for the better child nutrition outcomes.
- d) **Enhance food safety**: Ensure food is free from contaminants.
- e) **Generate nutrition knowledge**: What to grow, how to prepare it, why it's important.

4. Pathways Linking Agriculture and Nutrition

Agriculture influences nutrition through four pathways:

- i) *Food Production Pathway*: What is grown and how nutrient dense it is? (Availability and diversity of nutrient rich crops)
- ii) *Income Pathway*: Selling produce to buy other nutritious foods. (Increased earnings allow purchase of nutritious food)
- iii) *Women Empowerment Pathway*: When women control resources, more income is spent on family's health and nutrition? (Technology adoption reduces labour, enhances decision making and improves child nutrition)
- iv) *Food Environment Pathway*: Safe storage, processing and reduced post-harvest loss.

5. Nutrition Sensitive Technologies or Technologies for Nutrition

The following technologies are used based on their point of impact in the food system.

<u>Seed and Genetic Level</u>	<u>Farm and Production Level: Diversification and Agronomy</u>	<u>Post-Harvest and Processing Level: Reducing Loss and Enhancing Value</u>
Biofortification <i>(Breeding Nutrients In)</i>	Integrated Farming Systems <i>(Diversity on a Small Plot)</i>	Post-Harvest and Value Addition <i>(Preserving the Goodness)</i>
<ul style="list-style-type: none"> ▪ The process of increasing the nutrient density of staple crops through conventional plant breeding or agronomic practices. ▪ Convincing farmers to adopt varieties that may look different and consumers to accept them. 	<ul style="list-style-type: none"> ▪ Technologies and practices that increase the variety of foods produced on farm. ▪ Moving beyond monoculture promotion to integrated, diverse farming systems. 	<ul style="list-style-type: none"> ▪ Technologies that preserve nutrients, reduce contamination and add value to nutritious but perishable foods. ▪ Often overlooked, but critical for making nutrient rich foods available year round.

<u>Seed and Genetic Level</u>	<u>Farm and Production Level: Diversification and Agronomy</u>	<u>Post-Harvest and Processing Level: Reducing Loss and Enhancing Value</u>
Examples: Zinc Biofortified Rice & Wheat, Orange Fleshed Sweet Potato (OFSP), Iron Biofortified Pulses, Beans and Millets etc.	Examples: Homestead gardening, Fruit Tree Propagation, Small Livestock Rearing, Poultry and Aquaculture Integration, Water Smart Technology, Conservation Agriculture etc.	Examples: Solar Dryers and Improved Storage, Small Scale Fortification, Safe Food Handling etc.

Biofortification

Fortification refers to the intentional enhancement of one or more micronutrients (such as vitamins and minerals) in a food or condiment to improve its nutritional quality and provide public health benefits with minimal health risks. It is a proven intervention that helps prevent, reduce, and control micronutrient deficiencies. Fortification can be implemented on a large scale to address nutrient deficiencies in the general population (mass fortification) or targeted to specific groups, such as children, pregnant women, or recipients of social protection programs (targeted or market driven fortification).

Biofortification is emerging as a powerful strategy to combat micronutrient deficiencies in Bangladesh, where large segments of the population suffer from malnutrition. By enhancing the nutritional content of staple crops, biofortification aims to address deficiencies in essential vitamins and minerals, such as zinc, iron, and vitamin A, through everyday diets. In Bangladesh, several biofortified crop varieties have been developed to improve public health and nutrition, particularly among vulnerable populations.

a) Zinc Enriched Rice

Zinc (Zn) deficiency is a widespread issue in Bangladesh, leading to stunted growth and increased susceptibility to infections (Bhowmik *et al.*, 2010; Prasad, 2013; Gammoh and Rink, 2017; Calayugan *et al.*, 2021). A proven and effective way to address this problem is by scaling up the production and consumption of zinc biofortified rice. As the staple food in Bangladesh, rice serves as the primary source of protein and minerals in the diet, and zinc enriched varieties can provide up to 70% of the daily zinc requirement when consumed regularly.

Bangladesh Rice Research Institute (BRRI) pioneered the development of zinc biofortified rice through conventional breeding, releasing world's first variety named as BRRI dhan62 in 2013 with support from HarvestPlus (BRRI, 2014). These varieties, including BRRI dhan62, BRRI dhan64, BRRI dhan72, BRRI dhan74, BRRI dhan84, Bangabandhu dhan100 (BRRI dhan100), and BRRI dhan102 (Table 3). In addition to BRRI, several zinc-enriched biofortified rice varieties have also been developed (Table 4). These varieties are specifically bred for their higher zinc, which is essential for immune function, growth, and cognitive development. In addition to their nutritional benefits, these zinc enriched rice varieties also

offer desirable agronomic traits such as high yields, disease resistance and adaptability to different growing conditions, making them attractive or popular to the farmers. These varieties have been widely promoted by the government and non-governmental organizations as part of a broader strategy to combat malnutrition.

In addition to zinc biofortified rice, BRRI has also developed high protein varieties (containing 10.0-10.8% protein), rice enriched with both iron and zinc, as well as varieties with a low glycemic index (Low GI), antioxidant rich, and GABA (gamma aminobutyric acid) enriched rice (Table 5).

Vitamin A-enriched GR2-E BRRI dhan29 (golden rice), containing 12 ppm beta-carotenoids, has also been developed by BRRI and is now awaiting approval for commercial release to farmers. The development and dissemination of these biofortified rice varieties are essential to Bangladesh's efforts to achieve food and nutritional security, and improve the overall health of its population.

Table 3: Features of zinc (Zn) enriched rice varieties developed from BRRI (BRRI, 2023).

Variety Name	Season	Growth Duration (Days)	Zn (ppm)	Yield (t/ha)	Year of Release
BRRI dhan62	T. Aman	100	20	4.5	2013
BRRI dhan64	Boro	152	24	6.5	2014
BRRI dhan72	T. Aman	125	23	6.0	2015
BRRI dhan74	Boro	147	24	7.0	2015
BRRI dhan84	Boro	141	28	6.5	2017
BRRI dhan100	Boro	148	25	7.7	2021
BRRI dhan102	Boro	150	26	8.1	2022

Table 4: Some zinc enriched rice varieties other than BRRI.

Variety Name	Season	Growth Duration (Days)	Zinc (ppm)	Grain Type	Yield (t/ha)
BU Aromatic Hybrid Dhan-1	T. Aman	112-115	22	Aromatic long slender	5.0 - 5.5
BU Aromatic Dhan-2	Aus T. Aman Boro	115 (Aus) 120 (T. Aman) 145 (Boro)	22	Aromatic long slender	4.5 (Aus) 5.0 (T. Aman) 6.0 (Boro)
BINA dhan20 (Both Zn & Fe)	T. Aman	125-130	28 (Fe-31 ppm)	Long slender	4.5 - 5.5

Table 5: Nutritional and Nutraceutical rice varieties developed by BRRI

Items	Rice Varieties	Remarks
High protein enriched	BRRI dhan34, BRRI dhan36, BRRI dhan37, BRRI dhan66, BRRI dhan81, BRRI dhan86, BRRI dhan90, BRRI dhan91, BRRI dhan96, BRRI Hybrid dhan4 and BRRI Hybrid dhan7	10.0-10.8 %
Zinc and Iron enriched	BRRI dhan84	Fe: 10-12 ppm; Zn: 26.5-27.6 ppm
Low glycemic index	BR16, BRRI dhan46, BRRI dhan69, BRRI dhan105	52.4-55.0 (for diabetic patient)
Antioxidant enriched	BR5, BRRI dhan84	Anti-cancer
GABA enriched	BRRI dhan31	Anti depressive (GABA 12.50 mg100g ⁻¹)

b) Zinc Enriched Wheat

Wheat is another staple crop in Bangladesh, and biofortification efforts have been extended to it as well. Bangladesh Agricultural Research Institute (BARI) and Bangladesh Wheat and Maize Research Institute (BWMRI) have developed zinc enriched wheat varieties, BARI Gom 33 and BWMRI Gom 3, with zinc levels ranging from 50 to 60 ppm. These varieties are now being cultivated across the country to address widespread zinc deficiency. In addition to enhancing the nutritional value of bread and other wheat based foods, biofortified wheat supports the agricultural economy by providing farmers with resilient, high yielding crops.

c) Vitamin A Enriched Sweet Potato

To address vitamin A deficiency, which can cause blindness and other serious health issues, Bangladesh introduced biofortified sweet potato varieties rich in beta-carotene, a precursor to vitamin A. These varieties were developed by BARI and Bangladesh Agricultural University (BAU). The orange and yellow-fleshed sweet potatoes, introduced in various regions, have been well received due to their nutritional benefits and adaptability to local growing conditions. This initiative is part of a broader public health effort to increase vitamin A intake, particularly among children and pregnant women.

d) Iron Biofortified Lentil

Iron (Fe) deficiency is a major concern in Bangladesh, contributing to widespread anemia, particularly among women and children. Pulses like lentils, mung beans, and chickpeas, are important sources of protein and micronutrients in the Bangladeshi diet. To address anemia, BARI developed biofortified lentil varieties enriched with iron and zinc (Table 6). These lentils are specifically bred to contain higher levels of iron, making them an essential part of the diet in regions where lentils are a staple food. The biofortified lentils help increase iron intake, reducing the risk of anemia and promoting overall health.

Table 6: Features of some iron (Fe) enriched lentil varieties from BARI (Azad *et al.*, 2020).

Variety Name	Growth Duration (Days)	Fe (ppm)	Zinc (ppm)	Yield (t/ha)
BARI Masur-4	105-110	75.40	52.24	1.9-2.0
BARI Masur-6	105-110	87.42	65.15	2.0-2.2
BARI Masur-7	105-110	77.78	61.57	2.1-2.3
BARI Masur-8	110-115	75.40	56.50	2.2-2.3
BARI Masur-9	85-90	79.60	60.30	1.2-1.5

e) Other Crops

BARI has developed a biofortified potato variety called BARI Alu-101, enriched with iron, zinc, and a high level of anthocyanin (93.7 mg per 100g). Over 15 sweet potato varieties developed by BARI are also biofortified, enriched with beta carotene and anthocyanin, respectively. Additionally, BARI has developed several biofortified tomato varieties: BARI Tomato 18, which has a high lycopene content with the crimson gene inserted; BARI Tomato 19, a processing variety with a viscosity of 3200 cp; and BARI Tomato 20, rich in beta carotene, providing 227 µg of vitamin A per 100g for table tomatoes and 170 µg of vitamin A per 100g for regular consumption. Meanwhile, BAU Germplasm Centre (GPC) (the largest germplasm repository for fruits, medicinal plants, and agroforestry species in Bangladesh, and the second largest globally after Miami, USA) has released antioxidant rich seven coloured flesh potato and four sweet potato varieties.

Leadership Roles in Biofortification

Aspects	Zinc Rice	Orange Fleshed Sweet Potato (OFSP)
Scientists	Continue R&D on stability of traits, palatability and developing new biofortified varieties with high iron content.	Work on disease resistant, high yielding OFSP varieties suitable for different agro-ecologies.
Extension Officers	Promote adoption by demonstrating yield parity and emphasizing the <i>hidden</i> health benefit. Link seed availability to farmers.	Demonstrate cultivation techniques and promote OFSP as a cash and consumption crop. Organize cooking demonstrations.

Home/Homestead Gardening

- **Technology:** Go beyond traditional gardening. Focus on year round production of diverse, nutrient rich vegetables (red amaranth, spinach, pumpkin, beans etc.), fruits (papaya, guava etc.) and spices.
- **Nutrition Outcome:** Directly increases household access to vitamins and minerals. Empowers women who often manage homestead gardens.
- **Leadership Roles**
 - **Scientists:** Develop low cost, high efficiency irrigation and vertical gardening techniques for land poor households.
 - **Extension Officers:** Train farmers on seed preservation, organic pest management and nutrient rich recipe ideas. Champion the “*Garden to Plate*” concept.

Poultry and Aquaculture Integration

- **Technology:** Small scale poultry rearing (e.g., Sonali chickens) and pond based aquaculture (e.g. carp, mola [*micronutrient-rich small fish*]).
- **Nutrition Outcome:** Provides high quality protein, iron and vitamin B12 from poultry/eggs, and vital omega-3 fatty acids and vitamins from small fish.
- **Leadership Roles**
 - **Scientists:** Research disease-resistant poultry breeds and efficient feed formulations using local resources.
 - **Extension Officers:** Promote the integration: garden waste for feed, poultry manure for fishponds/fertilizer. Teach safe handling and preparation of animal-source foods.

Solar Dryers and Improved Storage

- **Technology:** Low cost solar dryers for preserving fruits and vegetables (mango, tomato) and hermetic storage bags (PICS bags) for grains and seeds.
- **Nutrition Outcome:** Reduces post-harvest losses, making nutrients available year round. Prevents aflatoxin contamination, ensuring food safety.
- **Leadership Roles**
 - **Scientists:** Optimize drying technologies for different crops to maximize nutrient retention.
 - **Extension Officers:** Demonstrate the economic and nutritional benefits of reducing losses. Train on proper use of storage technologies.

6. Agricultural Technologies Supporting Nutrition Outcomes

A. Crop Based Technologies

- **Biofortification**
 - High yielding and nutrient dense varieties (Zinc enriched rice and wheat, Vitamin A enriched sweet potato and tomato, Protein-rich pulses and oilseeds, Iron-rich beans, etc.)
 - Contribution to reducing hidden hunger/micronutrient deficiencies, supports diet diversification.
- **Diversification technologies**
 - Homestead gardening kits, seed kits for pulses, vegetables, fruits.
 - Multi-cropping and intercropping models.
- **Climate smart varieties**
 - Drought, salinity and flood tolerant varieties to ensure food security and nutrition in stress prone areas.

Agricultural Technologies for Nutrition

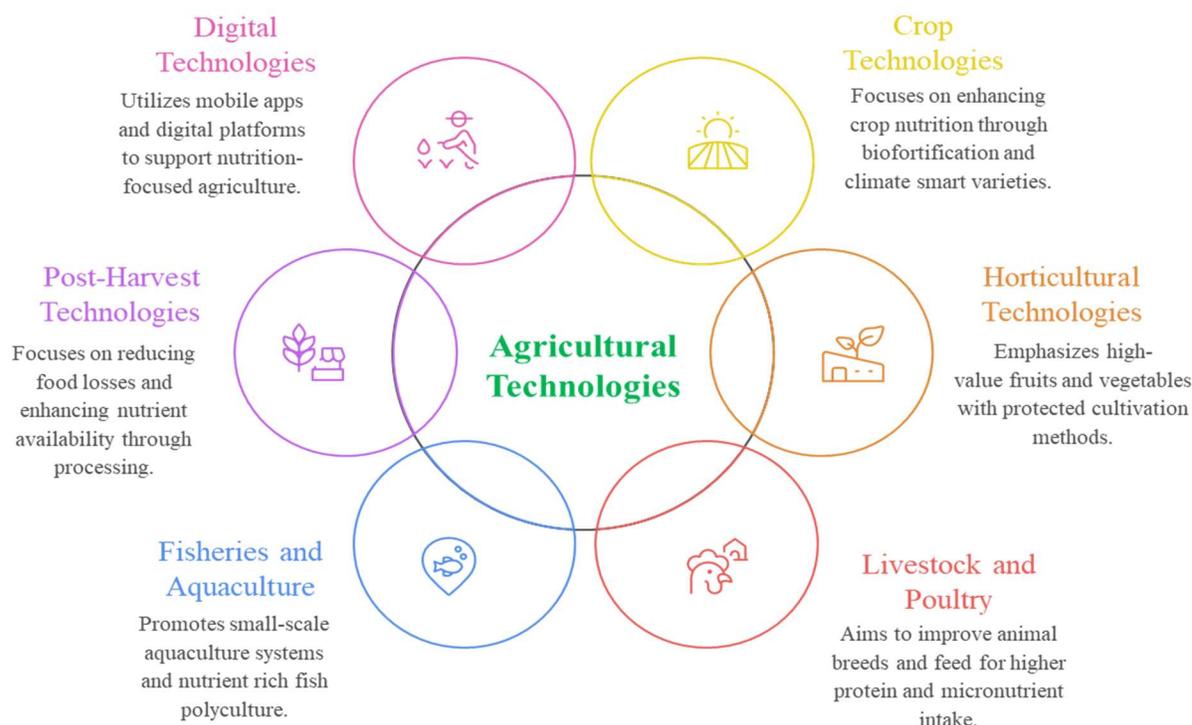


Figure: Agricultural Technologies for Nutrition

B. Horticultural Technologies

- **High value vegetables and fruits:** Improved varieties (tomato, mango, papaya, leafy greens).
- **Protected cultivation:** Plastic house, net house, hydroponics for off season vegetables.
- **Nutrition link:** Enhances year round access to micronutrient rich foods (Vitamin A, C, folate, fiber).

C. Livestock and Poultry Innovations/Technologies

- **Improved breeds and feed technologies:** Higher egg and milk yield for higher protein and micronutrient intake. Feed fortification to enhance nutritional value of animal products.
- **Backyard poultry (Sonali, indigenous breeds):** Affordable protein source.
- **Smallholder dairy technology:** Improved fodder and AI services for better milk production.

D. Fisheries and Aquaculture Technologies

- **Small scale aquaculture systems:** Carp polyculture, tilapia, pangas, mola fish.
- **Nutrient rich small fish (mola, punti, darkina) polyculture technologies:** High in vitamin A, calcium, iron.
- **Integrated rice fish systems:** Enhances dietary diversity and resilience.

E. Post-Harvest and Value Addition Technologies

- Low cost, small scale food processing (solar drying, cold storage, milling).
- Fortified complementary foods and value added products.
- Technologies to reduce aflatoxin and pesticide contamination.
- Increases the availability of nutrient rich foods by reducing post-harvest losses

F. Digital and ICT Based Technologies

- Nutrition sensitive mobile apps and advisory platforms (call centers and e-platforms).
- Decision support tools for extension workers (nutrition dashboards).
- Digital marketing platforms linking farmers with nutrition focused value chains.

7. The Leader's Toolbox: Integrating Technology into Extension

a) Beyond the Technology: The Systems Approach

Technology is a tool. It's impact is determined by the system around it. Leadership is about shaping this system.

- **Policies:** Advocate for procurement of biofortified crops for social safety nets.
- **Markets:** Help farmers create market linkages for nutritious crops.
- **Knowledge:** Integrate nutrition messaging into all extension activities.
- **Gender:** Ensure technologies are accessible to and controlled by women.
- *Don't just promote a technology; promote a system*
 - Example: Don't just give OFSP vines. Promote the OFSP System: vines + training on cultivation + recipes for weaning babies + linkages to markets for surplus.
- *Use Gender Intentional Strategies:* Ensure technologies reduce women labour, not increase it. Promote labour saving technology (e.g. easy to use weeders, grinders) alongside production technology.
- *Facilitate, Don't Dictate:* Use farmer field schools (FFS)/PARTNER schools and demonstration plots to let farmers see and taste the benefits themselves.

b) Key Messaging for Farmers

- Shift from: This crop gives high yield.
- To: This crop will help your children have stronger immunity and better eyesight.
- Growing a variety of crops is your family's best health insurance.
- By growing these vegetables, you save money at the market and know your food is safe.

