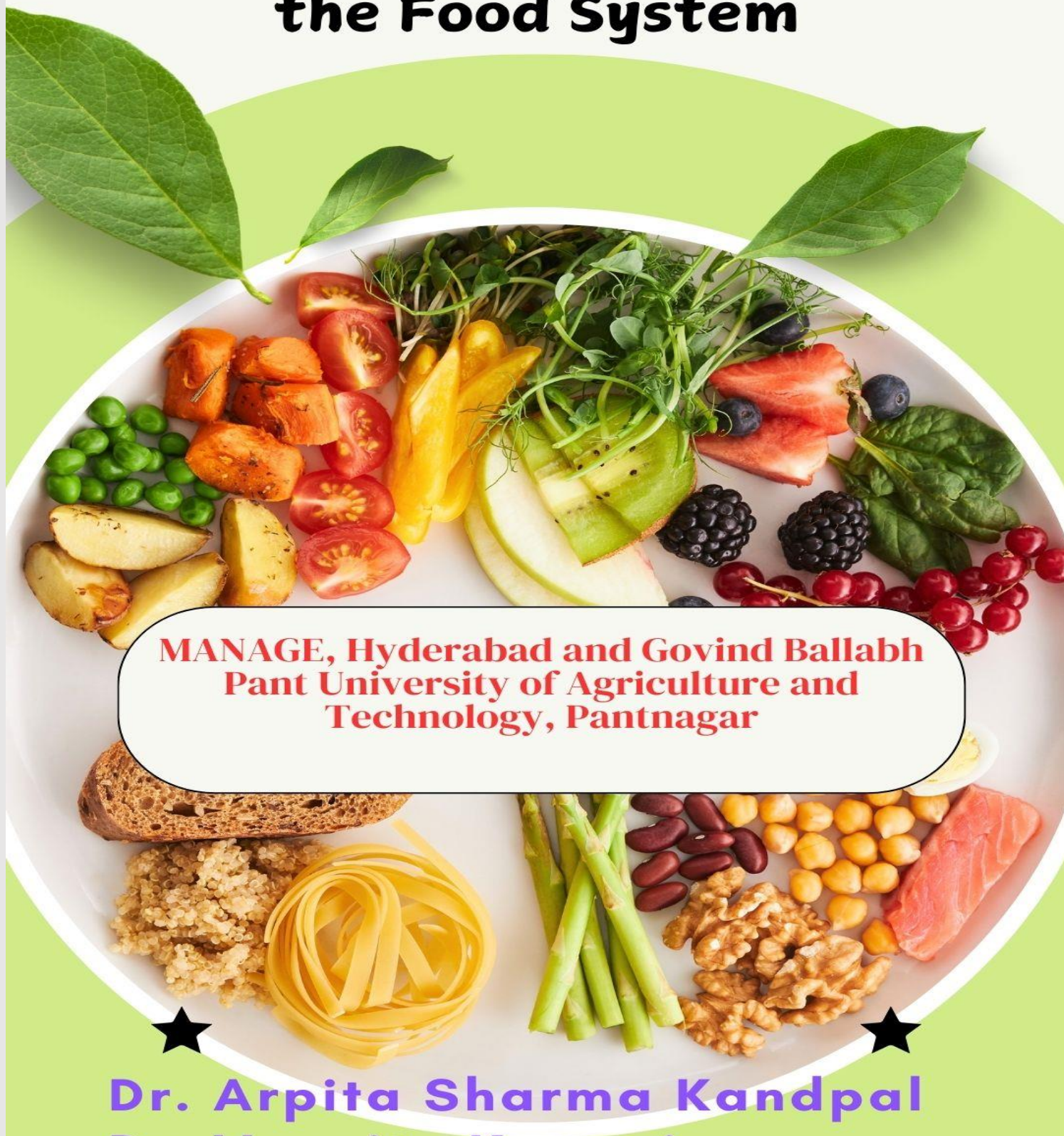


# Integrating Nutrition Sensitive Agriculture into the Food System



**MANAGE, Hyderabad and Govind Ballabh  
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# **Integrating Nutrition Sensitive Agriculture into the Food System 2025**

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## **Integrating Nutrition Sensitive Agriculture into the Food System**

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## FORWORD

Agriculture, in its truest sense, is not merely a means of producing food—it is the foundation of nutrition, health, and well-being. As the world moves towards achieving the Sustainable Development Goals (SDGs), particularly those concerning zero hunger, good health, and gender equality, the integration of nutrition-sensitive approaches into agricultural systems has emerged as a crucial pathway to achieving inclusive and sustainable development.

This book, *“Integrating Nutrition Sensitive Agriculture into the Food System,”* is a timely and commendable contribution towards strengthening the linkages between agriculture, nutrition, and public health. It provides comprehensive insights into the conceptual framework, significance, and strategic importance of Nutrition Sensitive Agriculture (NSA) in addressing malnutrition and promoting dietary diversity.

The various chapters of this volume encapsulate a wide range of perspectives—from understanding the conceptual underpinnings of NSA to identifying recommended practices and designing effective interventions at the grassroots level. The book also highlights the importance of cross-sectoral collaborations, value chain integration, gender analysis tools, and the pivotal role of Extension and Advisory Services (EAS) in mainstreaming nutrition-sensitive approaches. Of particular value are the discussions on labelling of functional foods and nutritional health claims, which provide a regulatory context crucial for ensuring transparency and consumer awareness.

By weaving together theoretical concepts, practical tools, and policy perspectives, this compendium serves as a valuable resource for policymakers, researchers, development practitioners, and field functionaries engaged in agricultural extension, nutrition, and rural development. It underscores MANAGE’s continued commitment to capacity building and knowledge dissemination aimed at transforming India’s food systems to be more nutrition-responsive and equitable.

I congratulate the editors and contributors for their efforts in compiling this insightful volume and trust that this publication will inspire meaningful action towards integrating nutrition sensitivity in agricultural planning, implementation, and evaluation across all levels.



Dr. Sagar Hanuman Singh, IPoS  
Director General, MANAGE



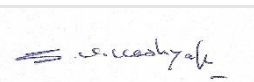
## EXECUTIVE SUMMARY

Agriculture has long been the foundation of human sustenance, but its role has expanded in recent years to tackle the pressing challenges of food and nutritional security. Nutrition-sensitive agriculture (NSA) highlights the importance of agricultural practices that not only ensure food availability but also enhance its nutritional quality, addressing malnutrition while contributing to sustainable development goals.

In this context, I commend the Department of Agricultural Communication, GBPUA&T, Pantnagar, and MANAGE, Hyderabad, for their commendable efforts in organizing the training program on 'Integrating Nutrition-Sensitive Agriculture into the Food System.' This program was designed to equip scientists, researchers, and field professionals with the necessary knowledge and skills to integrate nutrition-sensitive approaches into agricultural systems and policies effectively.

This e-book, an outcome of the training program, has been carefully curated to provide a comprehensive understanding of NSA and practical strategies for its implementation. It serves as a valuable resource, offering insights from distinguished speakers who shared their expertise and perspectives during the training sessions.

I extend my heartfelt appreciation to the organizers for choosing such a pertinent and impactful topic for this initiative. I am confident that the participants and readers will find this manual immensely beneficial, gaining insights that will empower them to leverage technology and innovative practices for advancing global nutrition and sustainable agricultural development.



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## **PREFACE**

This manual provides a comprehensive overview of integrating Nutrition-Sensitive Agriculture (NSA) into the food system, emphasizing its role in addressing global nutrition challenges and promoting sustainable agricultural practices. The content is thoughtfully structured, enriched with practical examples and expert insights, to guide scientists, researchers, and field professionals in implementing NSA principles effectively. By focusing on the interconnectedness of agriculture, nutrition, and sustainability, this manual highlights innovative approaches and actionable strategies for fostering nutritional security through agriculture.