8. A Call to Action for Leaders

As leaders regarding this field, following challenges are to:

1. *Be a Nutrition Champion:* Mainstream nutrition in research proposals and extension plans.
2. *Foster Collaboration:* Break down silos. Partner with health and nutrition departments.
3. *Listen to the Consumer:* Understand what mothers and children need and want to eat.
4. *Measure What Matters:* Track not just yield, but also dietary diversity scores and adoption rates of nutritious crops.

9. Leadership Role in Scaling Up Nutrition Sensitive Technologies

a) For Scientists

- Prioritize nutrition in research agendas.
- Conduct R&D on nutrient rich varieties.
- Develop evidence-based biofortified and climate smart crops.
- Collaborate across disciplines (nutritionists, public health, economists).

b) For Extension Officers

- Translate research into farmer friendly messages.
- Promote farmer awareness on nutrition benefits of technologies.
- Facilitate women's participation in technology adoption.
- Promote home gardening, poultry and aquaculture for dietary diversity.
- Lead community mobilization for nutrition sensitive practices.
- Bridge science-policy-practice gaps.

c) Leadership competencies

Systems thinking, advocacy, partnership building and communication.

10. Challenges and Gaps

- Overemphasis on rice monoculture.
- Weak integration among agricultural, health and nutritional policies.
- Limited awareness among farmer's about nutrition sensitive choices.
- Gender inequality in access to technologies.

11. Conclusion

- Bangladesh has advanced in food security, but nutrition challenges persist.
- Agricultural technologies must focus on nutrition sensitive approaches.
- Bangladesh has a powerful portfolio of technologies (Biofortification, Integrated Farming, Post-Harvest) ready for scaling.
- Scientists and extension officers are leaders in ensuring agriculture contributes directly to better nutrition outcomes.

12. Suggested Reading/Reference Materials

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- FAO (2017): *Nutrition-sensitive agriculture and food systems in practice. Options for intervention*. (openknowledge.fao.org/server/api/core/bitstreams/7055154c-1ac0-494a-a566-a0b1fbae10f9/content)
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Integration of Nutrition Sensitive Agriculture (NSA) Objectives into Policy and Strategy

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Background

Bangladesh has achieved commendable progress in agricultural production, especially in staple foods such as rice and wheat, ensuring a significant level of food self-sufficiency. However, malnutrition remains a critical challenge, with persistent issues like stunting (28% of children under five), wasting, micronutrient deficiencies, and a rise in overweight and non-communicable diseases linked to dietary imbalances. This paradox underscores the critical need for stronger integration of agriculture and nutrition goals.

Agriculture-Nutrition Linkage in Bangladesh

Agriculture and nutrition are inextricably linked, with millions of Bangladeshis dependent on agriculture for their livelihoods. Despite gains in staple crop production, dietary diversity remains low due to limited access to diverse foods and technological or market constraints among smallholder farmers. Women's empowerment and climate resilience are also pivotal in enhancing nutrition outcomes through agriculture. Nutrition-sensitive approaches improve dietary diversity, incomes, and resilience to climate shocks.

Why Policy Integration of NSA is Important

Integrating NSA into policies and strategies is crucial for systematically addressing the root causes of malnutrition and achieving sustainable food security. This approach moves beyond merely increasing staple crop yields to a holistic framework that deliberately links food production with improved nutritional outcomes. Without policy integration, agricultural interventions often remain focused on production volume and fail to consider nutrition quality, dietary diversity, and vulnerable populations' needs. Effective integration ensures that agricultural policies support year-round availability, access, and consumption of diverse, safe, and nutritious foods, while promoting climate resilience, gender equity, and market access. It also fosters inter-sectoral coordination, aligning agriculture with health, education, and social protection efforts to magnify nutrition impacts at the household and community levels.

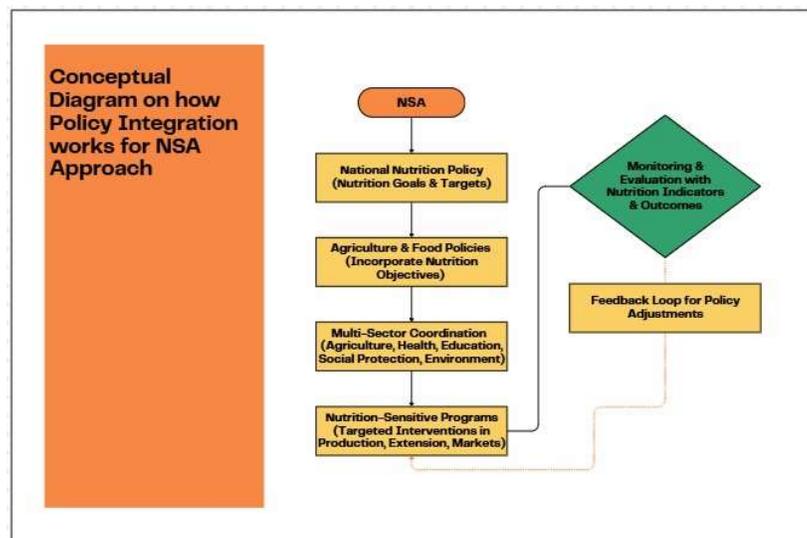
Existing National Policy and Strategic Frameworks Supporting Nutrition Sensitive Agriculture in Bangladesh

Bangladesh already has some key policies and strategies supporting Nutrition Sensitive Agriculture (NSA) focuses on enhancing the nutritional quality, diversity, and sustainability of food systems to improve food security and nutrition outcomes. Major frameworks include:

- **National Nutrition Policy (NNP) 2015** which emphasizes diversified agricultural production and multi-sectoral coordination for nutrition-sensitive **interventions**.

- **Second National Plan of Action for Nutrition (NPAN2) 2016–2025** promoting biofortification, climate-smart horticulture, and integration of nutrition into agricultural extension.
- **National Food and Nutrition Security Policy (NFNSP) 2020** adopts a food systems approach with pillars on dietary diversity, food safety, gender equality, and climate resilience, aligning NSA with agricultural extension.
- **Country Investment Plans (CIP-2 and CIP-3)** prioritize NSA through project appraisal systems, gender equity, climate-smart activities, and nutrition-sensitive value chains.
- **National Agricultural Policy (NAP) 2018 and National Agricultural Extension Policy (NAEP) 2020** promote nutrition integration in sustainable and climate-resilient production and extension programs targeting women and youth.
- **Good Agricultural Practices (GAP) Policy 2020 and School Meal Policy 2019** support safe, nutrient-preserving production and link nutrition-sensitive local food procurement to school feeding.

Here is a conceptual diagram explaining how policy integration for Nutrition-Sensitive Agriculture (NSA) typically works, with a description of each component:



Explanation of Diagram Components:

- **National Nutrition Policy**
- Sets overarching nutrition targets, priorities, and addresses malnutrition challenges. It provides policy mandates to make agriculture nutrition-sensitive.
- **Agriculture and Food Policies:** These policies incorporate nutrition objectives such as promoting nutrient-dense crops, biofortification, and diversified production aligned with nutrition goals.
- **Nutrition-Sensitive Programs:** Actual ground-level interventions taking place in production systems, agricultural extension services, value chains, and markets focusing on improving availability and access to nutritious foods.

- **Monitoring & Evaluation:** Policies include specific nutrition-sensitive indicators (dietary diversity, micronutrient status, food safety) to measure program impacts effectively.
- **Feedback Loop:** Continuous learning from M&E informs policy refinements ensuring NSA integration stays relevant and effective.

What Do We Mean by Advocacy in NSA Policy?

Advocacy goes beyond merely raising awareness about Nutrition-Sensitive Agriculture (NSA) issues or challenges. It is a proactive effort to influence and bring about positive change—whether in attitudes, behaviors, policies, or institutional systems—that supports the integration of nutrition objectives into agricultural development. In the context of NSA, advocacy seeks to ensure that marginalized, vulnerable, and excluded populations have their voices heard and their nutritional rights recognized, while defending their dignity.

Cross-cutting principles of an advocacy initiative

All advocacy initiatives are different. However, there are some cross-cutting principles to bear in mind when we are planning and implementing an advocacy initiative. An advocacy process should be flexible, collaborative, focused, strategic, credible and context-specific. An effective advocacy process actively engages affected communities, empowers civil society and non-governmental organizations, and expands spaces for open, inclusive dialogue between citizens, government agencies, and other key institutions. This collective engagement is essential for fostering shared ownership of the nutrition agenda.

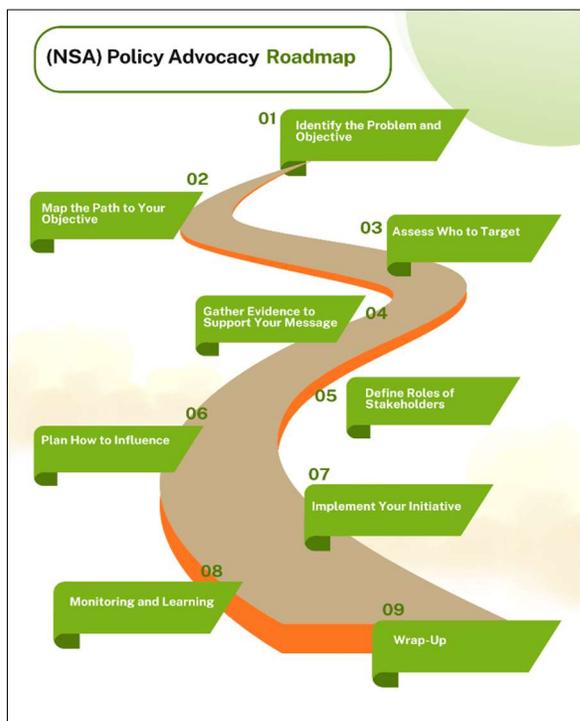
Using the Tools for Nutrition-Sensitive Agriculture (NSA) Policy Advocacy

This Tools provides a roadmap for designing and implementing effective advocacy initiatives. When applied to Nutrition-Sensitive Agriculture, each tool helps civil society, farmer groups, and nutrition champions push for policies that connect agriculture with better food and nutrition outcomes.

Steps of Policy Advocacy for Nutrition Sensitive Agriculture

1. Identify the Problem and Set Your Objective

Clearly understand and define the core nutrition-sensitive agriculture problem from local community perspectives and set a realistic advocacy objective.



Tools:

- Frontline Dashboard: Analyze local perspectives on nutrition challenges and priorities.
- Problem and Objective Tree: Explore root causes and consequences to frame the advocacy objective.
- Policy Analysis: Review existing policies related to nutrition and agriculture to identify gaps and required changes.

Role of Tools: These tools help to ground advocacy in real community needs and policy gaps, ensuring objectives are relevant and actionable.

2. Map the Path to Your Objective

Objective: Develop a strategic path to achieve advocacy goals by identifying opportunities and challenges.

Tools:

- Scenario Imagining: Define a shared vision of success.
- Forcefield Analysis: Identify factors that may support or hinder progress.
- Theory of Change: Outline the logical steps from activities to expected short-, medium-, and long-term outcomes.

Role of Tools: They provide a structured approach to planning advocacy that is realistic, flexible, and adaptable.

3. Assess Who to Target

Objective: Identify and understand key decision-makers, influencers, potential allies, and opponents relevant to NSA policy advocacy.

Tools:

- Power Mapping: Visualize stakeholders' power, influence, and support levels.
- Dealing with Allies and Opponents: Develop strategies tailored to allies and opposition.

Role of Tools: Enable targeted and effective engagement strategies, optimizing advocacy influence.

4. Gather Evidence to Support Your Message

Objective: Collect credible, relevant evidence that illustrates the need and benefits of NSA policy changes.

Tools:

- E-learning Platform - Using Evidence in Your Advocacy: Guidance on gathering and tailoring evidence for different audiences.
- Storytelling Ingredients & Case Studies: Present human stories supported by quantitative data.

Role of Tools: These ensure the advocacy message is compelling and credible, enhancing persuasion of policy actors.

5. Plan How to Influence

Objective: Decide on lobbying and campaigning strategies to effectively communicate and advocate for NSA policy.

Tools:

- Message Mapping: Develop clear and concise core and tailored messages for different audiences.
- Policy Paper Template: Craft well-argued policy briefs to influence decision-makers.
- Workplan Template: Organize and schedule advocacy activities.

Role of Tools: Facilitate clear messaging and coherent actions tailored to the context and targets.

6. Define Roles of Partners

Objective: Clarify each partner's contribution and identify gaps to strengthen advocacy coalition.

Tools:

- Partnership SWOT Analysis: Analyze strengths, weaknesses, opportunities, and threats within the partnership.

Role of Tools: Improve coordination and optimize use of partner capacities for unified advocacy action.

7. Implement Your Initiative

Objective: Execute advocacy actions according to plan, adapt as necessary, and maintain motivation.

Tools:

- Workplan Template: Track responsibilities and timelines during implementation.
- Role of Tools: Keeps advocacy organized, enabling timely follow-ups and coordination.

8. Monitor and Learn

Objective: Track progress, assess effectiveness, and extract lessons for ongoing improvement.

Tools:

- Outcome Mapping: Monitor changes in behavior of stakeholders.
- Potential Indicators: Measure advocacy progress with relevant indicators.
- Reflection Checklist: Reflect on successes, challenges, and lessons learned post-initiative.

Role of Tools: Support evidence-based evaluation and learning, vital for sustained advocacy impact.

9. Wrap Up

Objective: Consolidate gains, document experiences, and plan next steps in advocacy efforts. Ensures advocacy efforts are formally concluded and positioned for future initiatives.

Mind Mapping for Nutrition-Sensitive Policy Advocacy

A participatory group exercise for assessing problems, solutions, and policy linkages
Time -20 min

Purpose of Exercise

- Identify and prioritize specific problems linked to food, agriculture, and nutrition.
- Brainstorm practical, sustainable solutions.

- Map out relevant stakeholders, Government institutions and development partners who can support these solutions.
- Assess levels of support, influence, and access among stakeholders.
- Highlight key **policy advocacy issues** by exposing gaps, overlaps, and missed opportunities.

Step 1: Prepare the Session

- **Participants:** 10–20 persons
- **Materials Needed:** Large paper/flipchart, markers, scissors, colored cards or circles.



- **Facilitator’s Opening:** “Today, we will work together to identify one nutrition-related challenge, think of possible solutions, and then map which institutions or stakeholders can support us. We’ll use circles (chapatis) to represent how close or supportive they are in solving our problem.”

Step 2: Identify and Frame the Problem

- Ask the group:
“*What is one priority problem in our community affecting our food, nutrition, or livelihoods?*”
- Agree on **one problem** and write it clearly on the flipchart.

Step 3: Brainstorm Solutions

- Invite participants to suggest solutions.
- Write solutions in simple terms (e.g., “*involve women*”, “*train farmers on improved practices,*”)
- Group similar ideas together.

Step 4: Map Stakeholders (“Power Mapping”)

- Distribute cut-out circles to participants. Each circle represents a stakeholder (e.g., Government Implementing agency, Development partners, Research organizations, Privet sector, Community groups).
- Place larger circles for stakeholders with higher influence.
- Position circles closer to the problem if they are supportive and accessible; farther away if less accessible.

Step 5: Reflect and Advocate- Discuss questions:

- Who is already supporting us strongly?
- Where are there gaps or overlaps?
- Which stakeholders should we advocate for more action or policy change?

Innovative Approaches and Practices in Nutrition-Sensitive Agriculture.

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Innovation:

Innovation is the process of creating, developing, and implementing a new idea, method, product, or service that creates value. It is crucial to note that innovation is not just an invention (the creation of a new idea). It is the successful application of that idea to achieve a positive impact. An invention only becomes an innovation when it is adopted and delivers value. Innovative approaches and practices in nutrition-sensitive agriculture, structured to provide a comprehensive understanding.

From Fields to Forks:

For decades, the global agricultural paradigm was dominated by a single, powerful goal: **increasing calorie production**. The Green Revolution of the mid-20th century was a monumental success in staving off famine, focusing on high-yielding varieties of staple crops like wheat, rice, and maize. However, this singular focus had an unintended consequence. It created fields of plenty that often-hide valleys of micronutrient deficiency, a phenomenon known as "**hidden hunger**."

Nutrition sensitive agriculture (NSA) emerged as a transformative response to this. It is not merely about producing more food but about producing better food. It explicitly aims to maximize agriculture's contribution to human nutrition and health. It's a shift from thinking about "food security" (having enough to eat) to "**nutrition security**" (having enough of the right things to eat). This narrative explores the innovative approaches and practices that are bringing this philosophy to life.

The Core Philosophy: The "Why" Behind the Shift

Traditional agriculture asks: "How can we grow more tons per hectare?" Nutrition-sensitive agriculture asks: "How can we grow more nutrients per hectare, ensure they reach the most vulnerable, and that people can afford and choose to eat them?" This requires a system thinking approach, recognizing that nutritional outcomes are influenced by:

- What is grown (crop diversity)
- How it is grown (agroecological practices)
- Who controls the resources and knowledge (gender equity)
- How it is processed and stored (nutrient retention)
- How it is accessed and consumed (behavior change)

Innovative Approaches and Practices in Action

The innovation in NSA lies in the integration of techniques from agriculture, nutrition, health, and behavioral science. Here are the key thematic approaches:

1. The Biodiversity and Biofortification Approach:

Agrobiodiversity for Dietary Diversity: Instead of monocultures, farmers are encouraged to practice intercropping and home gardening with a wide variety of crops.

Innovative Practice: "Food Forests" and permaculture designs that mimic natural ecosystems, integrating fruit trees, vegetables, legumes, and herbs on the same plot. This provides a continuous harvest of diverse nutrients, improves soil health, and increases resilience to climate shocks.

Innovative Practice: Reviving Neglected and Underutilized Species (NUS) like millets, sorghum, amaranth, and indigenous leafy greens. These "superfoods" are often naturally drought-resistant and packed with vitamins and minerals missing from mainstream diets.

Innovative Practice: Dissemination of seeds for crops like Vitamin A-rich, orange-fleshed sweet potato (OFSP), iron-rich beans, and zinc-rich wheat and rice. The genius of biofortification is that it "hardwires" nutrition into the staple foods people already eat, requiring no change in consumer behavior.

Biofortification: This is a powerful breeding innovation where staple crops are made more nutritious as they grow.

2. The Technology-Enabled Precision Approach:

Data-Driven Decision Making: Mobile apps and platforms are being used to provide farmers with real-time information.

Innovative Practice: An app that not only provides weather alerts and market prices but also tailored nutritional advice. For example, it can remind a farmer when to harvest her moringa leaves for peak vitamin content or suggest recipes for nutrient-dense crops she is growing.

Post-Harvest Loss Reduction: Up to 30% of food is lost after harvest, along with its nutrients. Simple, low-tech innovations have a huge impact.

Innovative Practice: Solar dryers for preserving fruits and vegetables, hermetically sealed bags (like Purdue Improved Crop Storage - PICS bags) that protect grains from pests without pesticides, and low-cost, clay-based refrigerators for extending the shelf life of perishables.

3. The Gender-Transformative and Equity Approach:

Recognizing that women are primarily responsible for both food production and child nutrition in many regions but often have less access to resources.

Innovative Practice: "Nutri-Garden" projects that explicitly grant women secure land tenure for household gardens, coupled with nutrition education. This empowers them economically and gives them direct control over the diverse foods needed for their families.