The information contained in this manual also provides a detailed overview of the four-day training program (22nd–25th October 2024) on ‘Integrating Nutrition-Sensitive Agriculture into the Food System,’ organized by MANAGE, Hyderabad and GBPUA&T, Pantnagar. The training explored key topics such as the basics of nutrition, the role of agriculture in food and nutritional security, designing NSA activities, and building collaborations to strengthen NSA initiatives. The sessions, conducted by eminent experts, also addressed gender-inclusive agriculture, effective communication strategies, and nutrition-sensitive value chains.

The editors express their heartfelt gratitude to all the contributors who shared their knowledge and expertise, enriching this manual with diverse perspectives and practical insights. Special thanks are also due to MANAGE, Hyderabad, for their financial support in making this training program a success.

It is our hope that this manual will serve as a valuable resource for the academic community, including students, researchers, and professionals, as they work towards advancing NSA practices and contributing to a sustainable and nutritionally secure future.

**Editors**

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## **Concept, Significance, importance of Nutrition Sensitive Agriculture**

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GBPUA&T, Pantnagar**

Agriculture is the backbone of food security and a key driver of rural livelihoods, especially in developing countries like India. Traditionally, agricultural policies and programs have focused on increasing the production of staple crops to combat hunger and improve food availability. While this approach has succeeded in improving calorie intake and reducing hunger to some extent, it has often overlooked the quality and diversity of diets. As a result, millions continue to suffer from various forms of malnutrition including undernutrition, micronutrient deficiencies (often referred to as “hidden hunger”), and rising levels of overweight and obesity despite agricultural growth. This paradox highlights the need for a more holistic and integrated approach to agriculture that not only focuses on food quantity but also emphasizes food quality. Nutrition-Sensitive Agriculture (NSA) emerges as a powerful strategy that seeks to transform agricultural systems into tools for better health and nutrition. It involves reorienting agricultural policies, programs, and investments to explicitly address the nutritional needs of the population, particularly women, children, and other vulnerable groups.

NSA encourages the production and consumption of diverse, nutrient-dense foods such as fruits, vegetables, pulses, millets, livestock, dairy, and biofortified crops. It also emphasizes the importance of nutrition education, behavior change communication, women’s empowerment, and multi-sectoral coordination among agriculture, health, and social welfare sectors. Moreover, NSA supports sustainable agricultural practices that are environmentally friendly and climate-resilient, ensuring long-term food and nutrition security. In a country like India where agriculture employs nearly half of the population and malnutrition continues to affect a significant portion of the population NSA holds immense potential. By aligning agricultural development with nutrition goals, NSA can help create food systems that are not only productive but also equitable, inclusive, and health-promoting. It is not just about growing more food it is about growing the right kinds of food to nourish people and communities.

### **Concept of Nutrition-Sensitive Agriculture**

Nutrition-Sensitive Agriculture (NSA) is an approach that explicitly aims to improve nutrition outcomes through agricultural interventions. It goes beyond the traditional goal of increasing food production and emphasizes the quality, diversity, and nutritional value of food. NSA seeks to maximize the impact of agricultural development on the nutrition and health of populations, especially among vulnerable groups such as women, children, and the rural poor.



In conventional agriculture, the focus has largely been on calorie-rich staple crops like rice, wheat, and maize to meet food security objectives. However, this narrow focus has contributed to diets that are often lacking in essential nutrients, leading to various forms of malnutrition. Nutrition-sensitive agriculture addresses this issue by promoting the cultivation, availability, affordability, and consumption of a wider range of nutritious foods including fruits, vegetables, pulses, legumes, animal-source foods, and biofortified crops.

## Key Elements of Nutrition-Sensitive Agriculture

[1] **Nutrition as a Primary Objective:** NSA integrates nutrition goals into the planning, implementation, and evaluation of agricultural programs and policies. [2] **Dietary Diversity:** It promotes the production and consumption of a variety of food items to ensure balanced diets. [3] **Targeting Vulnerable Populations:** NSA places special emphasis on improving nutrition among women of reproductive age, infants, young children, and economically disadvantaged groups. [4] **Gender Empowerment:** It recognizes the critical role of women in agriculture and household nutrition, encouraging their involvement in decision-making and access to resources. [5] **Multi-Sectoral Approach:** NSA fosters collaboration between agriculture, health, education, water, and sanitation sectors to create a comprehensive impact on nutritional outcomes. [6] **Sustainable Practices:** The approach supports agro-ecological and climate-smart practices that sustain soil fertility, biodiversity, and environmental health while enhancing nutrition. [7] **Behavior Change Communication:** Nutrition-sensitive agriculture incorporates education and awareness campaigns to encourage healthy food choices and cooking practices.

## Comparison with Nutrition-Specific Interventions

While nutrition-specific interventions directly address the immediate causes of malnutrition (such as supplementation, breastfeeding promotion, and treatment of acute malnutrition), nutrition-sensitive agriculture tackles the underlying and basic causes by improving food systems, agricultural productivity, gender equality, and livelihoods—all with a strong nutrition focus.

## Broader Perspective

NSA is not a standalone concept but a framework that enhances the nutrition sensitivity of food systems. It encourages policymakers and development practitioners to think beyond mere food availability and to design interventions that contribute to nutritional well-being, dietary adequacy, and sustainable livelihoods. It provides a vital link between agriculture and health and is instrumental in achieving long-term goals related to food and nutrition security.

## Pathways Linking Agriculture to Nutrition

Nutrition-Sensitive Agriculture (NSA) operates on the understanding that agriculture can influence nutrition through multiple interconnected pathways. These pathways help in identifying

how agricultural interventions can be strategically designed to improve dietary diversity, health outcomes, and overall nutritional well-being. The key pathways that link agriculture to nutrition are as follows: **Food Production Pathway:** Agriculture contributes directly to household food availability by enabling the production of diverse and nutritious foods. Households that grow their own fruits, vegetables, pulses, or animal-source foods are more likely to consume a varied diet. Home gardening, kitchen gardens, livestock rearing, and mixed farming systems enhance dietary diversity, particularly in rural and remote areas. [a] Promotes self-sufficiency in food. [b] Encourages seasonal and local consumption of nutrient-rich foods. [c] Reduces dependency on market fluctuations and food prices.

**Income Generation Pathway:** Agriculture serves as a primary source of income for millions, especially in rural India. Income earned from the sale of crops, livestock, and agri-based products can be used to purchase nutritious food, healthcare, and education, which indirectly improve nutrition and well-being. [a] Enables households to afford diverse and high-quality foods. [b] Facilitates access to health services and sanitation. [c] Helps invest in better housing and hygiene, impacting nutritional status.

**Food Prices and Market Pathway:** Agricultural policies and market conditions influence the availability and affordability of various food items. By promoting the cultivation of nutrient-rich crops and ensuring efficient market access, food prices can be stabilized and access to healthy foods improved for both producers and consumers. [a] Increases market supply of nutritious foods. [b] Reduces the cost of healthy diets. [c] Supports local food systems and rural economies.

**Women's Empowerment Pathway:** Women play a pivotal role in agriculture and household nutrition. Empowering women by improving their access to land, credit, inputs, education, and decision-making in agriculture can significantly impact nutrition outcomes. When women control resources and income, they are more likely to invest in their family's nutrition, education, and health. [a] Enhances decision-making over food production and consumption. [b] Improves maternal and child feeding practices. [c] Reduces gender disparities in nutrition.

**Care Practices and Time Use Pathway:** Agricultural work often requires significant time and labor, which can affect the time women and caregivers have for breastfeeding, preparing food, and caring for children. NSA promotes labor-saving technologies and supports community-based childcare solutions to balance productive and caregiving roles. [a] Reduces time burden on women. [b] Improves child care and feeding practices. [c] Supports women's health and well-being.