Innovative Practice: Designing labor-saving technologies (e.g., easy-to-use weeders, efficient milling tools) that reduce women's time and energy burdens, freeing up time for childcare and food preparation.

4. The Market-Linked and Value-Chain Approach:

Making nutritious food desirable and affordable for consumers and profitable for farmers.

Innovative Practice: Creating value-added products. Farmer are being supported to process their diverse produce e.g., milling orange-fleshed sweet potato into flour for baking, making fruit bars from mangoes, or packaging pre-mixed sacks of diverse beans and grains. This opens new markets and increases income.

Innovative Practice: "Nutrition-Sensitive Value Chains" that create consumer demand. This involves marketing campaigns that highlight the health benefits of local, diverse foods and creating linkages between producers of nutritious foods and institutions like schools (for school feeding programs) and hospitals.

5. The Agroecological and Climate-Resilient Approach:

Healthy soils grow healthy food. NSA promotes practices that work with nature.

Innovative Practice: Widespread use of cover cropping and composting to enhance soil organic matter. Nutrient-dense soil produces crops with higher micronutrient content.

Innovative Practice: Integrated Agri-Aquaculture Systems (e.g., rice-fish farming). Fish provide a source of high-quality protein, fatty acids, and micronutrients for the farming family, while their waste fertilizes the rice crop, creating a symbiotic, nutrient-rich system.

A Case Study in Integration: The OFSP Success Story

The story of the Orange Fleshed Sweet Potato (OFSP) is a textbook example of NSA innovation in action:

1. **Biofortification:** The crop itself is bred to be rich in Vitamin A, a critical nutrient lacking in the diets of millions of children in Africa.
2. **Gender Focus:** Extension programs specifically target women farmers, providing them with vines and training.
3. **Processing & Markets:** Farmers are taught to make and sell value-added products like OFSP bread, juice, and pancakes, creating income.
4. **Behavior Change:** Through community demonstrations and cooking classes, mothers are taught how to prepare OFSP in appealing ways for their children.

5. Resilience: OFSP is drought-tolerant and grows well in poor soils, making it a reliable source of nutrition in challenging environments.

This multi-pronged approach tackles the problem of Vitamin A deficiency from every angle—production, access, affordability, and consumption.

Challenges and The Path Forward

Despite its promise, scaling NSA faces hurdles:

Measurement: It is complex to attribute improvements in nutritional status (e.g., reduced stunting) directly to agricultural interventions.

Policy Silos: Agriculture and health ministry often work in isolation. Successful NSA requires policy coherence and integrated programming.

Seed Systems: Getting quality seeds of diverse, nutrient rich crops into the hands of smallholder farmers remains a logistical challenge.

Consumer Habits: Changing deep-rooted dietary preferences, often towards processed foods, requires sustained behavioral change communication.

Conclusion:

Innovative nutrition-sensitive agriculture moves us beyond the simplistic metric of yield. It represents a holistic, intelligent, and humane redesign of our food systems. By blending cutting-edge science like biofortification with timeless wisdom like crop diversity, and by centering its efforts on women, equity, and sustainability, NSA offers a tangible pathway to a world where fields are not just productive but truly nourishing.

Behavior changes concerts to promote nutritious food, food safety, and nutrition

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Introduction

Behavior change is important to help people make better choices about what they eat and how they handle food. By learning about nutritious foods, safe food practices, and good nutrition, people can improve their health and well-being. Simple actions, like washing hands before eating, choosing more fruits and vegetables, and avoiding unsafe foods, can make a big difference. Changing activities, such as community talks, posters, and cooking demonstrations, can encourage everyone to adopt healthy habits for a better life.

Beyond the Lecture Hall

For decades, the message of good nutrition and food safety has been delivered through sterile channels: clinic pamphlets, school lectures, and intimidating government posters. While well-intentioned, these methods often fail to resonate, feeling more like a scolding than an invitation. To truly change deep-seated behaviors around food what we choose, how we prepare it, how we share it we must speak the language of community, culture, and emotion. This is where the concept of a Behavior Change Concert emerges as a powerful, innovative strategy. It is not merely a concert with a health message tacked on; it is a meticulously designed experiential event where entertainment and education are seamlessly fused to inspire lasting change.

The Stage is Set: Designing the Experience

A behavior change concert is a multi-sensory, community-centric event. Imagine a vibrant open space, a village square, a community field, or a city park transformed into a festival of health.

1. The Pre-Concert Environment (The "Village of Learning"): Before the headlining act takes the stage, the area buzzes with interactive activity. This is crucial for grounding entertainment in practical knowledge.

Interactive Cooking Stations: Local chefs and nutritionists demonstrate quick, delicious, and affordable recipes using locally available nutritious ingredients. Samples are distributed, allowing people to taste the change.

Food Safety "Games": Engaging booths where families can participate in activities. A "Glow Germ" station shows how easily bacteria spread with a UV light, teaching the importance of handwashing. A "Temperature Challenge" game has participants guessing the safe internal temperature for chicken or fish.

Farmer and Market Stalls: Local farmers are invited to sell fresh produce, creating immediate access to the nutritious foods being promoted. This bridges the gap between knowledge and availability.

Art and Storytelling Corners: Children draw pictures of "My Healthy Plate," while elders might share traditional stories about food and harvest, connecting the new message to cultural roots.

The Main Performance: Weaving the Message into the Music

The concert itself is the emotional engine of the event. The performers are not just musicians; they are relatable messengers.

Curated Lyrics and Themes: Popular local artists from Afrobeats stars to folk singers or hip-hop artists collaborate with health experts to write new songs or adapt existing ones. The lyrics incorporate key messages:

Nutritious Food: A catchy chorus might sing, "From orange sweet potato to dark green leaf / these are the foods that bring relief / for strong body and a mind so sharp / this is the rhythm of a healthy heart."

Food Safety: A humorous song about a character who got sick from unwashed fruit can illustrate the "clean, separate, cook, chill" principles in a memorable way.

Nutrition: An empowering anthem might celebrate the strength gained from balanced meals, especially targeting mothers and children.

On-Stage Engagement: The artists pause between songs to talk conversationally. "Hey everyone, did you try the orange-fleshed sweet potato at the stall? That little potato is packed with power for your kids' eyes! Let's hear a cheer for anyone who tried it!" They bring a nutritionist on stage for a quick, fun Q&A. They lead the crowd in a "20-second handwash dance" to the beat of one of their songs.

Visual Spectacle: The stage visuals projections, banners, and dancers are all themed. Dancers might wear costumes adorned with images of fruits and vegetables; projections might show vibrant fields of harvest.

The Psychology of Change: Why It Works

This approach is effective because it aligns with core principles of behavioral science:

1. **Emotional Connection:** Music evokes joy, nostalgia, and community spirit. By associating these positive emotions with healthy behaviors, the message bypasses resistance and creates a positive frame around nutrition.

2. **Social Proof and Modeling:** Seeing respected artists and local peers enthusiastically endorsing these behaviors makes them seem more desirable and achievable. It creates a new social norm.

3. Repeated, Reinforced Messaging: The key points are heard in the music, seen in the visuals, practiced at the booths, and tasted in the samples. This multi-pronged reinforcement aids memory and comprehension far more than a single leaflet.

4. Reducing Barriers: The event directly addresses access (through farmer stalls) and knowledge (through demos) simultaneously. It answers the "how" and the "where" right after inspiring the "why."

5. Community Ownership: Featuring local artists, local languages, and local foods ensures the message is not foreign but is instead a celebration and reinforcement of the best of local culture.

The Encore: Sustaining the Momentum

The concert is not the end, but a catalyst. The strategy includes a plan for the "encore":

Take-Home Kits: Distributed packages containing seeds for easy-to-grow vegetables, a recipe card from the concert, and a small bar of soap with a food safety reminder.

Digital Extension: A hashtag for the event encourages sharing photos of meals inspired by the concert. Follow-up SMS messages with cooking tips or reminders are sent to those who registered.

Community Champions: Identifying and training inspired attendees to become peer educators in their neighborhoods, keeping the conversation alive.

Conclusion:

A behavior change concert for nutrition is not just an event, but a strong way to tell a story. It turns the path to better health from a lonely and difficult effort into a shared celebration. The concert shows that behavior change is more than giving information. It is about touching emotions, building confidence, and creating support. Using the universal language of music and the joy of shared experience, the concert creates a new space. In this space, nutritious food, safe practices, and good health are celebrated, and the whole community is invited to join.

Design and implement of NSA interventions.

Dr. Md. Harunur Rashid

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Target and Availability of Food Items

Products	Target/desirable	Availability
Cereal (g/day/p)	375.0	387.0 ↑
Rice (g/day/p)	350.0	367.0 ↑
Vegetables & fruits (g/day/p)	400.0	203.0 ↓
Potato	60.0	64.8 ↑
Legumes	60.0	16.0 ↓
Meat (g/day/p)	120.0	147.8 ↑
Milk (ml/day/p)	250.0	208.7 ↓
Egg (no./year/p)	104.0	136.0 ↑
Fish (g/day/p)	60.0	62.6 ↑

Source: Livestock Economy at a Glance-2020, DLS

Source: HIES, 2016; BBS, 2022

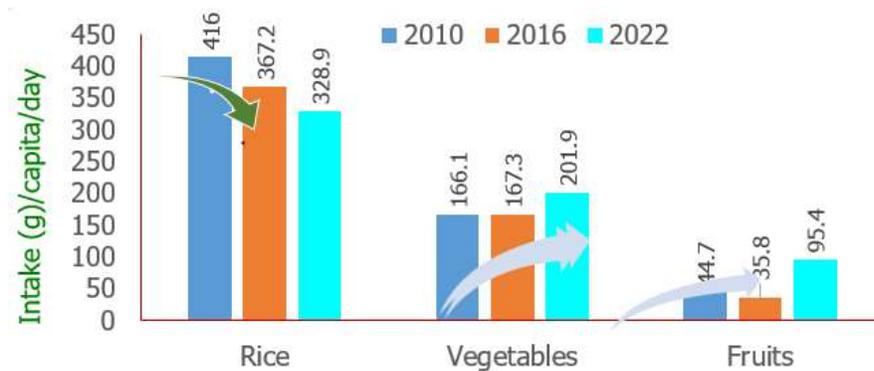
Post-harvest loss of some agro-products

Product	Post-harvest loss (%)	Source of information
Rice	10, 10.25	Bala, 1997; Nath et al., 2016
Potato	25-31, 21.8	Hossain and Miah, 2011; BARI, 2008-16
Fruits & Vegetables	25-50, 25-40	Amiruzzaman, 1990; Miaruddin and Shahjahan, 2008
Banana	20-80, 34.6, 20-26.6	NAS, 1978; Hasan, M. K., 2010, BARI 2008-16
Mango	34, 30-35, 27.2, 37	Bhuiyan, 2011; Mondal et al. 1995; Azad 2001; Hasan, M. K., 2010, BARI, 2016
Jackfruit	38, 43.5, 25.3-26.3	Hossain et al., 2017; Hasan, M. K., 2010, BARI 2008-16
Papaya	40-100, 39.9, 41.4	NAS, 1978; Hasan, M. K., 2010, Hassan et al., 2021
Pineapple	43.0	Hasan, M. K., 2010
Litchi	36.6	BARI, 2008-13

Post-harvest loss of some agro-products

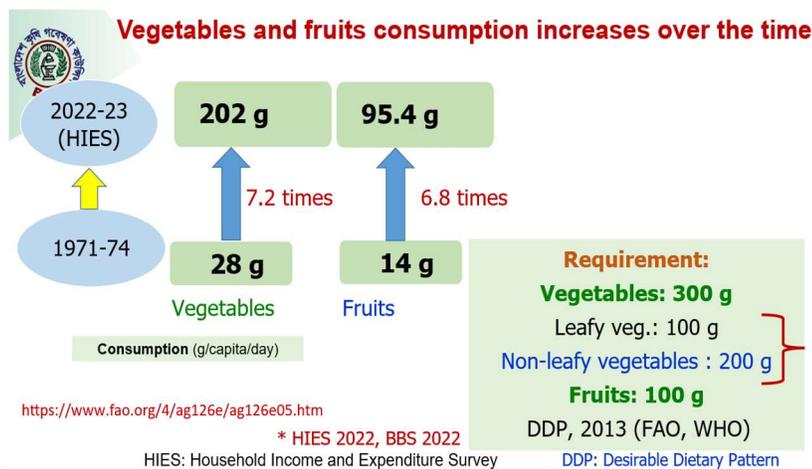
Product	Post-harvest loss (%)	Source of information
Tomato	32.9, 28	Hasan, M. K., 2010, Hassan et al., 2021
Cauliflower	34.4, 22-24.3	Hasan, M. K., 2010; BARI, 2008-16
Brinjal	29.3, 32, 20.4	Hasan, M. K., 2010, BARI, 2008-13; Acedo and Easdown, 2014
Okra	32.3	Hasan, M. K., 2010
Carrot	26.0	BARI, 2010-16
Pumpkin	7.8	BARI, 2021
Cabbage	25	Hassan et al., 2021
Cucumber	24.3	BARI, 2010-16, Hassan et al., 2021
Country bean	29.5	BARI, 2010-16, Hassan et al., 2021
YLB	17	Acedo and Easdown, 2014
Green Chili	17.2	Acedo and Easdown, 2014

Rice, Vegetables and Fruits Consumption Scenario

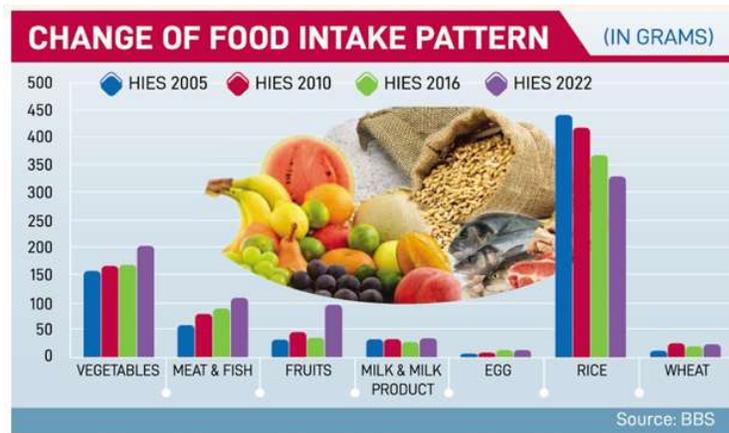


Rice consumption decreases over time, whereas vegetables and fruits consumption increases
HIES, 2016; HIES, 2022; BBS 2022

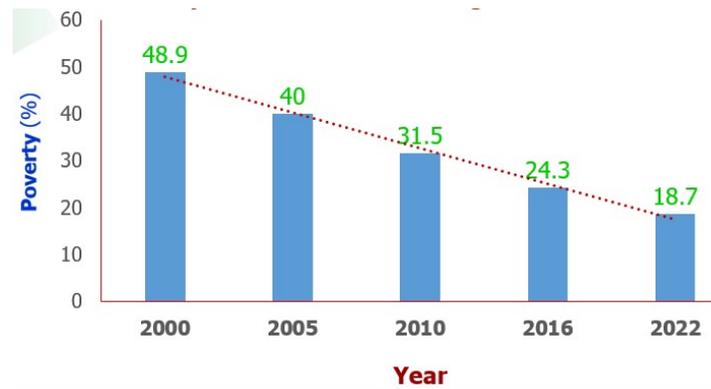
Vegetables and fruits consumption increases over the time



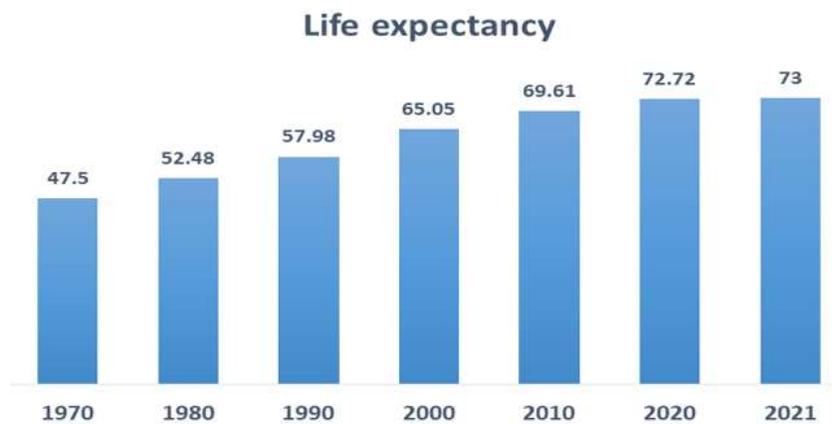
Food Intake Pattern: Overall



Poverty Level decreased in Bangladesh



Life expectancy situation in Bangladesh (years)



Malnutrition

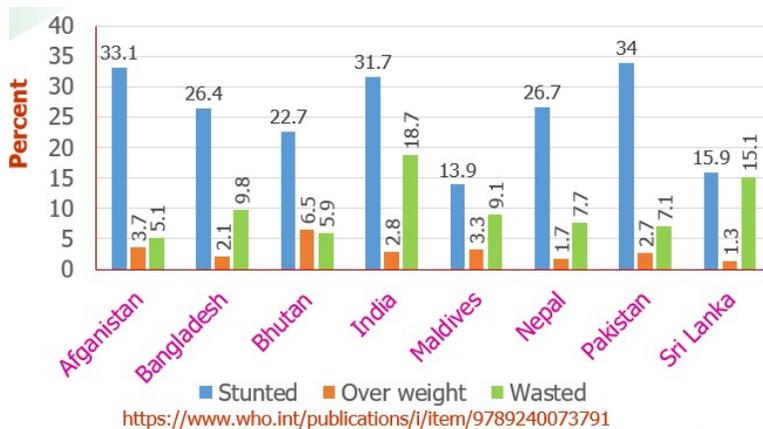
Malnutrition, in all its forms, includes-

- under nutrition (wasting, stunting, underweight),
- inadequate vitamins or minerals,
- overweight, obesity, and
- resulting diet-related non-communicable diseases.



(WHO, Malnutrition, 1 March 2024)

Malnutrition Burden in South Asian Countries



Nutrition Target: Global to local

Global SDG Target:

- 40% reduction in the number of stunted children under 5 years of age
- 50% reduction of anemia in women of reproductive age
- 30% reduction in low birth weight
- No increase in childhood overweight
- Increase @ breastfeeding in the first 6 months up to at least 50%
- Decrease and maintain childhood wasting to less than 5%.

Second National Plan of Action for Nutrition (2016-2025)

Country SDG & NPAN2 Target:

Parameter	Present situation (%)	Target (%)
Low birth weight	23	16 ↓
Minimum acceptable diet	34	40 ↑
Minimum dietary diversity	46	75 ↑
Overweight/obesity among women	39	30 ↓
Childhood obesity	2.8	0.8 ↓
Hand washing behavior	27	50 ↑
Child faeces management	49	70 ↑
Early marriage	59	30 ↓
Early pregnancy	28	10 ↓

Towards Building Advanced Int

Micro-nutrients, Vitamins or minerals lacking and Non-communicable diseases: Bangladesh

Intervention and NSA Intervention

- Among the under-5 children, deficiency of zinc in 31%, 20% iodine & 15% iron. While in the case of vitamins, 22% had vitamin D & 7% of children had moderate vitamin A deficiency.
- Among the non-pregnant and non-lactating women (NPNL), 43% had zinc deficiency, 30% iodine, 29% folate & 14% had iron deficiency. An alarming 70% of NPNL women lacked vitamin D, 20% had vitamin B12 deficiency, 7% had mild vitamin A deficiency.
- Additionally, 21% of children and 29% of non-pregnant and non-lactating women had mild to severe anaemia
- About 13.1 million people in Bangladesh have diabetes

<https://www.icddr.org/quick-links/press-releases?id=139&task=view>

- Intervention comes from the Latin *intervenire*, meaning "to come between, interrupt." Often an intervention is intended to make things better, like the Bangladesh government's intervention to give food and aid to Coastal area after tidal storm.
- The core idea is intentional involvement to create a better outcome.