**Health and Sanitation Pathway:** Agricultural environments influence access to clean water, sanitation, and hygiene (WASH). Practices such as integrated farming, water conservation, and sanitation facilities help prevent diseases related to poor hygiene and water quality, which are

closely linked to malnutrition. [a] Prevents waterborne diseases and infections. [b] Supports clean and safe food preparation. [c] Improves absorption of nutrients in the body.

**Agri-Nutrition Knowledge and Behavior Pathway:** By integrating nutrition education into agricultural extension services, farmers and households can be made aware of the importance of balanced diets, food safety, cooking methods, and health practices. This behavior change communication reinforces the nutritional outcomes of agricultural efforts. [a] Encourages adoption of healthy food habits. [b] Promotes informed food choices. [c] Enhances nutrition literacy among rural communities.

**Importance of Nutrition-Sensitive Agriculture in the Indian Context:** India is a country with a vast agricultural base and diverse agro-climatic zones, yet it faces persistent challenges in ensuring adequate nutrition for all its citizens. Despite significant achievements in food grain production and food security, malnutrition remains a widespread problem. According to the National Family Health Survey (NFHS-5), a large percentage of children under five are stunted or underweight, and anemia among women and adolescent girls remains critically high. This contrast between food availability and nutritional well-being highlights the need to shift the focus from food security to nutrition security, and this is where Nutrition-Sensitive Agriculture (NSA) plays a crucial role. NSA emphasizes the production and availability of diverse, nutrient-rich foods such as fruits, vegetables, pulses, millets, and animal-source products. Traditionally, Indian agriculture has been cereal-centric due to market incentives and food security policies like the Public Distribution System (PDS). However, this focus has contributed to the neglect of micronutrient-rich foods, leading to hidden hunger. NSA encourages a diversified farming system that revives traditional crops like millets, promotes home gardens, and integrates small-scale animal husbandry and fisheries. These interventions are essential to improve dietary diversity and address micronutrient deficiencies at the household level.

Moreover, NSA is especially important in India due to the central role of women in agriculture. Women contribute significantly to food production, processing, and household nutrition, yet often lack access to resources, decision-making power, and extension services. NSA promotes gender-sensitive approaches by empowering women with knowledge, skills, and control over agricultural assets. When women are empowered, they are more likely to allocate resources toward family nutrition, health, and education, thereby improving the nutritional status of the entire household.

Another vital aspect of NSA in the Indian context is its alignment with government initiatives and national nutrition goals. Programs like Poshan Abhiyaan, the Mid-Day Meal Scheme, and Integrated Child Development Services (ICDS) aim to reduce malnutrition, especially among vulnerable groups. NSA complements these programs by ensuring that food produced locally is not only sufficient in quantity but also high in quality. It also supports the goals of the National Nutrition Strategy and Sustainable Development Goals (SDGs), particularly SDG 2: Zero Hunger and SDG 3: Good Health and Well-being. In addition, NSA can strengthen climate-resilient and sustainable farming practices. As India grapples with climate change and environmental degradation, promoting crops like millets, pulses, and indigenous vegetables which are more resilient to climate shocks can contribute to both environmental sustainability and

nutritional outcomes. NSA also promotes organic farming, mixed cropping, and resource-conserving practices that support long-term soil fertility and ecosystem health.

## **Pathways Linking Agriculture to Nutrition**

Nutrition-Sensitive Agriculture (NSA) recognizes the multiple and interrelated pathways through which agriculture can influence nutrition. These pathways help to establish the crucial link between agricultural systems and improved nutritional outcomes, particularly at the household and community levels. They highlight how agricultural policies, practices, and interventions can contribute to better food security, dietary diversity, health, and overall well-being. Below are the key pathways through which agriculture affects nutrition:

### **1. Food Availability Pathway**

Agriculture directly influences food availability by ensuring the production of a variety of nutritious foods. This includes both staple foods like grains and pulses, as well as fruits, vegetables, and animal-source foods, which are essential for a balanced diet. Diversified farming systems, which include the production of nutrient-rich crops such as legumes, millets, vegetables, and fruits, contribute significantly to improving household food availability. [a] Home gardens, small-scale farming, and mixed cropping systems ensure households can access a variety of fresh, locally produced food. [b] Promotes food self-sufficiency at the household level, especially in rural areas. [c] Reduces dependence on external markets, thus improving access to nutritious food even in times of crisis.

### **2. Income Pathway**

Agriculture is the primary source of income for millions of rural households, especially in countries like India. Increased agricultural productivity and diversified farming systems allow farmers to generate higher incomes, which can be spent on purchasing diverse, nutrient-rich foods. This pathway focuses on the relationship between agricultural income and access to nutritious foods. [a] Higher income allows households to purchase a variety of nutritious foods, including fruits, vegetables, and animal products. [b] It provides the economic means to invest in health services, sanitation, and education, all of which contribute to better nutrition. [c] Income from agriculture, particularly through the sale of high-value crops (such as vegetables, fruits, or dairy products), can lead to improved household nutrition.

### **3. Women's Empowerment Pathway**

In rural agricultural systems, women play a central role in food production, preparation, and care practices. Empowering women through better access to resources, knowledge, and decision-making can have a transformative effect on nutrition. When women have control over agricultural production and income, they are more likely to invest in their family's nutrition, education, and

healthcare, leading to improved nutritional outcomes for children and other household members. [a] Women's empowerment in agriculture contributes to better food preparation, child care, and feeding practices. [b] Enhances women's ability to make decisions regarding nutrition and household food security. [c] Supports gender equality in the agricultural sector and improves the distribution of nutritional resources.

#### **4. Health and Sanitation Pathway**

Agricultural practices are closely linked to health and sanitation, particularly when it comes to water, sanitation, and hygiene (WASH). Irrigation practices, the management of waste, and the production of clean food all play a role in nutrition outcomes. For instance, agricultural activities that promote clean water access, such as rainwater harvesting or the establishment of community water systems, contribute to better health and nutrition. [a] Integrated farming systems that combine agriculture with proper water management help improve sanitation and reduce waterborne diseases. [b] Improved water access allows for better food safety and hygiene during food preparation. [c] Reducing water contamination from agricultural practices ensures that families do not suffer from waterborne illnesses that impair nutrient absorption.

#### **5. Food Utilization Pathway**

The way food is prepared, consumed, and absorbed in the body is critical to its nutritional benefits. Agriculture plays a role in promoting food utilization by encouraging nutrient-dense food production and offering knowledge on how to preserve and process food. For instance, the cultivation of nutrient-rich crops, such as vegetables high in vitamin A, can help in addressing vitamin deficiencies in local diets. [a] Promotes nutrient-dense foods that improve the quality of the diet. [b] Agricultural extension services can play a crucial role by educating communities on the best methods of preparing, storing, and cooking foods to retain nutrients. [c] Ensures that nutritional benefits from food are maximized by improving food preservation and preparation techniques.

#### **6. Education and Knowledge Pathway**

Agricultural interventions that integrate nutrition education into extension services can help farmers and rural communities understand the link between agriculture and nutrition. This knowledge empowers them to make informed decisions about their food choices and agricultural practices. [a] Provides training to farmers on diversified food production, including the cultivation of nutrient-rich crops. [b] Promotes awareness of good dietary practices, food safety, and nutrition during farming practices. [c] Educates communities about the nutritional benefits of local food varieties and encourages their consumption.

## **7. Climate Change and Resilience Pathway**

Climate change has a profound impact on agriculture and, by extension, on nutrition. Changes in weather patterns, the increasing frequency of droughts, and shifting seasons can affect crop yields and food availability. Nutrition-sensitive agricultural practices can help farmers build resilience to climate change by promoting climate-smart agriculture (CSA), which focuses on sustainable farming techniques that reduce climate risk and improve food security. [a] Encourages the cultivation of climate-resilient crops that are better suited to changing weather patterns, ensuring continued access to nutrient-dense food. [b] Promotes agro-ecological farming systems that contribute to both environmental sustainability and improved nutrition. [c] Reduces the vulnerability of communities to food insecurity caused by environmental shocks.