NSA Intervention

- A nutrition-sensitive agriculture (NSA) intervention is a food-based approach that integrates specific nutritional goals into agricultural development programs and food systems.
- Unlike conventional agriculture, which may focus solely on increasing staple crop production, NSA interventions prioritize improving the nutritional quality of food, dietary diversity, and food safety to combat malnutrition.

Why NSA is Important

- Agricultural productivity alone does not guarantee better nutrition.
- Simply growing more staple grains may increase overall food supply but does not necessarily reduce malnutrition or micronutrient deficiencies.
- NSA addresses this gap by ensuring that agricultural efforts are explicitly designed with nutritional outcomes in mind, creating a more sustainable and holistic approach to improving country health

Key Goals of NSA Intervention

- **Improve Nutrition:** To reduce undernutrition, overnutrition, and micronutrient deficiencies by promoting healthier diets.
- **Enhance Food Systems:** To create agricultural and food systems that consistently produce a sufficient quantity and quality of nutritious, safe, and affordable foods.
- **Empower Communities:** To improve the livelihoods of vulnerable populations and maximize the positive impact of agriculture on health outcomes.

Examples of Interventions

- **Crop Diversification:** Encouraging the cultivation of a wider variety of crops beyond staple grains to include nutrient-rich fruits, vegetables, and legumes.
- **Biofortification:** Increasing the nutrient content of crops through conventional breeding or genetic modification to enhance their nutritional value.
- **Value Chain Integration:** Incorporating nutrition goals into the entire food supply chain, from farm to consumer, including processing, storage, and marketing.

Examples of Interventions

- **Farmer Education:** Training farmers on modern agricultural practices, the nutritional value of different foods, and how to incorporate dietary diversity into their farming.
- **Supporting Processing and Market Access:** Linking farmers to markets and supporting local enterprises to process and market nutrient-dense foods.
- **Promoting Dietary Diversity at the Household Level:** Encouraging families to consume a wider range of foods through improved access and awareness.

Key components of NSA interventions

Diversification of food production: These interventions promote the farming of a variety of nutrient-dense crops, such as fruits, vegetables, pulses, and legumes, alongside staple crops. This approach improves the availability of diverse and nutritious foods at the household level and within local markets.

Promotion of biofortified crops: NSA interventions can distribute and encourage the use of crops bred to be richer in specific micronutrients. A common example is the promotion of vitamin A-rich sweet potatoes.

Improved post-harvest management: Interventions focus on better food storage, processing, and preservation techniques to reduce nutrient loss and post-harvest waste. Examples include teaching methods for drying fruits and vegetables or promoting food processing techniques that enhance nutrient bioavailability.

Key components of NSA interventions

Nutrition education and social behavior change: Many programs incorporate educational campaigns to increase awareness of healthy eating, dietary diversity, and food hygiene. These efforts encourage households to translate increased food access into improved dietary practices, especially for vulnerable groups like women and young children.

Empowerment of women: Interventions often include a strong gender component, recognizing the vital role women play in household food security and nutrition. Empowering women with greater control over resources and income tends to result in improved health and nutrition for their families.

Key components of NSA interventions

Integrated farming systems: This involves combining crops and livestock in ways that create a positive synergy. For example, using crop residues for animal feed and livestock manure for fertilizer can improve both crop productivity and access to animal-source foods, which are rich in high-quality protein and micronutrients.

Enhanced market access: Interventions may support the entire value chain of nutritious foods, from production to marketing. This ensures that vulnerable households can both produce and access a greater variety of healthy foods.

How NSA interventions create change

NSA interventions operate through multiple pathways to improve nutrition outcomes:

- **Food production pathway:** Directly increases the quantity, quality, and diversity of foods produced by households for their own consumption.
- **Income pathway:** Increases household income through the sale of agricultural products, allowing families to purchase a wider variety of nutritious foods and access other essential services like health care.

How NSA interventions create change

Women's empowerment pathway: Elevates women's status and decision-making power, which evidence shows leads to better spending on children's health and nutrition.

Food environment pathway: Improves food safety, storage, and processing, which helps retain nutritional value and expands the year-round availability of nutritious foods.

Design and Implement of NSA intervention

- Step 1: assess the specific nutritional needs and context of the target community,
- Step 2: identify the underlying causes of malnutrition such as lack of dietary diversity, poor access to food, or inadequate care practices.
- Step 3: design a multi-pathway approach that integrates agricultural production with nutrition education, women's empowerment, and improved water/sanitation, ensuring year-round access to diverse, nutrient-dense foods.
- Step 4: implement, monitor, and evaluate the intervention, continuously adapting it to ensure positive impacts on both agricultural and nutritional outcomes.

1. Situation Appraisal & Goal Setting

- **Analyze the context:** Understand the community's dietary patterns, existing agricultural practices, food systems, and underlying causes of malnutrition, including environmental and social factors.
- **Define objectives:** Set clear, measurable goals for the intervention, focusing on reducing malnutrition and improving livelihoods by increasing access to diverse, safe, and nutritious foods.

2. Intervention Design

- **Target nutritionally vulnerable groups:** Prioritize interventions that address the specific needs of vulnerable populations, such as women and young children.
- **Develop multi-pathway approaches:** Instead of focusing on a single pathway, design interventions that tackle multiple causes of malnutrition simultaneously.
- **Incorporate nutrition education:** Integrate nutrition information into agricultural activities, such as farmer field schools, to improve care practices and dietary diversity.
- **Promote diverse and nutritious food production:** Encourage the cultivation and consumption of a wide range of micronutrient-rich crops and small-scale livestock.

3. Intervention Design

- **Enhance access to food:** Improve food access through better income generation from agricultural sales, stronger market linkages, and post-harvest management.
- **Empower women:** Invest in women's empowerment and capacity building, as they play a crucial role in food production, household nutrition, and child care.
- **Improve health and water management:** Include components related to water, sanitation, and hygiene (WASH) to reduce disease and improve overall health outcomes.

3. Implementation Strategy

- **Foster cross-sectoral collaboration:** Work across different sectors, including health, water, and education, to create an enabling environment for good nutrition.
- **Integrate into value chains:** Embed nutrition considerations into agricultural value chains, from production and processing to marketing and storage.
- **Create enabling environments:** Design interventions that provide knowledge, incentives, and a supportive environment for adopting positive nutrition behaviors.

4. Monitoring and Evaluation

- **Establish a robust monitoring system:** Design a system to track progress and measure impact, including metrics related to agricultural productivity and nutritional outcomes.
- **Continuously adapt and refine:** Regularly review the intervention's performance and make necessary adjustments based on local context, priorities, and emerging challenges.

Bio-and Industrial Fortification in Bangladesh: Policy, Implementations, Monitoring and Evaluation Frameworks

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Introduction

This lecture note summarizes the key points presented by Dr. Ashek Mahfuz during the BARC workshop on 14 October 2025. It outlines the policy frameworks, implementation strategies, and monitoring mechanisms for bio- and industrial fortification in Bangladesh. The Global Alliance for Improved Nutrition (GAIN), a Swiss-based foundation, plays a pivotal role in transforming food systems to improve nutrition outcomes, especially for vulnerable populations.

Malnutrition and Nutritional Challenges

Bangladesh faces a triple burden of malnutrition: undernutrition, micronutrient deficiencies, and rising overweight/obesity. Key statistics include:

- 48.2% of people cannot afford a healthy diet
- 31.6% face acute food insecurity
- 1 in 4 children is stunted; 9.3% are wasted
- High prevalence of anemia among women
- Only 1 in 5 adults consume all five recommended food groups

Large-Scale Food Fortification (LSFF)

LSFF involves the addition of essential vitamins and minerals to staple foods such as edible oil, rice, flour, salt, and milk. It is a cost-effective strategy requiring minimal behavior change. Bangladesh has implemented mandatory fortification policies for edible oil and salt, with voluntary standards for wheat flour and fortified rice.

Legal and Policy Framework

Key legal instruments include:

- The Fortification of Edible Oil with Vitamin A Act (2013) and Rules (2015)
- Food Safety Act (2013), empowering BFSA to regulate fortification
- Draft Food Fortification Regulation (2023) by BFSA
- National Food and Nutrition Security Policy Plan of Action (2021–2030)
- BSTI standards for fortified products

Recommendations for LSFF

- Expand mandatory fortification to wheat flour and rice
- Finalize and implement the 2023 draft regulation

- Strengthen monitoring and enforcement by BFSA and BSTI
- Support industry compliance through incentives and training
- Integrate fortified foods into public procurement and safety nets

Biofortification

Biofortification enhances the nutrient content of crops through conventional breeding. Examples include zinc-enriched rice (BRRI) and iron-enriched lentils (BARI). It is recognized in the National

Strategic Actions for Scaling Biofortification

- Promote public-private partnerships for production and distribution
- Integrate biofortified foods into school meals and social programs
- Enforce regulations and labeling standards
- Conduct awareness campaigns for farmers and consumers

Challenges and Barriers

Despite existing legislation, several challenges hinder the effectiveness of fortification programs:

- Weak regulatory enforcement and limited testing infrastructure
- High cost and inconsistent quality of premix inputs
- Fragmented market structures and limited industry capacity
- Low public awareness and traceability issues in bulk oil
- Lack of coordination among government agencies and stakeholders

Communication and Advocacy Skills for Nutrition-Sensitive Agriculture.

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Training Approach

This session will be delivered in participatory method with through a mix of theory, practical activities, group discussion and case studies. Session materials will be provided to the participants during the session. (If required)

Materials: Sticky Notes, Flipchart, Markers

Session Information

Nutrition-sensitive agriculture is increasingly recognized as a vital approach to improving food security and public health, particularly in rural areas where undernutrition and diet-related health challenges are widespread. This session highlights how BARC officials and individuals can integrate and promote agricultural practices that improve nutritional outcomes through better communication within their departments and with wider audiences, as well as how they can effectively advocate for nutrition-sensitive agriculture.

Session Objectives

By the end of this session, participants will be able to:

1. **Identify** key stakeholders and opportunities for collaboration across government, community, private sector, and NGOs for advocacy and promoting Nutrition-Sensitive Agriculture
2. **Explain** the role of communication and advocacy in advancing nutrition-sensitive agriculture (NSA) in Bangladesh.
3. **Observe and learn** practical communication techniques to engage and influence stakeholders effectively.
4. **Plan** a basic advocacy approach to integrate NSA into their departmental and community-level work. (Action Task)

What are the Gaps in Communication and Advocacy Skills for Nutrition-Sensitive Agriculture (NSA) among officials?

There are various gaps that hinder effective communication and advocacy for Nutrition-Sensitive Agriculture among officials. These challenges may exist at multiple levels — within policies, systems, institutional operations, and individual capacities. The following section highlights some of the key issues and barriers that officials may be encountering in promoting and implementing NSA initiatives.

Conceptual Understanding Gap

- Many officials may have a **strong technical background in agriculture**, but limited understanding of **nutrition linkages** — e.g., how agricultural diversification, women’s empowerment, and food systems influence dietary outcomes.

- NSA is often viewed as an *add-on activity*, not as a *core part* of agricultural planning or research priorities.
- There is limited familiarity with **national nutrition frameworks** such as the NPAN2 (2016–2025) or the Food and Nutrition Security Policy (FNSP).

Example:

A crop scientist may focus on yield improvement without considering how crop choices affect household dietary diversity.

Communication Skills Gap

- Communication is often **top-down and technical**, rather than participatory or audience-specific.
- Limited capacity to **translate scientific information into simple, actionable messages** for farmers, community leaders, or policymakers.
- Weak use of **data visualization, storytelling, and digital communication tools** for conveying messages effectively.
- Internal communication across departments (e.g., between DAE and BIRTAN, or between agriculture and health sectors) is often **fragmented**.

Example:

Extension officers might share information on crop diversification but fail to communicate the nutrition benefits in simple terms that farmers understand.

Advocacy Skills Gap

- Many officials are not trained in **policy advocacy** — they focus on program delivery, not influencing systems or policy change.
- Limited understanding of **how to frame messages** that resonate with decision-makers or align with national priorities (e.g. SDG, NPAN or 8th Five Year Plan etc).
- Lack of confidence in **building inter-ministerial/department coalitions** or partnerships with NGOs, private sector, and academia.
- Inadequate documentation and dissemination of **success stories or best practices** to influence others.

Example:

DAE officials may have piloted nutrition gardens successfully but never documented the case or presented it to policymakers to scale it up or wider media for mass people replication.

Institutional and Coordination Gaps

- **Siloed approach:** Agriculture, nutrition, and health institutions often work independently rather than through an integrated “food systems” lens. (e.g. Bangladesh’s UNFSS National Pathway Document for Food Systems Transformation, N4G Commitment for nutrition)
- Is there any structured platform or mechanism for **regular communication or joint advocacy** between BARC, DAE, BIRTAN, and health/nutrition agencies? (e.g. SUN Movement MSP)
- Limited allocation of **budget and staff time** for advocacy activities or might not have any focus for advocacy

- Weak **monitoring indicators** on NSA-related communication and advocacy outcomes.

Example:

BIRTAN may run nutrition campaigns, while DAE conducts crop training — but there’s little coordination or shared messaging strategy.

Digital and Media Engagement Gap

- Most government officials still rely on traditional communication (meetings, reports, circulars), with **minimal use of digital platforms or social media** for advocacy.
- Lack of training in **using media or data-driven storytelling** to engage public audiences or influence policy debates.
- Underutilization of platforms like **DAE’s e-extension services or mobile apps** to communicate nutrition messages to farmers.

Example:

Few officials may use visual media (videos, infographics) to advocate for nutrition-sensitive practices despite having field data and success stories.

Communications

Introduction

Everyone uses interpersonal communication skills. We use them at home with our families, in the workplace with our bosses and coworkers, on our computers when we answer email, and on the telephone when we order pizza.

This short guide is intended to help participants improve their interpersonal communication skills and develop new abilities to become a more effective communicator.

Interpersonal communication applies to all of our relationships—both personal and professional. Others respect or reject us based on these skills. Every interaction sends a message—explicitly through words, or implicitly through facial expressions, body language, and physical space.

Definition of Communication

Communication can be defined in many ways. In simple terms, communication is:

- Information transmitted
- A verbal or nonverbal message
- A process by which information is exchanged between individuals through a common system of symbols, signs, or behaviour

Key Elements in Communication

There are three key elements in the communication process:

You	You bring professional experience, education, and training to every communication process. Your credibility is built through your experience with employees, board members, the public, media, and coworkers.
Your audience	To be an effective communicator, you must know your audience.

	<p>For example, if your audience is a highway crew, you can talk effectively about graders, cracks, and pavement deflection. But if your audience is the public or board members, you should switch to clear, plain English. The principles of communication remain the same, whether your audience is one person or one thousand.</p>
Your message	<p>The message is equally important. Ask yourself:</p> <ul style="list-style-type: none"> • What do you want to say? • What is the best way to communicate it? <p>A useful principle borrowed from journalism is to include the who, what, when, where, why, and how in your message. If your audience doesn't quickly understand these elements, they may lose interest and tune out.</p> <p>Every effective message should contain most of these elements:</p> <ul style="list-style-type: none"> • Who • What • When • Where • Why • How

Communication Tools

There are four basic communication tools:

- Listening
- Speaking
- Reading
- Writing

All four tools can be learned and improved. To enhance your communication skills:

1. You must want to improve.
2. You must understand their importance.
3. You must learn new techniques.
4. You must practice regularly.

From an early age, we learn to speak, read, and write—skills taught by parents and teachers. However, listening, which we use the most, is rarely taught formally. Yet, it's perhaps the most crucial communication skill to develop.

How We Get and Use Information

How much information we retain during communication depends on how we learn best.

Ask yourself:

- Do I remember more of what I read or hear?
- Do I learn better when someone shows me something?

Typical Information Retention Rates:

- 10% of what we read
- 20% of what we hear
- 30% of what we see
- 50% of what we see and hear
- 70% of what we see and discuss
- 90% of what we do

A Simple Learning Principle:

Tell me and I will probably forget,
Show me and I might remember,
Involve me and I will learn.

The Seven Secrets of Attractive Body Language for effective communication

Face: Have an animated face and making smiling part of your regular repertoire. Make sure you flash your teeth.

Gestures: Be expressive but don't overdo it. Keep your fingers closed when you gesture, your hands below chin level, and avoid arm or feet crossing.

Head Movement: Use Triple Nods when talking and Head Tilt when listening. Keep your chin up.

Eye Contact: Give the amount of eye contact that makes everyone feel comfortable. Unless looking at others is a cultural no-no, lookers gain more credibility than nonlookers.

Posture: Lean forward when listening, stand straight when speaking.

Territory: Stand as close as you feel comfortable. If the other person moves back, don't step forward again.

Mirror: Subtly mirror the body language of others.

Source: Pease, A & B. (2004). The definitive book of body language. New York: Random House.

Advocacy

Public Policy Advocacy: Public policy advocacy is the effort to influence public policy through various forms of persuasive communication. Public policy includes statements, policies, or prevailing practices imposed by those in authority to guide or control institutional, community, and sometimes individual behaviour.

Nutrition Sensitive Agriculture (NSA): is an approach that seeks to ensure the production of a variety of nutritious, affordable, culturally appropriate and safe foods in adequate quantity and quality to meet the dietary requirements of populations in a sustainable manner.

What Does Advocacy Mean for Government Officials?

For government officials, advocacy means actively promoting and integrating nutrition objectives into existing agricultural policies, programs, and services — *within your department, across ministries, and in collaboration with others.*

Unlike NGO or civil society advocacy, government advocacy is internal and system-focused, aiming to influence policies, planning, budgeting, and coordination mechanisms.

Advocacy for Nutrition-Sensitive Agriculture (NSA): What It Means for Government Officials

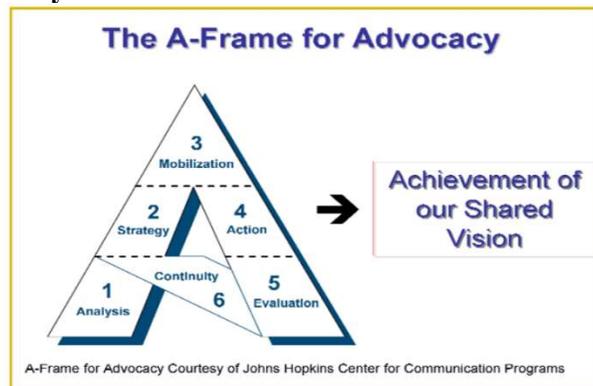
Nutrition-Sensitive Agriculture (NSA) is an approach that maximizes the contribution of agriculture to improved nutrition outcomes. It focuses not only on increasing production and income but also on ensuring that agriculture supports dietary diversity, food safety, women's empowerment, and better access to nutritious food for all.