## **Conclusion**

Nutrition-Sensitive Agriculture (NSA) is a powerful approach that recognizes the profound link between agricultural practices and nutritional outcomes. In the Indian context, where malnutrition remains a significant challenge despite advances in food production, NSA offers a sustainable solution to improving both food security and dietary diversity. By promoting the cultivation of diverse, nutrient-rich foods, empowering women, enhancing household income, and integrating climate-smart farming practices, NSA can address the multiple facets of malnutrition, including micronutrient deficiencies, undernutrition, and even obesity. The pathways linking agriculture to nutrition ranging from food availability and income generation to women's empowerment and education demonstrate the holistic potential of agriculture in improving public health. Implementing NSA requires a multi-sectoral approach, bringing together agricultural, nutrition, health, and social policies to ensure comprehensive and long-lasting improvements in nutrition security. As India continues to face the challenges of an evolving food system, climate change, and a growing population, NSA holds significant promise in advancing nutrition security, strengthening rural livelihoods, and creating sustainable agricultural practices. By integrating nutrition goals into agricultural policies and practices, India can make substantial progress toward achieving its national nutrition goals and the broader Sustainable Development Goals (SDGs).



## **Nutrition Sensitive Agriculture for Sustainable Development**

**Dr. V.L.V. Kameswari**

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Nutrition-sensitive agriculture is an innovative approach that ensures the production of a variety of affordable, nutritious, culturally appropriate, and safe foods in sufficient quantity and quality to meet the dietary needs of populations sustainably (Bhattacharyya et al., 2018). This approach bridges the gap between agriculture and nutrition by placing emphasis on nutritionally rich foods, dietary diversity, and food fortification to tackle malnutrition and micronutrient deficiencies. It acknowledges that agriculture has a dual role not only as a means of food production but also as a vital instrument for improving public health and achieving sustainable development. The significance of nutrition-sensitive agriculture was emphasised during the Second International Conference on Nutrition, held in November 2014 and organized by the Food and Agriculture Organization (FAO). The conference highlighted that agriculture must go beyond just producing food and address nutritional concerns to overcome the global challenges of malnutrition. This approach promotes dietary diversity by encouraging the cultivation of diverse crops, including fruits, vegetables, legumes, and bio fortified crops, rather than focusing solely on high-yield staples. Furthermore, it integrates food fortification and other interventions to enhance the micronutrient content of food, thereby addressing hidden hunger due to micronutrient deficiencies that often go unnoticed yet have far-reaching impacts on health and productivity.

### **Linkages between Agriculture, Nutrition, and Sustainability**

Agriculture, nutrition, and sustainability are deeply interconnected, forming the foundation for global food security, public health, and environmental resilience. Recognizing these linkages, the United Nations Sustainable Development Goal 2 (SDG2) aims to "End hunger, achieve food security and improved nutrition, and promote sustainable agriculture." This goal highlights the importance of addressing malnutrition, empowering smallholder farmers, promoting sustainable practices, and ensuring equitable access to nutritious food within the broader framework of the 17 Sustainable Development Goals (SDGs). At its core, agriculture provides the primary source of food and nutrition for households. However, beyond ensuring adequate caloric intake, proper nutrition requires a focus on micronutrient availability and access to diverse and healthy diets. Inadequate micronutrient intake, particularly among mothers and children during the critical 1,000 days from pregnancy to a child's second birthday, can have long-term developmental consequences. On the other hand, unhealthy diets and sedentary lifestyles have contributed to the rising prevalence of non-communicable diseases, such as diabetes and heart disease, in both developed and developing countries. By aligning agricultural practices with nutrition goals, these challenges can be addressed effectively.

Rural areas, where extreme poverty and hunger are most prevalent in developing countries, play a pivotal role in this context. Smallholder farmers and their families constitute a significant proportion of the rural poor and malnourished population. To break this cycle, boosting agricultural productivity, improving rural incomes, and empowering marginalized communities—especially women—become crucial.

Efficient food production and distribution systems also play a significant role in connecting agriculture, nutrition, and sustainability. Reducing food loss and waste at every stage of the value chain ensures more food reaches those who need it, while minimizing environmental impact. The adoption of integrated decision-making processes that address trade-offs among agriculture, water, energy, land use, and climate change can further strengthen the overall food system. The connections between agriculture and other sectors such as health, education, and social protection are critical to achieving nutrition and sustainability goals. Multi-sectoral initiatives like the Scaling-Up Nutrition (SUN) Movement and the Zero Hunger Challenge highlight the importance of collaborative approaches in linking agriculture to improved nutrition and sustainable practices. Engaging local communities in these efforts fosters ownership and accountability, making them active participants in building resilient food systems.

### **Diversification of Agriculture for Nutrition Sensitive Agriculture**

Diversification of agriculture plays an important role in advancing nutrition-sensitive agriculture by improving the availability, affordability, and stability of diverse and nutritious foods while promoting environmental sustainability and resilience. At its core, agricultural diversification seeks to broaden the range of crops, livestock, and other agricultural activities to meet the dietary and economic needs of communities. This approach addresses critical gaps in nutrition and contributes to a sustainable food system by integrating practices that simultaneously enhance productivity, dietary diversity, and ecosystem health.

On a larger scale, diversification implemented at regional or national levels has the potential to significantly impact market availability and reduce the prices of nutritious foods. For instance, fostering diversified production systems involving commercially oriented producers can increase the supply of nutrient-dense foods in local and global markets, ensuring they are accessible and affordable to a broader population. Integrated farming systems, such as agrosilvipastoral practices (combining crops, livestock, and forestry), legume-based cropping systems, and rice-wheat systems, are effective methods for achieving sustainable intensification while maintaining soil fertility and boosting yields. These systems not only enhance productivity but also support environmental conservation by reducing the need for synthetic inputs and promoting biodiversity.

Ecosystem-based approaches such as conservation agriculture, integrated pest and nutrient management, and efficient water management further bolster the sustainability of diversified agricultural systems. Conservation agriculture, for example, minimizes soil disturbance, maintains

soil cover, and fosters crop rotation, leading to improved soil health and resilience against climate change. Similarly, the use of drought-resistant or locally adapted crop varieties ensures stability in food production, particularly in regions prone to climatic fluctuations. Strengthening the horticulture sector is equally vital, as it emphasizes the production and consumption of fresh fruits and vegetables, which are essential for preventing micronutrient deficiencies and diet-related non-communicable diseases. Expanding this sector can directly contribute to healthier diets and more sustainable agricultural practices.

At the household and smallholder level, diversification strategies such as home gardening and integrated farming systems hold immense potential for improving nutrition and livelihoods. Home gardens, particularly those focused on nutrient-dense varieties of vegetables and fruits, offer families direct access to essential micronutrients and proteins, which may otherwise be difficult to afford or acquire in remote areas. Integrated farming systems that combine crops, livestock, and aquaculture provide a diversified income stream and help mitigate seasonal fluctuations in food availability. Complementary activities like beekeeping, mushroom farming, and fish production further enhance dietary diversity and household income while encouraging sustainable resource use.

Gender-sensitive approaches to diversification are also critical for maximizing nutritional outcomes, as women play a central role in agricultural activities and household food management. Empowering women through access to resources such as land, water, and seeds, along with targeted nutrition education, ensures that diversification strategies reach their full potential in improving diets and overall well-being. Additionally, market-based interventions, such as strengthening multiple value chains, stimulate production diversity while supporting the livelihoods of small-scale farmers. To achieve long-term success, diversification efforts must prioritize nutrient-dense crops and integrate sustainable practices that enhance soil health and biodiversity. Supporting smallholder households with food processing and preservation capacities further ensures year-round access to nutritious foods.

### **Role of Stakeholders in Promoting Nutrition-Sensitive Agriculture**

Nutrition-sensitive agriculture is a transformative approach that integrates nutrition goals into agricultural practices to address malnutrition, improve food security, and promote sustainable development. It recognizes that agriculture is not only about producing enough food but also ensuring the availability of diverse, nutrient-rich foods that support healthy diets. Achieving this requires the collective efforts of multiple stakeholders, including governments, international organizations, local communities, farmers, NGOs, researchers, the private sector, and consumers. Each of these actors plays a critical role in shaping food systems that are sustainable, inclusive, and nutrition-focused. Together, their collaboration can drive impactful changes, ensuring better health, resilient livelihoods, and the achievement of global development goals.

## **Government**

Government play a pivotal role in creating an enabling environment for nutrition-sensitive agriculture. By integrating nutrition-sensitive strategies into agricultural policies and programs, they can ensure that nutrition becomes a central focus of agricultural development. Governments can provide subsidies and incentives to promote the adoption of sustainable farming practices that prioritize the cultivation of nutrient-dense crops. Additionally, they can allocate funding for research and development of nutrition-sensitive initiatives and create regulations to fortify food systems with adequate micronutrients.

## **International Organisation**

International organizations, such as the Food and Agriculture Organization (FAO), the World Food Programme (WFP), and UNICEF, play a critical role in driving global initiatives for nutrition-sensitive agriculture. These organizations provide technical assistance, policy advice, and funding to governments and local communities to support sustainable agricultural practices. They also work to establish global standards for food security and nutrition, ensuring that countries adopt evidence-based practices.

## **Local Communities**

Local Communities are at the core of implementing and sustaining nutrition-sensitive agricultural practices. Community engagement ensures that agricultural projects are culturally appropriate and meet the specific nutritional needs of the population. For example, traditional knowledge about local crops and food systems can be leveraged to promote sustainable farming practices that are aligned with the community's dietary habits.

## **Farmers**

Farmers are the primary stakeholders in nutrition-sensitive agriculture, as they are responsible for producing the food that feeds populations. By adopting diverse cropping systems, organic farming, agroforestry, and other sustainable practices, farmers can contribute directly to improved food security and nutrition. They play a crucial role in ensuring the availability of nutrient-rich crops such as legumes, fruits, and vegetables, which are essential for a balanced diet. However, farmers often face challenges such as lack of access to resources, knowledge, and markets. Providing farmers with training on sustainable agricultural techniques, access to quality seeds, and financial support can help them transition to nutrition-sensitive practices.

## **Non-Governmental Organizations (NGOs)**

NGOs play an instrumental role in bridging the gap between policy and grassroots implementation. They work closely with local communities and farmers to implement nutrition-sensitive agriculture projects by providing training, resources, and technical support. For example, NGOs often organize workshops to educate farmers on sustainable

farming practices, post-harvest management, and crop diversification. They may also distribute inputs like seeds and tools to resource-constrained farmers. Additionally, NGOs play an advocacy role, influencing governments and international organizations to prioritize nutrition-sensitive agriculture in their policies and programs.

### **Private sector**

Private sector has a significant role in driving innovation and investment in nutrition-sensitive agriculture. Companies can develop and promote sustainable agricultural technologies, such as precision farming tools, organic fertilizers, and bio fortified crops, which enhance productivity while improving nutrition. Private sector also plays a key role in creating value chains for nutritious foods, ensuring that these products reach consumers at affordable prices.

### **Consumers**

Consumers are vital stakeholders in nutrition-sensitive agriculture, as their choices influence food production systems. By demanding diverse, nutritious, and sustainably produced foods, consumers create market incentives for farmers and companies to prioritize nutrition-sensitive practices. Educating consumers about the benefits of a balanced diet and the importance of sustainable agriculture can drive behavioural changes that promote healthier lifestyles. Moreover, consumers can reduce food waste by adopting responsible consumption practices, which contribute to the sustainability of food systems. Engaging consumers through awareness campaigns and nutrition education programs is essential for building a culture that values both health and sustainability.

## **Conclusion**

Nutrition-sensitive agriculture is an innovative approach that integrates agricultural practices with the objectives of improving nutrition, health, and environmental sustainability. By emphasizing the cultivation of diverse, nutrient-rich crops and sustainable farming practices, it addresses both the direct and indirect factors contributing to malnutrition. This approach seeks to bridge the gap between food production and nutrition by not only ensuring food availability but also by enhancing the nutritional quality of food produced, focusing on essential micronutrients, proteins, and vitamins needed for optimal health. For a country like India, where agriculture is the backbone of rural economies and plays a pivotal role in national development, adopting nutrition-sensitive agriculture is crucial. With a significant portion of the population dependent on agriculture for their livelihoods, the integration of nutrition goals into agricultural practices can improve food security, reduce malnutrition, and increase economic resilience. Additionally, sustainable farming techniques, such as agroecology and diversification, can help enhance environmental sustainability by reducing land degradation, conserving water, and promoting biodiversity. As the global community works towards achieving the Sustainable Development Goals, particularly SDG 2 (Zero Hunger) and SDG 12 (Responsible Consumption and Production), nutrition-sensitive

agriculture becomes an essential strategy. It not only helps alleviate hunger but also promotes healthier diets, fosters sustainable agricultural practices, and creates a more resilient food system for the future.

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## **Importance of collaborations and linkages for promoting nutri-sensitive agriculture**

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### **Abstract**

This chapter underscores the essential role of collaborations and linkages in advancing nutri-sensitive agriculture as a sustainable solution to the dual challenges of malnutrition and climate change. Diverse stakeholders—including government bodies, private enterprises, and non-governmental organizations—play a critical role in promoting sustainable, economically viable, and environmentally resilient agricultural practices. Case studies, such as the JEEViKA initiative in Bihar, illustrate the impact of women’s empowerment, local value chains, and community engagement in driving nutrition-sensitive agricultural outcomes. Through the program, 1.17 crore women actively participate in transforming health and nutrition practices within their households and communities. JEEViKA has trained and employed 7,500 Poshan Sakhis and deployed 135 Swasthya Mitras in hospitals and medical colleges, emerging as a national model for health and nutrition improvement, especially in economically disadvantaged areas. Two key technologies developed by Dr. Rajendra Prasad Central Agricultural University—the hand-cranked chakki and electric Okhali—further enhance this model by making food processing more efficient and reducing labor demands on rural women. Millets are positioned as cornerstone crops in climate-smart, nutri-sensitive agriculture strategies due to their minimal water requirements and ability to thrive in low-fertility soils, making them ideal for regions facing desertification. Additionally, the Pulse Polio Eradication Initiative exemplifies the importance of multi-level collaborations, with governmental, international, healthcare and community partnerships working together to eliminate poliomyelitis. **Keywords:** Community engagement; Food security; Nutrient-rich crops; Policy frameworks; Sustainable agriculture; Women's empowerment.

## Introduction

As the global population grows, the demand for food production intensifies, particularly in developing countries where millions still suffer from malnutrition. The traditional focus of agriculture has often been on increasing yield to meet the food security needs of growing populations. However, this approach—centered on **staple crops** like rice, wheat, and maize—often overlooks the **nutritional quality** of the food produced. As a result, there is a growing recognition of the need for **Nutri-sensitive agriculture**—an agricultural approach that not only ensures food security but also emphasizes the nutritional value of food, environmental sustainability, and the economic empowerment of farming communities. Collaboration allows parties with different perspectives to constructively discuss their differences and seek solutions that surpass their initial limited views of what is achievable (Gary, 1989), whereas linkage, as per Oxford's definition is the action of linking or the state of being linked or a system of links of different institutes or organisation etc. (Oxford University Press, 2024)

## Nutri-Sensitive Agriculture: A Holistic Framework

**Nutri-sensitive agriculture** is defined by its focus on producing food that is not only plentiful but also nutritionally rich, ecologically sustainable, and economically viable. At its core, Nutri-sensitive agriculture is a **multidimensional approach** to food systems, recognizing that food security is more than just ensuring sufficient caloric intake. It addresses the critical aspects of **diet diversity, micronutrient sufficiency, and environmental stewardship**.