Key Aspects of Advocacy for Government Officials:

- **Policy Influence:** Officials may advocate for new laws, regulatory changes, or the reform of institutional arrangements within government departments.
- **Strategic Communication:** They use arguments, data, and passionate networks to persuade stakeholders and the public to support their policy recommendations.
- **Broader Context:** Advocacy can extend beyond influencing policies, encompassing a broader effort to create positive change in areas like human rights, social justice, and environmental sustainability.
- **Internal and External:** While some officials advocate for their agency's needs, others advocate on behalf of external organizations or causes, such as a human rights group or a business.
- **Diverse Methods:** Advocacy involves a range of activities including public speeches, policy proposals, media engagement, and collaborating with other officials or organizations.

In essence, advocacy by a government official is a proactive and strategic effort to champion a particular cause or policy outcome through the influence of public debate and government processes.

The A-frame for Advocacy:



The 6 steps of the A-frame for advocacy are:

<p>1. Analysis Understand the issue and context before acting.</p> <ul style="list-style-type: none"> • What is the policy problem? • Who are the key decision-makers and stakeholders? • What are their priorities and motivations? • What are the most effective channels to reach them? 	<p>2. Strategy Plan how to achieve your advocacy goals.</p> <ul style="list-style-type: none"> • What are your objectives? • How will you build coalitions or partnerships? • What activities, events, or materials will you develop? • What are credible sources to support your argument? • What are the potential barriers or risks?
<p>3. Mobilization Organize and prepare for action.</p> <ul style="list-style-type: none"> • Delegate tasks and define roles. • Develop messages tailored to your audience. • Schedule activities and set timelines. • Train advocates or spokespersons. • Engage the media to amplify your message. 	<p>4. Action Implement your advocacy plan.</p> <ul style="list-style-type: none"> • Carry out planned activities and events. • Monitor activities in real time. • Address controversies or crises promptly. • Acknowledge and credit collaborators and supporters.
<p>5. Evaluation Measure what worked and what can improve.</p> <ul style="list-style-type: none"> • Establish indicators to track progress. • Assess processes, outcomes, and impact. • Disseminate results and lessons learned. • Share credit generously with partners. 	<p>6. Continuity Ensure sustainability and long-term impact.</p> <ul style="list-style-type: none"> • Monitor implementation of policy changes. • Reinforce and institutionalize successful changes. • Mobilize resources for ongoing advocacy. • Strengthen coalitions and networks. • Persevere to maintain momentum.

Examples of Advocacy in Action

Level	Example of Advocacy	Expected Impact
Within the department	Presenting data on the nutritional benefits of diversified cropping systems (e.g., pulses, vegetables, fish culture) in staff meetings.	Helps prioritize NSA activities in work plans.
Across departments	Collaborating with the different bodies, department like Ministry of Food, Health or Women Affairs, livestock etc to integrate nutrition messages in agricultural extension materials.	Promotes a multi-sectoral approach to nutrition.
At local/community level	Engaging local government or farmer, women and youth/ students' groups to promote home gardening and dietary diversity.	Strengthens community-level nutrition outcomes.

Level	Example of Advocacy	Expected Impact
Through public platforms	Highlighting NSA success stories during field visits or district-level meetings.	Builds awareness and political will.

Stakeholder Engagement

Identify key stakeholders:

- **Government:** MoA, DAE, BARC, MoHFW, MoWCA, LGD etc.
- **Development partners:** FAO, GAIN, IFAD, DANIDA, different embassies etc.
- **Private sector:** Seed companies, agri-entrepreneurs, SMEs
- **Community:** Farmer groups, women’s associations, youth networks

Engage them through meetings, joint programs, and information sharing.

Communication Tools

Use the right communication channels for different audiences:

- Social media and others digital platform
- Policy briefs or internal memos for decision-makers
- Field demonstrations or community meetings for farmers
- Media campaigns or social media for public awareness

Advocacy and Communication Skills for Officials

To advocate effectively, officials need strong **communication skills**, including:

- **Active listening:** Understand others’ perspectives before proposing solutions.
- **Message clarity:** Keep your messages short, simple, and evidence-based.
- **Confidence:** Present ideas with data and real-world success stories.
- **Collaboration:** Build alliances across departments and sectors.

Example of a clear advocacy message:

“To improve national nutrition status, we must make our agriculture more nutrition-sensitive by promoting diversified food production, supporting women farmers, and integrating nutrition education into extension services.”

Why Your Advocacy Matters for officials like you?

- As government officials, your voice carries **legitimacy and influence**.
- Your technical expertise helps connect **science, policy, and practice**.
- Your coordination ensures that **nutrition-sensitive agriculture** becomes part of national and local plans — not just pilot projects.

“When government officials advocate for nutrition, it becomes a system change, not a short-term project.”

An action you can take after this training:

- What one advocacy action can you take in your current role to make agriculture more nutrition-sensitive?
- Who can you collaborate with in your department or district to make it happen?

Reference: Learn more about communications and advocacy

- **Effective Communication Skills:**
https://kutresources.ku.edu/storage/1621440686_Communication_Skills.287100715.pdf
- **A" Frame for Advocacy:** <http://etoolkits.dghs.gov.bd/sites/default/files/JHUCCP-%20A%20Frame%20%28English%29.pdf>

Resource Mobilization and Strategic Partnership Building

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1. Background

Nutrition-Sensitive Agriculture (NSA) seeks to enhance the nutritional impact of agricultural systems by addressing the underlying causes of malnutrition through improved food diversity, accessibility, and utilization. In Bangladesh, the agricultural sector remains the backbone of rural livelihoods, contributing approximately 11% of national GDP and employing around 30–35% of the workforce (World Bank, 2024). Despite notable progress in food production and poverty reduction, 28% of children under five remain stunted and about 10% are wasted (UNICEF, 2024; Global Nutrition Report, 2023). The persistence of undernutrition underscores the need to shift agricultural investment from a production-centric to a nutrition-sensitive paradigm. This transformation requires robust resource mobilization and strategic partnerships (RMSP) that integrate financial, institutional, and technical capacities across government, private, and community stakeholders (FAO, 2017; Ruel et al., 2018). Bangladesh’s national development plans, National Pathway Document for the UNFSS and the National Food and Nutrition Security Policy (NFNSP)—recognize the interlinkages between agriculture, food systems, and nutrition outcomes. Yet, effective financing and coordination mechanisms remain underdeveloped, calling for innovative approaches in resource mobilization and partnership building.

2. Importance of Resource Mobilization for NSA

Adequate and sustained financial resources are vital for scaling up NSA interventions, such as homestead food production, biofortification, climate-smart diversification, and women’s empowerment in agriculture. However, public expenditure on agriculture and nutrition remains modest—agriculture receives around 6% of total budget allocations, and nutrition-specific interventions are scattered across ministries (Ministry of Finance, Bangladesh, 2024; Development Initiatives, 2023).

Segment-wise Actions for Resource Mobilization:

Segment	Strategic Actions
Public Sector	Integrate nutrition-sensitive markers into the Medium-Term Budget Framework (MTBF) and Annual Development Program (ADP); strengthen nutrition expenditure tracking across ministries.
Development Partners	Align donor assistance with national investment frameworks (e.g., NFNSP, Country Investment Plan III) to reduce duplication and increase coherence.
Private Sector	Promote blended finance, results-based financing, and nutrition bonds for investments in fortified foods, cold chains, and value-added nutrient-rich products.
Community and Local	Introduce local-level matching grants and microfinance schemes

Segment	Strategic Actions
Governments	to support smallholder diversification and women’s income-generating groups.
Research and Academia	Mobilize research grants focusing on cost-effectiveness analysis and return on investment of nutrition-sensitive practices to attract policy support.

3. Strategic Partnerships for Nutrition Outcomes

Strategic partnerships foster synergies among agriculture, health, education, and social protection systems to maximize nutrition outcomes. In Bangladesh, the Bangladesh National Nutrition Council (BNNC) and the Food Planning and Monitoring Unit (FPMU) are crucial coordination bodies linking policy with action. Public-private partnerships (PPPs) can play a transformative role in developing nutrition value chains, supporting fortification industries, and improving market access for nutrient-dense foods. Civil society organizations (CSOs) and community-based platforms can ensure inclusivity and behavioral change through nutrition education and women’s empowerment programs (Fanzo et al., 2020; Hawkes & Ruel, 2020).

Segment-wise Actions for Strategic Partnerships:

Segment	Key Actions and Focus
Government Ministries	Institutionalize inter-ministerial coordination between Agriculture, Health, Education, and Women’s Affairs; harmonize policies and monitoring systems.
Private Sector and Agribusiness	Develop PPP models for producing, processing, and distributing fortified and nutrient-dense foods; encourage contract farming and social enterprise investment.
Civil Society and NGOs	Partner with government programs to extend community-based nutrition interventions and awareness campaigns.
Research and Academia	Conduct operational research on policy innovations and best practices in NSA for evidence-based decision-making.
International Development Agencies	Support multi-donor trust funds, technical assistance, and capacity-building for government systems managing NSA programs.

4. Institutional Mechanisms and Governance

Institutionalizing RMSP within governance structures enhances coordination, accountability, and evidence-based decision-making. Bangladesh has made progress through mechanisms like the BNNC and Sector-Wide Approach (SWAp) in health, yet agricultural-nutrition linkages remain weak at implementation levels.

- Policy Integration: Embed nutrition targets within agriculture and food security policies.
- Coordination Platforms: Strengthen the BNNC’s coordination with the Ministry of Agriculture and local governments.
- Data and Evidence Systems: Develop joint monitoring frameworks with shared indicators between nutrition and agriculture sectors.
- Capacity Development: Train extension officers, planners, and finance officials on nutrition-sensitive budgeting and reporting.
- Accountability Mechanisms: Introduce regular multi-sectoral expenditure reviews and citizen monitoring tools.

5. Challenges and Way Forward

Key Challenges:

- Fragmented funding and weak inter-ministerial coordination.
- Limited fiscal space for agriculture and nutrition.
- Low private investment in nutrient-dense value chains.
- Weak local institutional capacity and limited data integration.
- Donor dependency and short-term project-based financing cycles.

Opportunities and Way Forward:

- Integrate nutrition in agricultural planning using measurable indicators in ADP and NFNSP.
- Expand blended finance, PPPs, and nutrition impact bonds.
- Adopt digital dashboards for budget tracking and beneficiary targeting.
- Provide fiscal and non-fiscal incentives for investment in nutritious food systems.
- Institutionalize training for sub-national officials and agricultural extension agents in NSA.
- Strengthen partnerships between universities, think tanks, and ministries for evidence-based decisions.

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Implementing Nutrition-Sensitive Agriculture at Promoting Diverse Food.

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Nutrition-Sensitive Agriculture

Nutrition-Sensitive Agriculture refers to agricultural practices and systems designed not just for food quantity (yield), but for *nutrient quality, diversity, accessibility*, and ultimately better nutritional outcomes for people (especially vulnerable groups: children, pregnant women, etc.).

Key components often include:

- **Crop diversification:** growing a variety of species/varieties, especially nutrient-rich ones (fruits, vegetables, legumes, tubers).
- **Use of underutilized/neglected species** which may be locally adapted, nutrient-rich, and resilient.
- **Soil health and sustainable soil management** so that nutrient content in crops is maintained or improved.
- **Post-harvest handling, storage, processing** that preserve nutrients and reduce losses.
- **Nutrition education / behavior change** so people know what a diverse diet looks like, why different foods matter, how to use them.
- **Market & value-chain integration** so that nutrient-rich foods are available, affordable, and demandable.

Importance

- Many agricultural policies focus heavily on staple crops (rice, wheat, maize) which provide calories but often lack micronutrients. This can lead to “hidden hunger” (micronutrient deficiencies) even when people are getting enough calories.
- NSA helps address malnutrition in a more holistic manner, linking food systems and health systems.
- Can increase dietary diversity, improve nutrient intake, reduce disease burdens, especially in low-income, rural, or food-insecure areas.

Basic Nutrition Concepts (Essential for Agriculture Professionals)

- **Forms of malnutrition**
 - Undernutrition: stunting, wasting, underweight
 - Micronutrient deficiencies (e.g. iron, vitamin A, iodine, zinc)
 - Overweight / obesity (in some contexts)

- **First 1,000 days concept**
Critical period from conception to 2 years; interventions here yield highest long-term benefit
- **Nutrients & food groups overview**
 - Macronutrients: carbohydrates, proteins, fats
 - Micronutrients: vitamins, minerals
 - Food groups: cereals, legumes, vegetables, fruits, animal source foods, fats, etc.
 - Balanced diet and dietary diversity
- **Causes of malnutrition (Conceptual framework)**
 - Immediate causes: inadequate dietary intake, disease
 - Underlying causes: food insecurity, care practices, health environment, WASH
 - Basic causes: socio-economic, political, resource constraints

Agriculture ↔ Nutrition Pathways

- The “pathways” or mechanisms via which agriculture can influence nutrition.
Examples:
 1. **Food production → own consumption** (diversified crops and livestock)
 2. **Income pathway** (sell produce → buy nutritious foods)
 3. **Women’s empowerment / time / decision-making**
 4. **Market / value chain / food environment**
 5. **Health & hygiene / WASH environment** (healthy environment enabling nutrient absorption)
 6. **Post-harvest & processing** (reducing nutrient losses)
- Understand both **positive** and **negative** potential effects (e.g. increased workload for women, risk of monocropping).

Key Steps / Strategies for Implementation

When designing and implementing NSA to promote diverse food, consider the following:

Step	What to do
Assessment / Baseline	Gather data on local diets (what people eat), local nutritional deficiencies, what crops are currently grown, climate/soil, local culture, markets.
Stakeholder Engagement	Farmers, extension services, health sector, women’s groups, local government, markets/traders. Multi-sector coordination (agriculture + health + education).
Design diversified cropping systems	Introduce or expand nutrient-rich crops: legumes, vegetables, fruits, tubers; promote crop rotation, intercropping; use of underutilized species adapted to local conditions.
Soil & Input Support	Improve soil fertility (organic matter, micronutrients), ensure access to good input (seeds, water, fertilizer) especially for nutrient-rich crops.

Step	What to do
Post-harvest & Processing	Build infrastructure / promote techniques to reduce losses, preserve nutrients (drying, storage, minimal processing).
Nutrition Education & Behaviour Change	Teach people about balanced diets, safe food preparation, feeding practices especially for mothers/children. Use local foods.
Market Access & Value Chains	Develop supply chains for nutrient-rich foods, ensure farmers have markets, possibly link with school feeding or local consumption programmes.
Monitoring & Evaluation	Include nutrition-specific indicators: dietary diversity, micronutrient status, etc. Track production, consumption, health. Feedback loops to adjust interventions.

Challenges / Barriers

Implementing NSA faces several common obstacles:

- **Institutional fragmentation:** sectors often work in silos (agriculture vs health vs education), making coordination difficult.
- **Capacity gaps:** farmers, extension agents, local officials may not have knowledge or training on nutrition outcomes, handling of diverse crops, processing.
- **Financial constraints:** lack of funding for small farmers; higher costs for inputs / labour for diverse crops; cost of infrastructure for post-harvest handling etc.
- **Cultural / social norms:** food taboos, preferences, lack of familiarity with some crops may limit adoption.
- **Market / value chain weaknesses:** even if farmers grow nutrient-rich foods, if there is no market or poor infrastructure, perishables may waste or not reach consumers.
- **Monitoring & data issues:** lack of nutrition indicators, weak data collection; difficulty in measuring long-term nutritional outcomes.
- **Environmental/climatic constraints:** climate variability, degraded soils, water scarcity, pests etc. that affect production of diverse foods.

How to Promote Diverse Food Through NSA

To make sure NSA actually results in more *diverse food consumption*, not just crop variety, one should:

- Prioritize local nutrient-rich plants (including underutilized ones) that adapt well to local climate and are acceptable culturally.
- Support home gardens / homestead gardens especially for vegetables and fruits used in households: accessible, manageable, less transport required.
- Integrate animal source foods (small livestock, poultry, fish) if feasible, because they often help with micronutrients (iron, B12, zinc).

- Ensure affordability: cost of seeds, labour, tools, plus reducing losses so people can afford to consume.
- Use behaviour change / social marketing to shift diets: cooking demonstrations, school programs, nutrition counselling etc.
- Connect producers to local food markets & institutional buyers (schools, health centres) to ensure demand and stable income.

Example Plan

Here's a sketch of how one might plan an NSA program to promote diverse food in a region. You can adapt for local conditions.

- 1. Baseline Survey**
 - Dietary surveys (what people eat, food frequency)
 - Identify nutrient deficiencies
 - Map local crops, land sizes, climate, soil types
- 2. Stakeholder Meeting & Planning**
 - Involve agriculture extension, health sector, local government, NGOs, community leaders
 - Define goals (e.g. reduce anemia in children by X, increase dietary diversity)
- 3. Crop & Livestock Diversification**
 - Identify suitable nutrient-rich crops (vegetables, pulses, fruits) and small livestock / poultry / fish options
 - Select underutilized species if feasible
- 4. Support systems**
 - Provide seed/seedlings and inputs
 - Training for farmers in cultivation, soil management, pest control
- 5. Home/Homestead Gardens & Nutrition Education**
 - Encourage households (especially women) to set small gardens for vegetables, fruits
 - Conduct nutrition education, cooking practices
- 6. Value Chain & Market Linkages**
 - Improve post-harvest storage / processing
 - Find markets for surplus (local markets, schools)
- 7. Policy & Institutional Support**
 - Ensure policies support nutritional goals in agricultural planning
 - Integrate nutrition into extension services, agricultural curricula

8. Monitoring & Evaluation

- Define indicators (dietary diversity, crop diversity, health outcomes)
- Regular monitoring, feedback to adjust program

Challenges, Risks & Mitigation

- **Barriers / constraints**
 - Institutional silos, weak coordination
 - Limited farmer capacity / knowledge
 - Financial/resource constraints
 - Market or infrastructure gaps
 - Cultural food preferences, food taboos
 - Labor burden (especially on women)
- **Risks / unintended consequences**
 - Overworking women → negative health/nutrition
 - Encouragement of nutrient-rich crops without adequate market => risk of wastage
 - Monocropping of “nutritious” crop displacing other diversity
- **Mitigation strategies**
 - Gender-sensitive design
 - Phased interventions, pilot testing
 - Building infrastructure, value chain support
 - Community engagement, behavior change
 - Coordination among sectors

Summary & Key Takeaways

- NSA shifts the focus from “produce more” to “produce better / more nutritious / more diverse.”
- Integrating nutrition into agriculture requires multi-sectoral action, not just technical fixes.
- Success depends on aligning production, markets, education, and health environment.
- Monitoring and adaptive management are vital.

Role of Agricultural Extension Services in Implementing NSA to Promote Diverse Food

- **Agricultural extension services (AES)** are systems (officers, advisors, agents) that deliver knowledge, training, inputs, and support from research/government/NGOs to farmers.
- When these services are “nutrition-sensitive,” they explicitly include nutrition outcomes (dietary diversity, micronutrients, safe food) among their goals, not just yield or income.