## Defining Nutri-Sensitive Agriculture

According to FAO, Nutrition-sensitive agriculture prioritizes nutritionally rich foods, dietary diversity, and food fortification to address malnutrition and micronutrient deficiencies through agricultural development.

According to IFAD, Nutrition-sensitive agriculture focuses on integrating nutritionally rich foods and dietary diversity to combat undernutrition, over-nutrition, and micronutrient deficiencies.

## Objectives of Nutri-Sensitive Agriculture

The goals of nutri-sensitive agriculture align with **sustainable development**, aiming to:

1. **Promote biodiversity** by growing a wider range of crops that contribute to better nutrition and environmental resilience. This includes incorporating **nutri-cereals**, pulses, and vegetables that provide a richer source of micronutrients.
2. **Reduce malnutrition** by integrating nutrition-sensitive interventions into agricultural systems, thereby addressing the root causes of malnutrition such as poor diet diversity and reliance on calorie-dense but nutrient-poor staples.
3. **Enhance food security** by building resilient agricultural systems that are less vulnerable to environmental stresses like drought, flooding, and climate variability.
4. **Sustain ecological health** by adopting farming practices that protect ecosystems, reduce **soil degradation**, and mitigate climate change impacts.
5. **Promote economic empowerment** through local value chains that create employment opportunities, particularly for women and marginalized communities. Supporting **cottage industries** and decentralized food processing enhances rural economies and ensures the equitable distribution of benefits.

### **The Role of Millets in Nutri-Sensitive Agriculture**

**Millets**, often referred to as "ancient grains," have garnered attention for their **resilience to climate change** and their exceptional nutritional benefits. These small-seeded grains, which include species like **pearl millet**, **finger millet**, **foxtail millet**, and **barnyard millet**, are highly adaptable to harsh environments and can thrive in **semi-arid regions** with minimal water. As such, millets are positioned as a key component of **climate-smart** and **nutri-sensitive** agricultural strategies.

### **Nutritional Superiority of Millets**

Millets are not only resilient but also nutritionally superior to many of the staples that dominate global agriculture. They are rich in:

- **Proteins:** Millets like **foxtail millet** and **proso millet** contain **12.3–12.5 grams of protein** per 100 grams, making them a valuable source of protein, particularly in regions where animal protein is scarce or unaffordable (The Indian Express, 2024).

- **Dietary Fiber:** Millets like **barnyard millet** boast **13.6 grams of fiber** per 100 grams, significantly higher than rice and wheat (Ask Nestle, 2024). This high fiber content aids digestion, helps manage blood sugar levels, and reduces the risk of cardiovascular diseases.
- **Micronutrients:** Millets are a rich source of **iron, calcium, magnesium, and zinc**. For instance, **finger millet** contains **344 mg of calcium** per 100 grams (Devi et al., 2011). These nutrients are essential for maintaining strong bones and preventing conditions such as **anemia**.

Additionally, millets are **gluten-free**, making them an ideal alternative for individuals with gluten intolerance or **celiac disease**. This has increased their popularity in urban markets, where consumers are seeking healthier, alternative grains.

### **Climate Resilience of Millets**

Millets are often hailed as **climate-smart crops** due to their ability to withstand **extreme environmental conditions**. With the global climate becoming more erratic—characterized by rising temperatures, unpredictable rainfall, and prolonged droughts—millets offer a solution to **food security** in vulnerable regions. These crops require **less water** than wheat and rice and can grow in soils with low fertility, making them suitable for areas prone to **desertification**.

The climate resilience of millets is particularly important in the context of **global warming**, which is expected to reduce the yields of many major crops. As temperatures rise, traditional crops like rice and maize struggle to survive in arid conditions. However, millets can maintain high productivity under stress conditions, ensuring a **stable food supply** even in challenging environments.

### **Community Approaches for Social Upliftment**

The success of nutri-sensitive agriculture largely depends on the **engagement of communities**. Agriculture, particularly in rural areas, is more than just a means of food production—it is deeply embedded in communities' social and cultural fabric. As such, interventions promoting nutri-sensitive agriculture must involve the active participation of local populations, particularly smallholder farmers, women, and marginalized groups. The shift towards nutri-sensitive agriculture requires community-driven approaches that focus on sustainable practices, resource

conservation, and local empowerment. Traditional mono-cropping systems and the reliance on staple cereals have contributed to soil degradation and limited nutritional benefits. However, through crop diversification, crop rotation, and the promotion of nutria-cereals such as millets, farmers can improve both environmental sustainability and public health outcomes. Additionally, encouraging the establishment of cottage industries for processing agricultural products at the local level reduces dependence on large-scale industries and fosters economic growth within rural communities. Embracing natural methods for storage and utilizing biomass for soil enrichment, rather than burning it, further supports environmental health. These practices aim to reduce agricultural waste and promote judicious use of resources, ensuring a balanced approach that benefits both the farming community and the environment. Table 1 illustrates the recommended shifts in agricultural practices to achieve these objectives.

**Table 1: Shifts in Agricultural Practices: Limit vs. Promote for Nutri-Sensitive Farming**

| <b>S. No.</b> | <b>Category</b>           | <b>Practices to Limit or Replace</b>                        | <b>Recommended Sustainable Practices</b>            |
|---------------|---------------------------|-------------------------------------------------------------|-----------------------------------------------------|
| <b>1.</b>     | <b>Farming Methods</b>    | Single-crop farming (monoculture)                           | Diverse crop rotation for ecosystem health          |
| <b>2.</b>     | <b>Primary Crops</b>      | Dependence on refined grain cereals                         | Inclusion of nutrient-dense grains (nutria-cereals) |
| <b>3.</b>     | <b>Food Processing</b>    | Extensive processing                                        | Minimal processing to retain natural nutrients      |
| <b>4.</b>     | <b>Industrial Scale</b>   | Large-scale industrial production, even for primary produce | Small-scale, locally-driven cottage industries      |
| <b>5.</b>     | <b>Storage Techniques</b> | Reliance on chemical preservatives                          | Use of natural methods for safe and fresh storage   |
| <b>6.</b>     | <b>Biomass Management</b> | Burning of agricultural stubbles/biomass                    | Using biomass to enhance soil health and resilience |

|    |             |                      |                                             |
|----|-------------|----------------------|---------------------------------------------|
| 7. | By-products | Wastage of leftovers | Strategic, efficient use of all by-products |
|----|-------------|----------------------|---------------------------------------------|