Key Functions of Extension Services in NSA

Extension services can contribute in multiple ways to promoting diverse, nutritious food production & consumption:

Function	What Extension Can Do
Capacity Building / Training	Train farmers on diversified cropping (vegetables, fruits, legumes, small livestock), soil health, pest/disease management, post-harvest handling & preservation.
Information / Behavior Change Communication	Share nutrition messages (balanced diet, safe food prep), cooking with local foods, role of diversity, gender roles.
Input / Resource Facilitation	Provide or facilitate access to seeds/varieties of nutrient-rich crops, small animals/poultry, water management, appropriate tools.
Demonstration & Field Schools	Use Farmer Field Schools (FFS), demonstration plots to show diversified systems work; include nutrition in these.
Linking to Markets & Value Chains	Help farmers sell surplus diversity; link them to institutional buyers (schools, local markets), facilitate value addition (processing, preservation).
Monitoring & Feedback	Track adoption, dietary diversity, nutrition outcomes; use data to adapt extension messages/practices.
Gender Sensitive & Inclusive Extension	Ensure women are included (as participants & decision-makers); address time, labor, social norms; use both male & female agents as needed.

Implementation Steps for Extension to Promote NSA

Here are concrete steps extension systems can follow:

1. **Needs & Context Assessment**
 - Identify local nutritional deficiencies (e.g. micronutrients) and food gaps
 - Survey what crops people grow, how diversely, what dietary patterns exist
 - Understand constraints: land, water, seasonality, labor, gender roles
2. **Training & Capacity Building of Extension Agents**
 - Training extension staff in nutrition concepts, communication, gender, food safety
 - Provide them with appropriate materials, demonstration tools
3. **Integration of Nutrition Messages into Extension Activities**
 - Incorporate diet diversity, safe food handling, home garden nutrition into regular extension advice
 - Use simple, culturally appropriate messages and tools (visual aids, recipe demonstrations etc.)
4. **Demonstration Projects and Farmer Field Schools (FFS)**
 - Set up diversity plots: mixed cropping, home/homestead gardens, small livestock integrated with cropping
 - Use these as learning hubs for farmers

5. Providing Inputs and Incentives

- Distribute seeds/varieties of vegetables, legumes, fruits
- Promote small livestock / poultry / aquaculture
- Support for post-harvest storage, preservation

6. Market Linkages & Value Addition

- Help farmers access markets for nutrient-rich foods
- Encourage local processing/preservation to reduce losses, extend availability

7. Cross-Sector Collaboration

- Coordinate with health, nutrition, education, sanitation sectors (for example, health clinics, schools)
- Link with social protection programs, food programs

8. Monitoring, Evaluation, and Adaptation

- Use indicators like dietary diversity, production diversity, consumption patterns, nutrition status
- Collect feedback from farmers; adjust messages or practices as needed

4. Examples / Evidence

- The *Agriculture, Nutrition, and Gender Linkages (ANGeL)* project in Bangladesh compared using male agriculture extension workers vs female nutrition workers to deliver nutrition-sensitive messages. Both improved knowledge, diet quality, production diversity; results were similar across models.
- The *Integrated Agriculture and Health-Based Interventions (IAHBI)* project in Southern Bangladesh: extension-led Farmer Field Schools, homestead food gardens, nutrition education, processing/preservation led to significant reduction in underweight among children.
- Mainstreaming nutrition in extension in Bangladesh: combining backyard poultry / small livestock production with extension services connected with nutritional messaging.

5. Benefits & Opportunities

- Improves **dietary diversity** within households; more nutrient-rich foods produced and consumed.
- Enhances **nutrition knowledge** among farmers, caregivers.
- Increases **income** from sale of surplus nutritious foods.
- Potential to reduce malnutrition (underweight, micronutrient deficiencies).
- Builds resilience (diversified food sources, reduced risk from crop failure).

6. Challenges / Barriers

- Extension agents may lack **nutrition training** or capacity.
- Extension systems are sometimes geared to staple crops, yield, not nutrition.
- Resource constraints: seeds/inputs for diversity often more costly, riskier.
- Cultural norms / food preferences: some nutritious crops might be undervalued or have social stigma.
- Gender issues: women may have less access to extension services, land, decision-making.
- Institutional fragmentation: health + agriculture sectors may not coordinate.
- Monitoring & evaluation: measuring nutrition outcomes (diet, health) is more complex than yield.

7. Recommendations / Best Practices

- Train extension agents specifically in nutrition, gender, communication.
- Use participatory, farmer-centred methods (FFS, demonstration plots).
- Ensure affordability and access of inputs for nutrient-rich foods.
- Use both male and female extension workers to reach all sectors of community.
- Integrate extension with health/nutrition programs (e.g. clinics, schools).
- Harmonize nutrition messages (ensure consistency, culturally relevant).
- Build market and value chain support for nutrient-dense foods.
- Ensure long-term sustainability: local ownership, institutionalization of NSA in extension policies.

Transformational Leadership for Navigating Complex Relation

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1. Conceptualizing the topic

The topic comprises of three keywords: (a) Transformational leadership, (b) Navigation and (c) Complex relation. The talk has been built-up interlinking the keywords, sketched in Diagram 1 as an example.

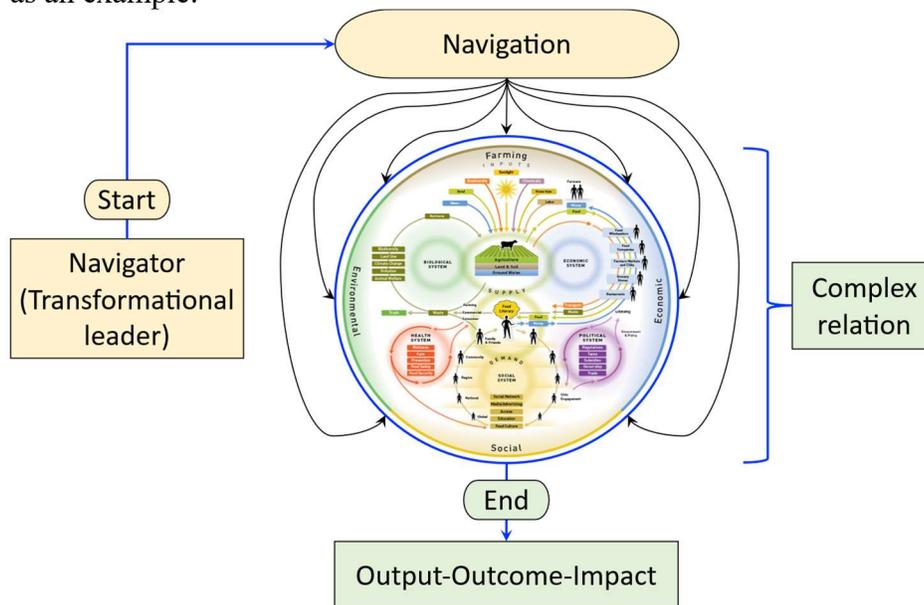


Diagram 1: An example of navigating comprehensive food system, a complex relation, through the ‘Food System Map’ (centre (WorldLink, 2024)) for achieving set-goal(s) in relation to food and/or nutrition security.

The complex relation, presented as ‘comprehensive food system’ in the centre of the diagram, is essentially a ‘system’. A system is an assemblage of elements contained within a boundary such that the elements within the boundary have strong functional relationships with each other, but limited, weak or non-existent relationships with elements in other assemblages; the combined outcome of the strong functional relationships within the boundary is to produce a distinctive behaviour of the assemblage such that it tends to respond to stimuli as a whole, even if the stimulus is only applied to one part (Conway, 1985). A system has five properties: (i) composed of components; (ii) contained in a boundary; (iii) has interaction between the components within the boundary; (iv) has limited, weak or non-existent interaction between the components outside the boundary; and (v) it responds to stimuli as a whole, even if the

stimulus is only applied to one part. Taking the example of Diagram 1, the comprehensive food system has four major components – farming, economic, social and environmental. Each component may be built-up with a number of influencers, called sub-component. For example, the farming component has sub-components such as species, land and soil, labour, knowhow, agro-chemicals, biodiversity, seed and water. A navigator navigates all the probable channels (may be termed as ‘navigation channels’) through analysing the underlying interactions between and within the components to reach its goal, here the output(s) which results in outcome(s) and creates impact of an ‘intention’ in the long run. The intention may be a new programme or a new approach of a development programme such as ‘climate smart agriculture’ or ‘precision agriculture’ or ‘nutrition sensitive agriculture’. A complex relation system is, in fact, a ‘complicated interwoven mesh’ of components and sub-components with the strands held and manipulated by a person called the ‘navigator’ who given his preferences and aspirations and applying his wisdom attempts to produce transformational outputs. In this forum, we call the ‘navigator’ as ‘**Transformational Leader**’, and his act as ‘**Transformational Leadership**’.

The transformational leadership, as narrated by Ugochukwu (2025) is *a style where leaders inspire and motivate their team by creating a clear vision, encouraging innovation, and fostering personal growth. They build trust and enthusiasm, helping people exceed their own expectations and achieve big, positive changes together. Transformational leadership inspires positive changes in those led and is invested in the success of every single member involved in the process.* James Victor Downton Jr, a renowned American sociologist, first coined the term ‘transformational leadership’ in 1973 (Downton, 1973), and further developed by American historian and political scientist James MacGregor Burns. There are four key attributes of transformational leaders (Bass *et al.*, 1996). Those are:

- i. Idealized influence (They act as highly respected role models): Role model; Walk to walk; Enthusiasm; and Embody value;
- ii. Inspirational motivation (They express optimism and enthusiasm about achieving goals): Clear vision; Optimism; Inclusion; and Productivity;
- iii. Intellectual stimulation (They encourage critical thinking and creative problem solving): Innovation; Creativity; Goals; and Challenges; and
- iv. Individualized consideration (They show empathy and a genuine sense of purpose toward others): Mentorship; Empathy; Purpose; and Strength and skills.

2. Application of the concept: Agro-processing sector development in Bangladesh

Bangladesh agriculture is undergoing transformation, travelling from subsistence farming to commercialization. On this momentum, agro-processing sector development would play one of the key roles. In this lecture, we analyze this sectoral development in system’s perspective, as presented in Diagram 2.

Agro-processing sector development (APSD) is a complex relation connecting the six pillars into it and associating the corresponding pathways (denoted by roman numbers). To achieve the desired results, each pathway to address three developmental sub-pathways: Scope (S), Challenges (C) and Way forward (W). Furthermore, a number of stakeholders are aligned to the sub-pathways. To add the complexity, there are interactions, strong or weak, among the pathways.

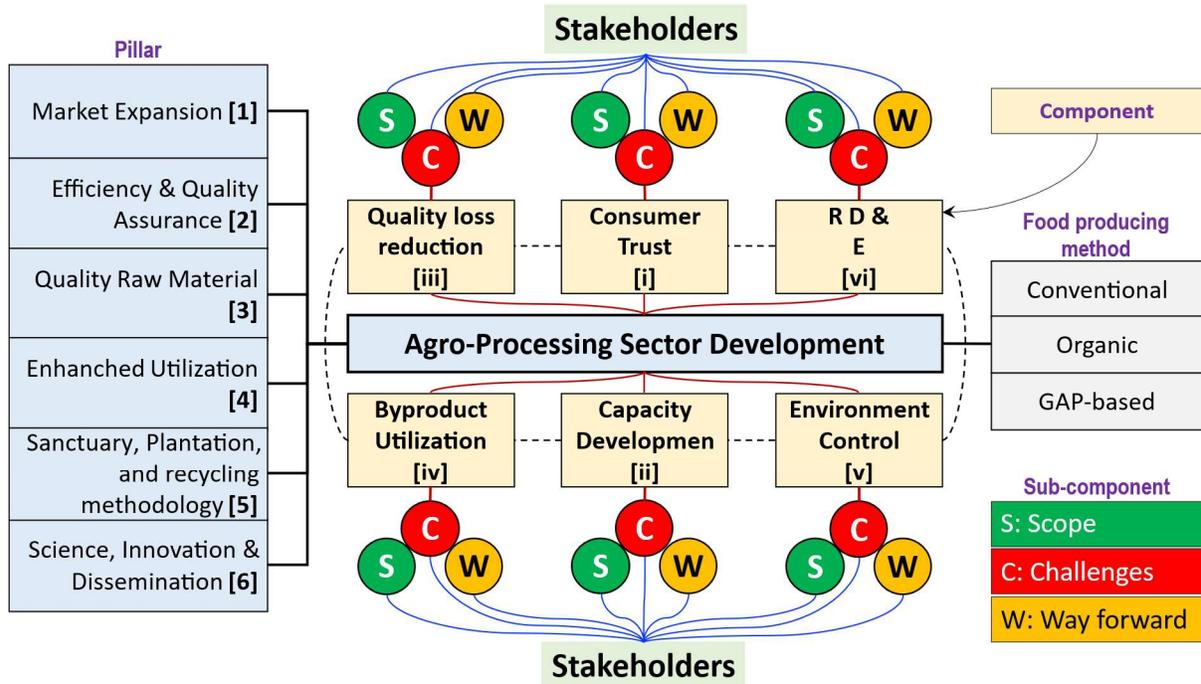


Diagram 2: Schematic diagram showing six pillars (denoted by counting numbers) of agro-processing sector development of Bangladesh and their corresponding pathways (denoted by roman numbers) for a transformational leader to navigate and apply his leadership reaching the goal in the complex relation.

For a clearer understanding, brief description of one navigation channel (Pillar → Pathway → Sub-pathway). By building consumer trust and preference (i) through products differentiation, quality enhancing and branding of products, this pathway will trigger both domestic and international market expansion (1).

The **scope (S)** include: (a) Standardization for products developed for domestic and international market based on customer demand (Stakeholders - Ministry of Commerce (MoC), Ministry of Agriculture (MoA), Ministry of Fisheries and Livestock (MoFL), NGO, and association includes; Bangladesh Agro Processor Association (BAPA), Bangladesh Frozen Food Exporters Association (BFFEA), and Bangladesh Fruits Vegetables & Allied Product Exporters Association (BFVAPA); (b) Revision, if required, and full implementation of government regulatory policies (Stakeholders – Government of Bangladesh (GoB), primary producers, and manufacturers); (c) Lacking authentic evidenced-based certification of processed products (Stakeholders - GOB, and manufacturers); (d) Public assurance is a crying need - Processed food is okay and safe for consumption (Stakeholders - GoB (Ministry of Industry (MoI), MoA, MoC, MoFL) and Food Company).

The **challenges (C)** include: (a) Lacking entrepreneur mind-set to develop uniform products; (b) Lack of quality raw materials used in agro-processed products; (c) Hiding true information of ingredients (d) Use of prohibited chemicals as preservatives; (e) Overdose of permitted chemical use; (f) Misinformation on the label, pricing and brand piracy; (g) Tempering of expiring date and adulteration; (h) Lack of awareness among value chain policy builders and

policy implementers (i) Lack of consumer acceptability / reliability; (j) Insufficient packaging and labelling information (Traceability) and lack of food safety and quality; and (k) Missing mass media communication.

The **way forward (W)** includes: (a) Short-term, formation of a special body for locally certifying the agricultural processed products, which is a crying need for Small and Medium-sized Enterprise (SMEs). Responsible agencies are MoA, MoFood, MoFL; (b) Medium-term, the nationwide campaign to be organized for promoting the benefits and safety of processed foods. Responsible agency is MoI; (c) Long-term, food testing laboratory establishment and maintenance for evaluating product quality. MoFood and MoA are responsible for that.

3. Conclusion

The present topic by the virtue of its attributes, transformational leadership is fundamental to understand and navigate each of the channels and apply his judgements to make agro-processing sector of Bangladesh developed, established and sustained.

4. References

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Multi-sectoral approaches for NSA improving market access for nutrient dense food.

Dr. Mohammed Razu Ahmed

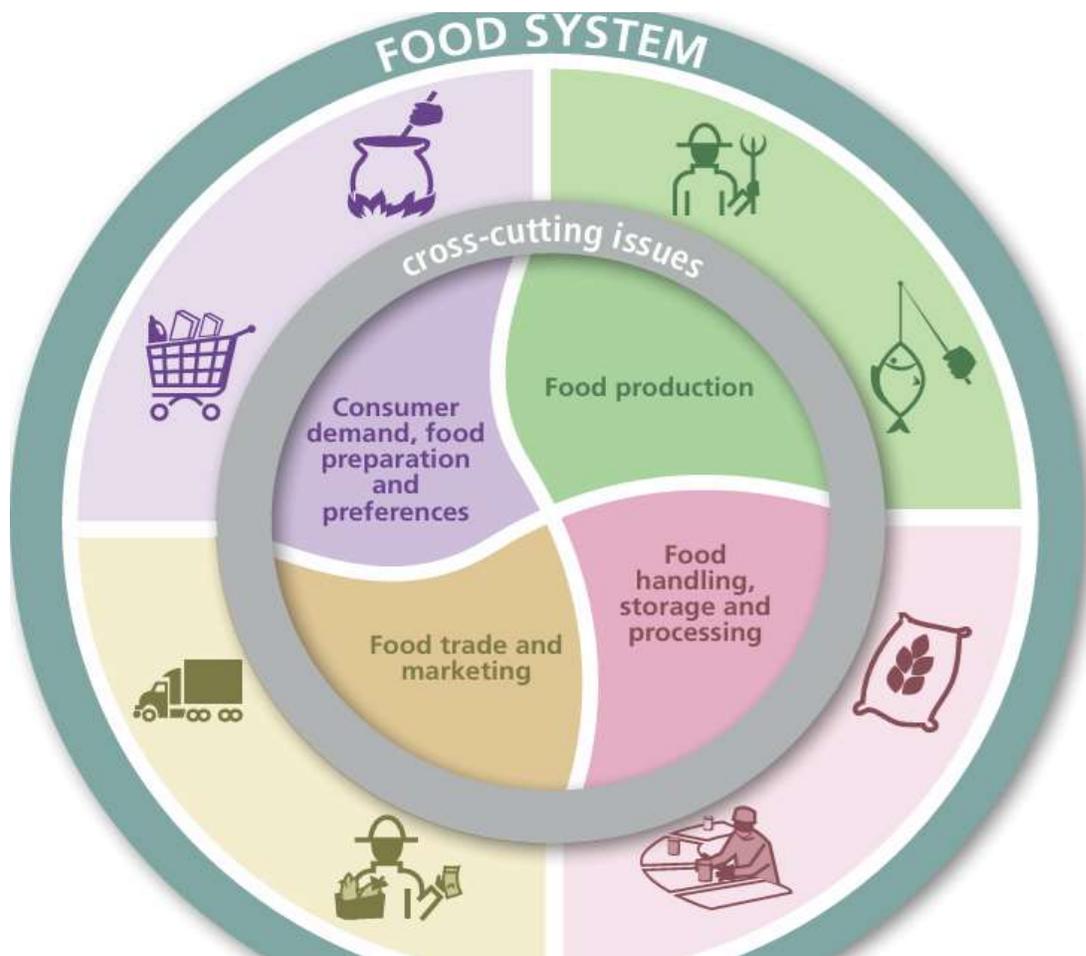
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Nutrition-sensitive agriculture is an approach that seeks to ensure the production of a variety of affordable, nutritious, culturally appropriate and safe foods in adequate quantity and quality to meet the dietary requirements of populations in a sustainable manner. the recognition that addressing nutrition requires taking action at all stages of the food chain - from production, processing, retail to consumption – has led to a broader focus which encompasses the entire food system.