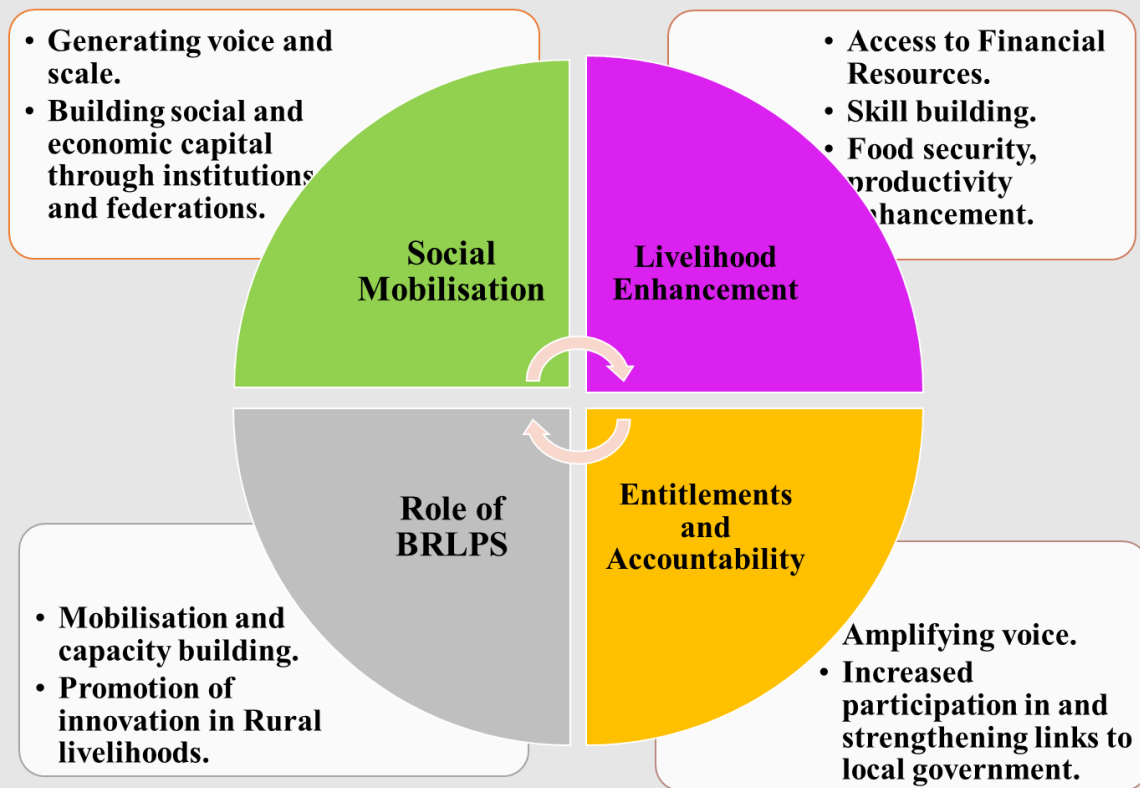
### Women's Empowerment through JEEViKA SHGs

A shining example of community-based approaches in action is the **JEEViKA initiative** in Bihar, India, which has mobilized millions of rural women through **self-help groups (SHGs)**. These women-led SHGs have become a powerful force in promoting **livelihood enhancement**, improving **food security**, and advancing **women's empowerment**.

Through the JEEViKA initiative, women are trained in **nutrition-sensitive farming**, learning how to grow diverse crops, manage kitchen gardens, and produce value-added food products. These SHGs have also established **community kitchens**, where nutritious foods are prepared and distributed to vulnerable groups, such as pregnant women, lactating mothers, and young children. By involving women in every stage of the food production and distribution process, JEEViKA ensures that the benefits of nutri-sensitive agriculture reach the entire community.

Moreover, the income generated through SHG activities has empowered women economically, giving them greater autonomy and decision-making power within their households. This has ripple effects on **child nutrition** and **family health**, as women are more likely to invest their earnings in their children's education, healthcare, and nutrition.





**Fig. 1. Cycle matrix: Framework of Project Interventions (JEEViKA BRLP, 2014)**

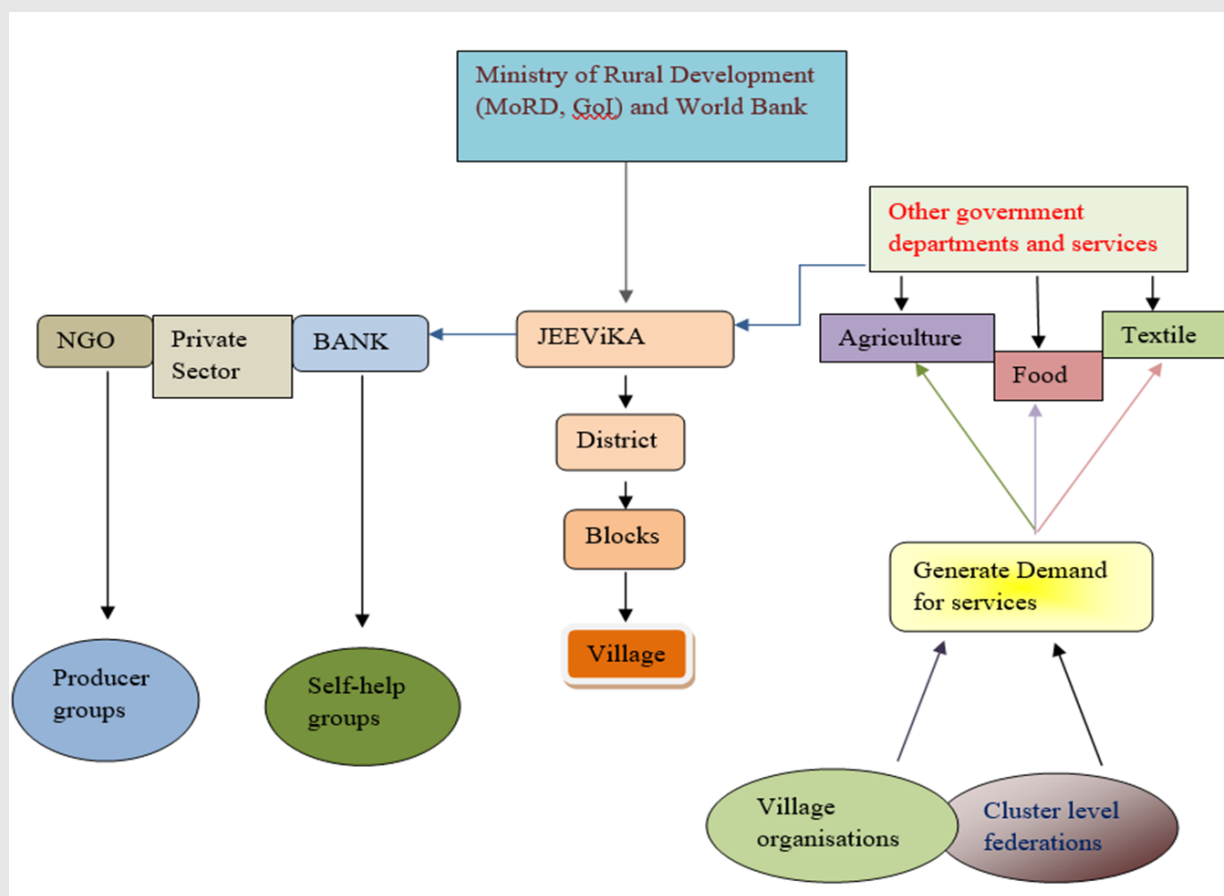
The core pillars of the JEEViKA aim to empower rural communities, especially women, through a cyclical and interconnected process. It forms a continuous cycle—**social mobilization** strengthens access to **livelihoods**, which enhances the ability to claim **entitlements**, all supported by **BRLPS** (Fig. 1). This holistic approach leads to sustained rural empowerment.

1. **Social Mobilisation:** JEEViKA organizes rural women into **Self-Help Groups (SHGs)** to amplify their collective voice, enabling them to tackle issues like poverty and inequality. These SHGs further form **Village Organizations (VOs)** and **Cluster-Level Federations (CLFs)**, building social and economic capital through pooled resources and access to formal credit.
2. **Livelihood Enhancement:** JEEViKA enhances rural livelihoods by improving **access to financial services**, promoting **skill-building** in agriculture and non-farm enterprises, and advancing **food security** through the cultivation of nutria-cereals and climate-resilient farming.

3. **Entitlements and Accountability:** Women are empowered to **demand entitlements** like food security, healthcare, and pensions. JEEViKA fosters increased participation in **local governance**, ensuring marginalized voices are heard and development is more inclusive.
4. **Role of BRLPS:** BRLPS plays a crucial role by facilitating **mobilization, capacity building**, and promoting **innovation** in rural livelihoods, including sustainable agriculture and value-chain development.