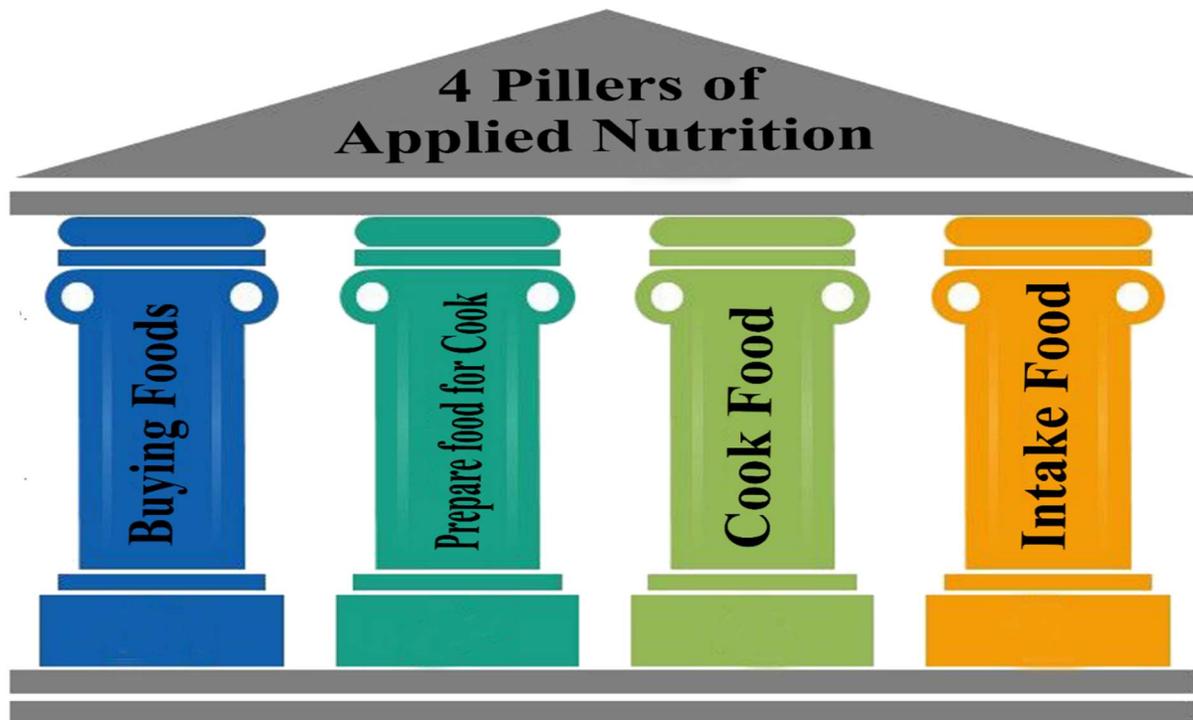
Improving Market Approaches for Nutrient-Dense Foods

A. Policy Enabling NSA Market Approach

- Trade and trade policies can promote better nutrition, but can also have negative nutritional outcomes. For example, freer trade broadens food choice, thus promoting a more diversified diet but, at the same time, it is associated with increased availability of cheaper foods characterized by high calorie and low nutritional content, which can lead to an increased incidence of obesity and other diet-related chronic diseases.
- In a context of globalization, urbanization and increased market reliance, looking at trade through a nutrition lens is increasingly important for maximizing benefits and reducing risks.
- Lowering trade barriers for fruits and vegetables has great potential to improve nutrition through increasing their availability in importing countries, especially in counter-seasonal periods.
- Increased import tariffs and import bans on some “unhealthy” foods have been used in some Pacific Islands in response to the obesity epidemic, along with lowered tariffs on specified “healthy foods”.

B. Nutritional Awareness

- Nutritional awareness is basic need to promote market focus on nutritional food
- All customers at least need to the awareness on applied nutrition



Based on nutritional knowledge

C. Diversified Production

Encouraging the production of a wide range of nutritious foods, not just staple grains, to improve dietary diversity and micronutrient intake. Promote SMART crops which are highly nutritious, need only little inputs to grow, environment friendly and good price of crops.

The potential of livestock and fishery sector to contribute to address malnutrition problems is high, but still undervalued. Building a body of evidence in nutrition-sensitive livestock and fishery, and developing capacity in integrated nutrition and livestock/fishery programming is necessary to foster a ‘nutrition-sensitive’ culture among experts of animal-based interventions and to ensure that these interventions are included in the portfolio of dietary diversification strategies supported by nutrition experts.

The development of national food-based dietary guidelines is essential to advise on healthy consumption of animal source foods. If they integrate a sustainability dimension, food based dietary guidelines can also help reduce environmental impacts of dietary patterns and food systems activities.

D. Quality Control

Ensuring the safety and nutrient quality of foods from farm to fork through better post-harvest handling, processing, and retail practices.

E. Income Generation

Creating opportunities for farmers and other stakeholders to generate income, which can then be used to purchase a more diverse and nutritious diet.

F. Market Linkages

Connecting farmers to markets that value and demand nutrient-dense foods, creating economic incentives for sustainable production.

Monitoring Indicators for Nutrition-Sensitive Agriculture

Dr. Zakiah Rahman Moni

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1. Introduction

Nutrition-Sensitive Agriculture (NSA) refers to agricultural interventions that aim to improve nutrition outcomes. Unlike traditional agriculture, which focuses primarily on food production and economic outputs, NSA integrates nutrition objectives into agricultural policies, programs, and investments.

Why Monitor NSA?

- Ensure that agriculture contributes to improved dietary diversity, food security, and nutrition.
- Assess the effectiveness of interventions.
- Inform adaptive management and policymaking.

2. Key Concepts

- **Nutrition-specific interventions:** Directly address nutritional deficiencies (e.g., supplementation).
- **Nutrition-sensitive interventions:** Indirectly impact nutrition through underlying determinants like food availability, access, income, and women's empowerment

3. Importance of Monitoring Indicators

Monitoring indicators help:

- Track progress towards nutrition goals.
- Ensure accountability.
- Identify gaps and opportunities for improvement.
- Demonstrate impact to stakeholders and funders.

4. Categories of Monitoring Indicators for NSA

A. Input Indicators

Measure the resources allocated to NSA interventions.

Examples:

- Budget allocated to nutrition-sensitive agricultural programs.
- Number of extension workers trained in NSA practices.
- Availability of inputs (e.g., seeds of nutrient-rich crops).

B. Process/Activity Indicators

Track the implementation of NSA activities.

Examples:

- Number of farmer training sessions conducted on dietary diversity.
- Number of households receiving biofortified seeds or livestock.
- Number of community gardens established.

C. Output Indicators

Measure the immediate results of the activities.

Examples:

- Proportion of farmers adopting NSA practices.
- Number of households growing nutrient-dense crops (e.g., legumes, orange-fleshed sweet potatoes).
- Number of women participating in agricultural cooperatives.

D. Outcome Indicators

Reflect short- to medium-term changes resulting from NSA interventions.

Examples:

- Household Dietary Diversity Score (HDDS).
- Women's Dietary Diversity Score (WDDS).
- Percentage of households with year-round access to diverse foods.
- Income from sales of nutrient-rich crops.

E. Impact Indicators

Measure long-term changes in nutrition and health outcomes.

Examples:

- Prevalence of stunting, wasting, and underweight among children under five.
- Prevalence of anemia in women of reproductive age.
- Changes in child growth indicators (height-for-age, weight-for-age).
- Micronutrient status (e.g., Vitamin A, iron levels).

5. Cross-Cutting Indicators

These indicators address broader themes that influence NSA outcomes:

A. Gender and Empowerment

- Women's control over agricultural income.
- Women's decision-making in food production and household nutrition.
- Time use and labor burden of women.

B. Food Environment

- Availability and affordability of diverse foods in local markets.
- Seasonality of food production and consumption.

C. Environmental Sustainability

- Use of sustainable agricultural practices.
- Water availability and management.

6. Frameworks and Tools for Monitoring NSA

- FAO's Nutrition-Sensitive Agriculture Framework

- USAID’s Agriculture to Nutrition Pathways
- The Global Food Security Strategy (GFSS)
- Monitoring and Evaluation (M&E) Frameworks by IFPRI, FAO, WHO, etc.

These frameworks offer standardized sets of indicators and guidance for data collection and analysis.

7. Challenges in Monitoring NSA

- Complexity of multi-sectoral interventions.
- Data limitations (e.g., quality, frequency, disaggregation).
- Attribution of outcomes to agriculture.
- Limited capacity for integrated monitoring systems.

8. Best Practices

- Use a mix of quantitative and qualitative methods.
- Ensure contextual relevance of indicators.
- Engage multi-sectoral stakeholders in design and monitoring.
- Incorporate gender-sensitive and equity-based indicators.
- Build capacity at local levels for data collection and use.

9. Conclusion

Monitoring indicators in nutrition-sensitive agriculture are essential tools for ensuring that agricultural development contributes meaningfully to improved nutrition. A robust M&E system helps track progress, improve accountability, and ensure the sustainability and effectiveness of interventions.

As **scientists and extension workers**, who are the front line of integrating nutrition goals into agricultural research, practices, and outreach. The roles are:

- Promoting practices that lead to better nutrition.
- Monitoring outcomes at the farm and community level.
- Supporting evidence-based decision-making.

For Extension Workers:

- Promote **nutritious crops and practices** (e.g., kitchen gardens, small livestock).
- Track and report on simple indicators like **crop diversity, food availability, and diet quality**.
- Empower **women and vulnerable households** through targeted training and support.

For Scientists:

- Design **measurable NSA research projects**.
- Validate **indicators** that link agriculture to nutrition outcomes.
- Support M&E systems that inform policy and scale-up.

References and Further Reading

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Leading and Managing Multi-Disciplinary Teams for NSA.

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1.1 What is Nutrition-Sensitive Agriculture (NSA)?

Nutrition-Sensitive Agriculture (NSA) is an approach that leverages agriculture to improve nutrition and overall well-being, especially for vulnerable groups like women and children. Unlike conventional agriculture, which is focused mainly on yields, NSA intentionally designs policies and practices to enhance diet quality and health outcomes.

NSA emphasizes:

- i. **Dietary diversity:** Promoting production and consumption of nutrient-rich foods (e.g., fruits, vegetables, legumes, animal-sourced foods).
- ii. **Food safety:** Ensuring food is nutritious and free from harmful contaminants throughout the value chain.
- iii. **Women's empowerment:** Supporting women's access to resources, education, and decision-making to improve household nutrition.
- iv. **WASH (Water, Sanitation, and Hygiene):** Preventing infections that hinder nutrient absorption.
- v. **Livelihoods and health access:** Increasing agricultural income to afford better food and healthcare.

In summary, NSA aligns agriculture with human health, social equity, and sustainable development, making food systems more people-centered and nutrition-driven.

1.2 Why are multi-disciplinary teams necessary for NSA?

NSA requires a coordinated, multi-sectoral approach to address the complex factors affecting nutrition. Sustainable impact is only possible when professionals from agriculture, food & nutrition, health, gender, WASH, policy, and economics collaborate.

Multi-disciplinary teams:

- Combine diverse expertise for well-rounded solutions.
- Align efforts to avoid duplication and maximize impact.
- Ensure programs are targeted, inclusive, and sustainable.

In short, no single sector can achieve NSA goals alone; collaboration is essential for meaningful, lasting nutrition outcomes.

2.1 What is a Multi-disciplinary Team?

A multi-disciplinary team brings together professionals from diverse fields to work collaboratively toward a common goal, while each retains their specialized expertise. Unlike single-discipline teams, this approach draws on varied perspectives and skills to tackle complex issues more effectively.

In the context of NSA, such teams may include experts in agriculture, nutrition, health, gender and social development, WASH, and policy and economics. Each member contributes unique sectoral insights, but success depends on close coordination, mutual respect, and shared accountability to deliver integrated, nutrition-focused outcomes.

2.2 Benefits: Why Multi-disciplinary Teams Matter

Multi-disciplinary teams are essential in addressing complex, cross-sectoral challenges like nutrition. They bring together diverse expertise to create more effective and sustainable solutions.

First, they offer **broader perspectives**—each member contributes unique insights from their field. An agriculturalist may focus on food availability, a nutritionist on dietary diversity & quality, a health worker on disease prevention, and a gender specialist on household dynamics. They provide a holistic understanding of the problem and more inclusive solutions. Second, they enable **holistic problem-solving**. Nutrition issues span agriculture, health, social norms, and policy. Multi-disciplinary teams support integrated planning, coordinated interventions, and comprehensive monitoring, ensuring strategies tackle root causes, not just symptoms.

In short, these teams enhance nutrition-sensitive programs' relevance, depth, and impact through collaboration and cross-sectoral coordination.

2.2.1 Increased Innovation

Multi-disciplinary teams are potent drivers of innovation. When professionals from different sectors collaborate, they bring diverse experiences, challenge conventional thinking, and spark creative solutions that no single discipline could achieve alone. This cross-pollination of ideas often leads to outcomes that are technically sound, locally relevant, and culturally appropriate.

In the context of the NSA, such collaboration can lead to co-creating innovative tools and approaches, like nutrition-smart value chains, gender-responsive agricultural extension models, or integrated agri-WASH interventions. These solutions are more likely to resonate with communities, address real-world complexities, and deliver lasting impact.

2.3 Challenges in Multi-disciplinary Teams

By fostering innovation, multi-disciplinary teams make NSA programs more adaptive, inclusive, and effective.

2.2.2 More Sustainable Interventions

Engaging multiple sectors makes interventions more sustainable and resilient. When diverse stakeholders co-design and implement programs, the results will likely be **owned by various institutions and communities, backed by aligned policies and budgets, and adaptable**

over time, drawing on each sector's evolving knowledge and experience. This shared ownership reduces reliance on any single actor or funding source, increasing the likelihood that programs will continue and adapt even as circumstances change.

In essence, multi-disciplinary teams are beneficial and vital to the long-term success of NSA. By bridging traditionally siloed sectors, these teams foster integrated solutions, amplify impact, and ensure that nutrition efforts are grounded in technical expertise and community relevance. For NSA to deliver lasting change, collaboration must be its foundation.

While multi-disciplinary teams offer significant benefits in NSA, their success is not automatic. Bringing together professionals from different sectors and disciplines often introduces unique challenges. Understanding these challenges is key to managing them effectively and fostering genuine collaboration. Here are four significant obstacles commonly encountered in multi-disciplinary team settings:

2.3.1. Communication Barriers: One of the most frequent obstacles is **difficulty in communication**. Team members from different sectors often speak **discipline-specific language** or use **technical jargon** that others may not understand. For example, an economist might talk in terms of "marginal returns" or "cost-benefit ratios", while a public health worker may refer to "stunting prevalence" or "WASH interventions". This disconnect can lead to:

- **Misunderstandings** or misinterpretations of key messages
- **Frustration** during meetings or planning sessions
- Reduced **efficiency** in decision-making and implementation

2.3.2. Conflicting Priorities or Mandates: Each discipline or sector in a multi-disciplinary team has its **mandate, agenda, and performance indicators**. For instance:

- The agriculture department might be focused on increasing crop yields or export revenue.
- The nutrition unit might prioritize dietary diversity or nutrient intake.
- Health teams may aim to reduce maternal and child morbidity.

These **competing priorities** can lead to **tensions in project design and resource allocation**. If not addressed, they may cause fragmentation or compromise the integrated nature of NSA. Successful teams must strive for **aligned goals**, shared objectives, and flexible planning that respects each sector's contribution.

2.3.3. Differing Work Cultures or Terminologies

Every sector has its own **professional culture**, including decision-making processes, timelines, accountability mechanisms, and values. For example:

- Agricultural extension services may prioritize **field-level practicality** and seasonal timelines.
- Public health teams may follow **protocol-driven**, evidence-based approaches.
- Social development professionals might work in **participatory** or community-led frameworks.
- These differences can cause:
- **Delays** in coordination

- **Resistance** to new methods
- Misinterpretation of each other's **working styles or expectations**
- Building mutual respect and understanding through **joint orientation, team-building exercises, and learning sessions** is vital to harmonize these cultures.

2.3. 4. Power Imbalances: Not all sectors hold equal weight in decision-making processes. Sometimes, one discipline, such as agriculture, may **dominate discussions**, budgets, or leadership roles, leaving others (like gender or nutrition specialists) with **less influence**. This can result in:

- **Unbalanced program designs** that overlook critical elements like women's roles or health behaviors
- **Demotivation** of underrepresented team members
- Poor integration of **cross-cutting issues**
- To overcome this, NSA programs should promote **inclusive leadership**, equitable resource sharing, and **rotational facilitation** to ensure all voices are heard and respected.

While multi-disciplinary teams are essential to delivering comprehensive NSA outcomes, they must be carefully **managed, supported, and nurtured**. Recognizing and addressing the challenges of Communication barriers, Conflicting mandates, different work cultures, and Power dynamics is the first step toward building strong, respectful, and productive teams.

3.1 Leadership in Multi-disciplinary Teams

Effective leadership is crucial for the success of multi-disciplinary teams in the NSA. Leaders in these settings are not just technical experts but facilitators, bridge-builders, and visionaries who align diverse sectors toward a common goal.

With team members from agriculture, nutrition, health, gender, WASH, and policy, leaders must manage differing perspectives while fostering collaboration. Five key leadership skills are essential:

1. **Visioning:** Clearly articulating a shared purpose that unites the team, such as reducing malnutrition, and motivating members by connecting their roles to the bigger picture.
2. **Facilitation:** Creating an inclusive environment where all voices are heard and valued, ensuring balanced participation and shared ownership of decisions.
3. **Conflict Resolution:** Navigating disagreements constructively, respecting diverse viewpoints, and maintaining team cohesion through open dialogue.
4. **Decision-making:** Balancing technical input from multiple disciplines to make timely, transparent, and unbiased decisions that align with the team's vision.
5. **Emotional Intelligence:** Demonstrating self-awareness, empathy, and responsiveness to team dynamics, building trust, morale, and psychological safety.

In short, strong leadership in NSA means guiding with clarity, empathy, and inclusivity to turn diverse expertise into unified action.

3.2 Leadership Styles in Multi-disciplinary Teams

Effective leadership in the NSA goes beyond authority; it's about fostering commitment, collaboration, and shared purpose. Three leadership styles are particularly effective:

- **Transformational Leadership:** Inspires and energizes the team by communicating a compelling vision and motivating members to work toward common goals.
- **Servant Leadership:** Prioritizes the needs and development of the team, creating a supportive environment where individuals are empowered to grow and contribute fully.
- **Collaborative Leadership:** Promotes shared ownership, mutual respect, and joint problem-solving, essential for integrating diverse sectoral perspectives.

These styles help leaders build trust, drive innovation, and align multi-sectoral efforts toward lasting nutrition outcomes.

3.3 Leadership Styles in Multi-disciplinary Teams

Effective leadership in Nutrition-Sensitive Agriculture (NSA) goes beyond authority—it's about fostering commitment, collaboration, and shared purpose. Three leadership styles are particularly effective:

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4. Managing Multi-disciplinary Teams

4.1 Building the Team

Effective team management begins with intentional design and clear communication:

- **Mapping Stakeholders:** Identify key sectors, such as agriculture, nutrition, health, WASH, gender, and policy, and understand their unique contributions to NSA goals.
- **Clarifying Roles and Responsibilities:** Use tools like the RACI matrix (Responsible, Accountable, Consulted, Informed) to define each member's role, reduce overlap, and ensure accountability.
- **Team Onboarding:** Provide a structured orientation to NSA principles, objectives, and the specific ways each sector supports integrated, nutrition-sensitive interventions.

A well-structured and purpose-driven team lays the foundation for effective collaboration, cross-sector

4.2 Communication and Coordination

Strong communication and coordination are essential for the success of multi-disciplinary teams in the NSA. Given the diversity of sectors involved, intentional efforts are needed to ensure alignment and effective collaboration.

Shared digital platforms, such as WhatsApp groups or Google Drive, allow team members to exchange information in real time and access key documents easily. **Interdisciplinary**

meetings help maintain momentum, strengthen relationships, and ensure ongoing alignment across sectors.

Equally important is the development of a **common language and shared glossary**. Agreeing on key terms with professionals from different technical backgrounds helps avoid misunderstandings and fosters more transparent communication.

By investing in these practices, teams can improve coordination, build mutual understanding, and stay focused on shared NSA goals.

4.3 Setting Joint Objectives

Establishing clear, shared objectives is key to guiding multi-disciplinary NSA teams. Teams should use **SMART goals**—Specific, measurable, achievable, relevant, and time-bound, aligned with NSA principles and focused on improving nutrition outcomes.

Joint planning should be **co-created**, with input from all sectors involved. This inclusive approach ensures that the objectives reflect diverse expertise, foster ownership across disciplines, and support coordinated implementation.

By setting collaborative, well-defined goals, teams can stay aligned, track progress effectively, and maximize their collective impact.

4.4 Monitoring and Evaluation

Effective monitoring and evaluation (M&E) is vital for tracking progress and improving the impact of multi-disciplinary teams in Nutrition-Sensitive Agriculture (NSA). To ensure meaningful results, teams should **develop shared indicators** that reflect nutrition-sensitive goals—such as dietary diversity scores, women’s empowerment metrics, or child nutrition outcomes.

Joint field visits and cross-sector learning reviews allow team members to observe implementation on the ground, identify challenges, and share real-time insights. This collaborative approach strengthens accountability and promotes continuous learning.

NSA teams should practice **adaptive management**, using data and feedback to revise work plans, improve strategies, and respond to emerging needs. In dynamic environments, flexibility and responsiveness are key to sustaining progress. By embedding collaborative M&E into their work, teams can stay aligned, focused, and effective in delivering nutrition-sensitive results.

5. Capacity Building and Motivation

Building the capacity and motivation of multi-disciplinary teams is essential for the sustained success of NSA initiatives. As team members come from diverse sectors, investing in mutual learning and ongoing engagement strengthens collaboration and effectiveness.

5.1 Cross-training

Cross-training helps bridge knowledge gaps and fosters mutual understanding among team members. Regular **knowledge-sharing sessions**, such as nutrition basics for agriculture staff or WASH principles for health workers, promote integrated thinking. Techniques like **job shadowing, mentoring, and peer learning** allow team members to appreciate each other’s roles and see how their efforts connect to broader goals.

5.2 Motivation Strategies

Keeping teams motivated requires intentional effort. Strategies include **recognizing individual and group contributions**, offering **professional development opportunities**, and **encouraging innovation and ownership** of activities. When team members feel valued and empowered, they are more committed to the shared mission and more proactive in problem-solving.

In short, a motivated and well-equipped team is better positioned to drive impactful, sustainable nutrition-sensitive interventions.

6. Gender and Inclusion in Team Leadership

Promoting gender balance and inclusive participation in leadership is crucial for the effectiveness of multi-disciplinary teams in NSA. Ensuring that women and marginalized groups have meaningful roles in decision-making strengthens equity and enriches team perspectives.

Leaders must remain aware of **power dynamics** between different disciplines and sectors, actively working to create an environment where all voices are heard and respected. Applying **gender analysis tools** can guide equitable team management and help design programs that address the diverse needs of communities. By embedding gender and inclusion principles into leadership, NSA teams foster fairness, collaboration, and more responsive nutrition outcomes.

Tools and Resources

- RACI Matrix – for defining team roles
- Nutrition-sensitive agriculture framework (FAO, 2017)
- Multi-sectoral Planning Guidelines (SUN Movement, UNICEF, FAO)
- Household Dietary Diversity Score (HDDS)
- Minimum Acceptable Diet (MAD) indicators for children
- Gender Marker Tools (CARE, UN)

Leadership: Pre-requisites in NSA

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Discussion on this set topic is laid on two parts: (A) Fundamental knowledge in nutrition sensitive agriculture (NSA) and (B) Framework for leadership prerequisites in NSA.

A. Fundamental knowledge in NSA

NSA is a complex relation and characteristically a ‘complex system’. Fulfilling ‘Individual Food Need’ (IFN) by utilizing all probable navigating channels is the output of the system (Diagram 1). The IFN is a function of an individual’s age, sex and body structure. In NSA approach, the individual asks for enough food, nutritious food, safe food and tasty food. Those ‘asks’ can be met through a sound food growing environment - ‘Production and Diversification system’ (PDS). Farming systems produce commodities for PDS by selecting species and associated varieties and/or breeds, and applying management onto those. The food-supplying components of farming systems, include crop, livestock, fisheries and homestead. Dictated by multiple factors, a farming system is composed of all the four or fewer components.

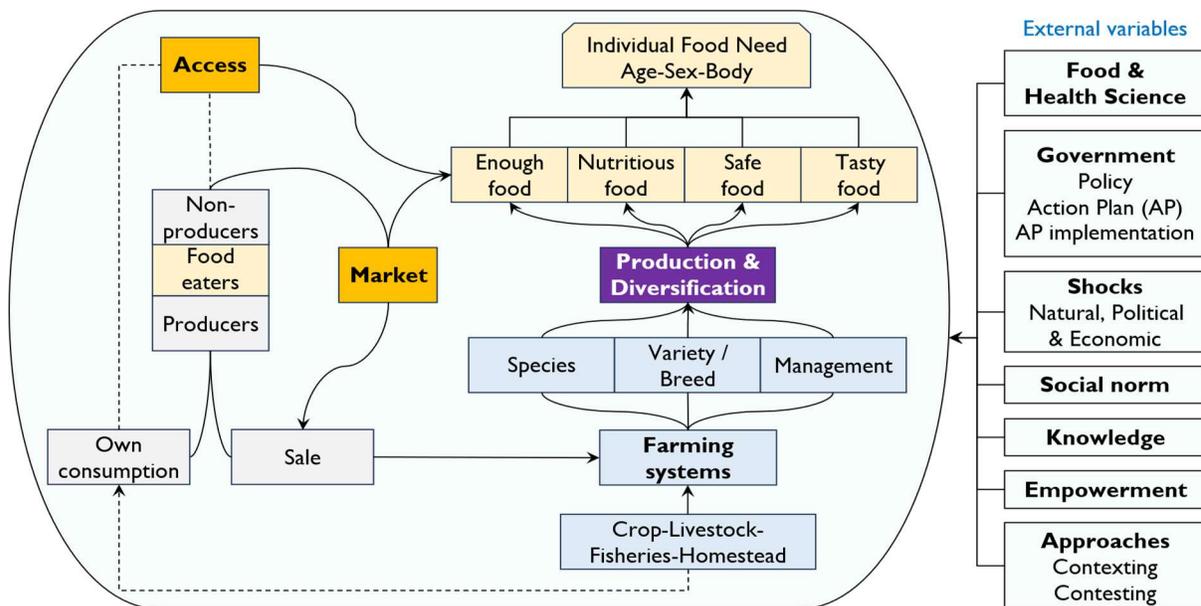


Diagram 1: Schematic diagram of a typical nutrition sensitive agriculture (NSA) system of Bangladesh together with external variables influencing the system.

The farming systems are operated by producers, often recognized as farmers. Producers grow commodities largely for selling purposes, the price is dictated by market. Technologies used

by the growers for commercially growing commodities are often not nutrition-friendly. There are two types of food-eaters – producers and non-producers. Producers use part of their produces for own consumption, the commodity type and quality for this purpose often differ from selling commodities. The access of food for part of the both types of food-eaters still remain a question mark. The diversity and quality of food is fully dependant on market in terms of availability, and the market price largely affects accessibility of food for non-producers, both in quantity and quality.

External variables affect in the stability and/or improvements in the current NSA-System. Food and Health Science is a positive influencer in the system, whereas natural, political and economic shocks adversely affect the system. Government, on policy formulation, action plan (AP) development and AP implementation, is the key variable in the improvements in the system. Social norms, knowledge and community empowerment, especially for women, play negative role on the system. Besides, are numerous agricultural development approaches spinning around these days. While the contexting approaches are beneficial to NSA-System, the contesting ones could be harmful and we should be aware of those.

Having gaining a thorough knowledge in the existing NSA-System, we will enter into the next part of discussion.

B. Framework for leadership prerequisites in NSA

Drawing a comprehensive framework for leadership prerequisites in nutrition sensitive agriculture (NSA) requires visualizing the interplay between individual leadership qualities, collaborative processes, and a supportive enabling environment. Effective leadership in this context must bridge the gap between technical agricultural know-how and broader societal determinants of nutrition. This framework outlines the core components necessary for effective leadership in NSA, structured across three interconnected domains: Individual Leadership Attributes, Collaborative Action and Capacity Building, and the Enabling Environment (Diagram 2).

Domain 1: Individual leadership attributes

This domain focuses on the personal characteristics and competencies of leaders essential for driving NSA initiatives.

- *Systems mindset*: The ability to understand the food system as an interconnected web, not a collection of isolated parts. A leader with a systems mindset recognizes how agriculture, policy, economics, and health all influence one another.
- *Visionary and strategic thinking*: Leaders must have a clear, long-term vision for improving nutritional outcomes through agriculture. They must be able to define the overall direction and set realistic, achievable goals.
- *Communication and advocacy skills*: The capacity to articulate the link between agriculture and nutrition to a wide range of stakeholders is vital. This includes advocating for policy changes and mobilizing resources for NSA initiatives.
- *Adaptability and resilience*: Food systems are complex and face challenges like climate change and market volatility. Effective leaders must be flexible and able to adapt strategies in the face of uncertainty.

- *Empathy and integrity*: Demonstrating integrity builds trust among community members and partners. Empathy is crucial for understanding the needs of vulnerable populations, such as women and children, and for building strong, respectful relationships.

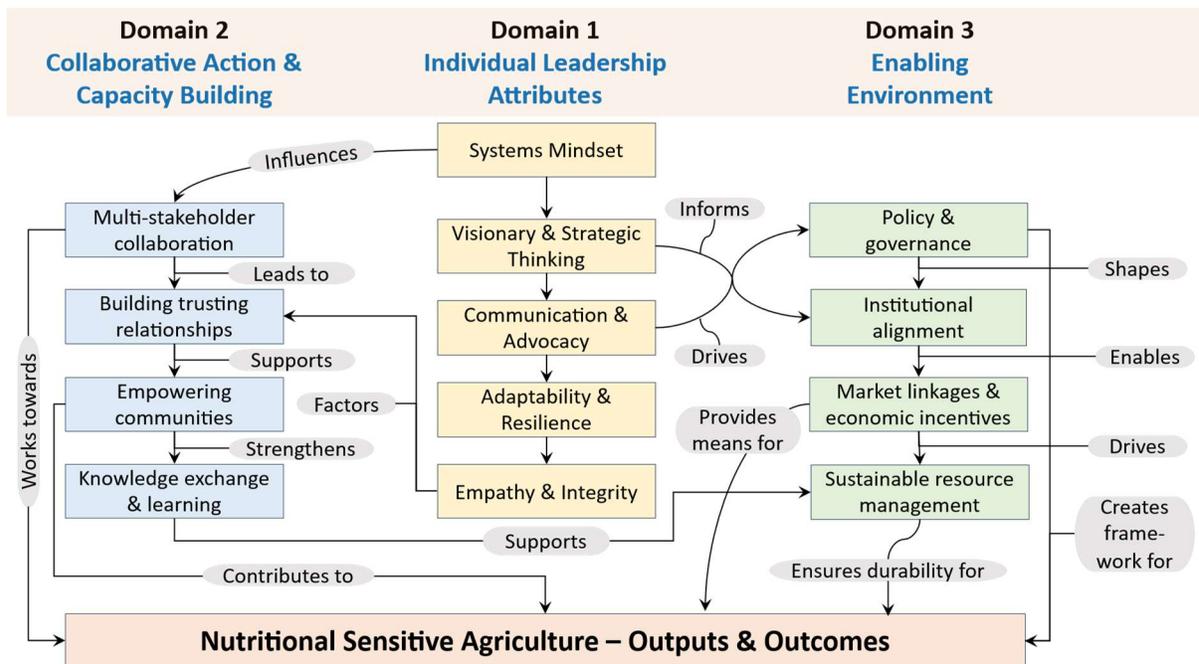


Diagram 2: Framework for leadership prerequisites in nutrition sensitive agriculture (NSA).

Domain 2: Collaborative action and capacity building

This domain highlights the relational skills needed to build consensus and empower others, as no single entity can solve the complex challenges of malnutrition alone.

- *Multi-stakeholder collaboration*: This is at the heart of NSA. Leaders must facilitate platforms and processes that bring together government, private sector, civil society, and local communities to work toward shared goals.
- *Building trusting relationships*: Cultivating strong relationships among diverse stakeholders is the foundation for effective collaboration. This allows for the sharing of knowledge, risks, and benefits.
- *Empowering communities*: Rather than imposing solutions, leaders should foster community ownership and build local capacity. A key part of this is empowering women, who often play a pivotal role in household nutrition.
- *Knowledge exchange and learning*: Leaders must create mechanisms for continuous learning and adaptation. This includes facilitating the sharing of information, best practices, and innovative ideas across the network.

Domain 3: Enabling environment

This domain covers the broader structural conditions that leaders must influence and leverage to ensure the sustainability of their efforts.

- *Policy and governance*: Leaders must understand and be able to shape policy frameworks to integrate nutrition-sensitive concepts into agricultural planning, investments, and regulations.
- *Institutional alignment*: The framework emphasizes the need to strengthen institutional structures and capacity. This includes building organizational systems for monitoring and evaluation to ensure accountability at all levels.
- *Market linkages and economic incentives*: Leaders should work to create market connections that benefit local farmers and entrepreneurs. This includes developing incentive models that align economic interests with nutritional goals.
- *Sustainable resource management*: Environmental factors are critical to long-term success. Leaders must champion sustainable practices related to land, water, and biodiversity to ensure resilience and food security.

How the three domains intersect?

The framework operates as an integrated system:

- An individual leader with a systems mindset can effectively navigate the collaborative action domain by understanding the motivations of different stakeholders (Domain 2).
- By leveraging a supportive enabling environment (Domain 3) — such as favorable government policies — leaders can scale up their capacity-building efforts (Domain 2) and expand their impact.
- The personal qualities of integrity and empathy within the individual leadership domain (Domain 1) are critical for building the trust needed to sustain multi-stakeholder partnerships over the long term (Domain 2).
- This comprehensive approach recognizes that effective NSA leadership is not simply about one person's abilities, but about cultivating a network of skilled and motivated individuals who can operate within and transform a complex ecosystem.

Programme Schedule

Training on Leadership Development in “Nutrition Sensitive Agriculture”

Inaugural Session

Date & Time	: 13-15 October 2025 & 9:00 AM to 5:00 PM
Registration	: Muhammad Habibur Rahman, Office Assistant cum-Computer Operator, BARC.
Venue	: Conference Room-1, BARC, Dhaka.
Organized by	: Nutrition Unit, BARC.
Participant	: Scientists and Officers
Course Director	: Dr. Md. Harunur Rashid, Director (Nutrition), BARC, Dhaka.
Course Co-Ordinator	: Dr. Zakiah Rahman Moni, PSO (Nutrition), BARC, Dhaka.

Day-1 (13/10/2025)		
Registration and Opening Ceremony		
Time	Topic	Resource Specker
9:00-9:30	1. Concepts of Nutrition-Sensitive Agriculture.	Dr. Md. Harunur Rashid, Director (Nutrition), BARC
10:30-11:00	Tea & Health break	
11:00-12:00	2. Agricultural Technologies Supporting Nutrition Outcomes.	Dr. Md. Abdus Salam, Member Director (Crops) BARC
12:00-1:00	3. Integration of NSA Objectives into Policies and Strategy.	Mst. Jannatul Naim, Nutrition and Food System Specialist, RAINS Project, FAO Bangladesh
1:00-2:00	Prayer and lunch break	
2:00-3:00	4. Innovative Approaches and Practices in Nutrition-Sensitive Agriculture.	Dr. Anil Kumar Das National Consultant (Program), FAO, Dhaka.
3:00-4:00	5. Behavior Changes Concerts to Promote Nutritious Food, Food Safety and Nutrition.	
4:00-5:00	6. Design and implement of NSA interventions.	Dr. Md. Harunur Rashid, Director (Nutrition), BARC
Day-2 (14/10/2025)		
9:30-10:30	7. Bio-and Industrial Fortification in Bangladesh: Policy, Implementations, Monitoring and Evaluation Frameworks.	Mr. Ashek Mahfuz, PhD, Portfolio Lead, Large Scale Food Fortification (LSFF) & Value Chain, GAIN, Bangladesh
10:30-11:00	Tea & Health break	
11:00-12:00	8. Communication and Advocacy Skills for Nutrition-Sensitive Agriculture.	Mr. Mehedi Hasan Bappy, Project Coordinator, Youth and Adolescent Nutrition, GAIN, Bangladesh.
12:00-1:00	9. Resource Mobilization and Strategic Partnership Building.	Dr. Mohammad Monirul Hasan, Country Advisor, GAIN, Bangladesh
1:00-2:00	Prayer and lunch break	
2:00-3:00	10. Implementing Nutrition-Sensitive Agriculture at Promoting Diverse Food.	Mohammed Shafiuzzaman, Chief Instructor, ATI, Agargaon, Dhaka
3:00-4:00	11. Transformational leadership for navigating complex relation.	Dr. Mouin us Salam, Consultant (HDR), PARTNER, APCU-BARC
4:00-5:00	12. Multi-sectoral approaches for NSA improving market access for nutrient dense food.	Dr. Mohammed Razu Ahmed, Component Director, Small Holder Agriculture Connectiveness Project, DAM
Day-3 (15/10/2025)		
9:30-10:30	13. Monitoring Indicators for Nutrition-Sensitive Agriculture.	Dr. Zakiah Rahman Moni, PSO (Nutrition), BARC
10:30-11:00	Tea & Health break	
11:00-12:00	14. Leading and Managing Multi-Disciplinary Teams for NSA.	Professor Dr. Nazma Shaheen, Former Director, Institute of Nutrition and Food Science University of Dhaka
12:00-1:00	15. Leadership: Pre-requisites in NSA.	Dr. Mouin us Salam, Consultant (HDR), PARTNER, APCU-BARC
1:00-2:00	Prayer and lunch break	
2:00-3:00	Post-test & Evaluation	
3:00-4:00	Certificate Distribution and Closing Ceremony	



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