### **Institutional framework and stakeholder collaboration within JEEViKA**

Fig. 2. showcases **JEEViKA's collaborative model** involving multiple stakeholders—government agencies, banks, NGOs, private sector partners, and rural community institutions (SHGs, VOs, CLFs). These stakeholders work together to empower rural women, improve livelihoods, and ensure access to financial and development resources at the grassroots level. Through this integrated framework, JEEViKA creates a sustainable system where rural communities, particularly women, are mobilized to drive their own socio-economic growth.



**Fig. 2. Community Platform under JEEViKA**

1. **Ministry of Rural Development (MoRD, GoI) and World Bank:** At the top level, the Ministry of Rural Development (Government of India) and the World Bank provide the overall policy and funding support for the JEEViKA project. This partnership ensures financial and institutional backing for the initiative.
2. **JEEViKA Structure:** JEEViKA operates through a decentralized structure:
  - **District level:** JEEViKA's plans are implemented at the district level.
  - **Blocks:** Each district is further divided into blocks for localized governance and implementation.
  - **Village:** At the grassroots, JEEViKA works directly with rural communities to implement programs and services.

### 3. Collaborations with Banks, NGOs, and Private Sector

- **Banks:** Banks provide financial services like loans, savings, and credit to Self-Help Groups (SHGs) and federations, fostering economic independence for women.
- **NGOs and Private Sector:** These entities collaborate with JEEViKA to build **Producer Groups** and provide technical support and capacity building. The private sector may also facilitate market linkages.
- **Self-Help Groups (SHGs):** Women in the community are mobilized into SHGs, where they save money, access credit, and collectively pursue economic opportunities.

### 4. Producer Groups and SHGs

- **Producer Groups:** These groups focus on collective production activities, such as agriculture, textiles, or other rural industries, enabling economies of scale and shared resources.
- **Self-Help Groups:** Rural women form SHGs to manage savings and credit activities and build their financial independence.

### 5. Other Government Departments and Services: Various government departments (Agriculture, Food, Textile, etc.) work in tandem with JEEViKA to deliver sector-specific services:

- **Agriculture:** Provides support related to farming, access to improved inputs, and market linkages.
- **Food:** Focuses on food security and nutrition-related services.
- **Textile:** Supports women engaged in textile production.

### 6. Village Organizations and Cluster-Level Federations

- **Village Organizations (VOs):** SHGs come together to form Village Organizations, which manage resources, coordinate activities, and create stronger economic and social networks at the village level.

- **Cluster-Level Federations (CLFs):** These federations bring together multiple Village Organizations at a higher level to handle larger issues, provide support, and connect with markets and services on a broader scale.

7. **Generate Demand for Services:** Village Organizations and Cluster-Level Federations, supported by SHGs, help **generate demand for services** from both the government and the market. By articulating their needs for agricultural inputs, financial resources, or skill development, they actively engage in the development process and access the services provided by different government departments.

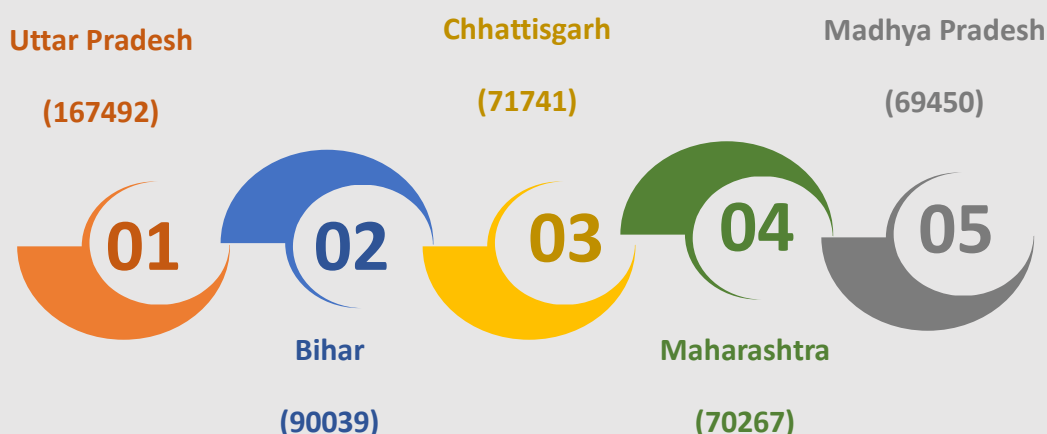
Table 2 highlights the widespread impact of JEEViKA across Bihar, showcasing its deep reach in terms of geographical spread (districts and blocks), institutional presence (Village Organizations and Cluster Level Federations), and the number of women empowered through Self-Help Groups. With 1.17 crore women participating in the program, JEEViKA has become a transformative force for rural women's economic and social empowerment in Bihar.

**Table 2: Total reach out of JEEViKA (BRLPS, 2021; Lal *et al.*, 2022)**

| S. No. | Particulars               | Numbers     |
|--------|---------------------------|-------------|
| 1      | District                  | 38          |
| 2      | Blocks                    | 534         |
| 3      | Village Organizations     | 60955       |
| 4      | Cluster Level Federations | 1085        |
| 5      | Women Self-Help Groups    | 10 Lakhs    |
| 6      | JEEViKA Didi              | 1.17 Crores |

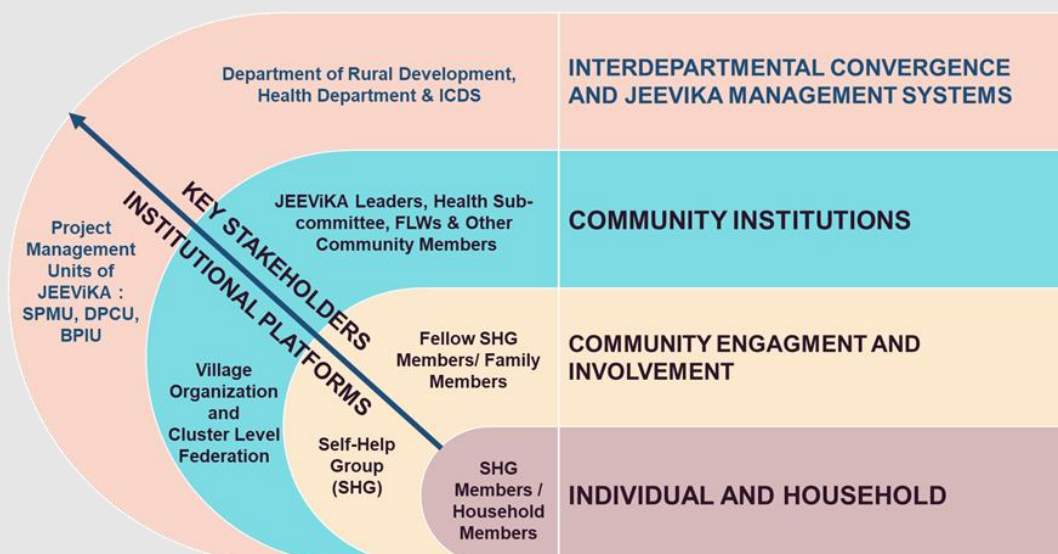
The top five Indian states with the most Accredited Social Health Activists (ASHAs) shown in Fig. 3. Uttar Pradesh leads with 167,492 ASHAs, followed by Bihar with 90,039, Chhattisgarh with 71,741, Maharashtra with 70,267, and Madhya Pradesh with 69,450. These ASHAs are

crucial for public health outreach, particularly in rural and underserved areas, where they provide essential health services and support community health initiatives (Lal *et al.*, 2022).



**Fig. 3. Top 5 states with Accredited Social Health Activists (ASHAs)**

JEEViKA's health and nutrition strategy focuses on empowering women to transform health and nutrition practices in their households and communities. Fig. 4 outlines various levels of stakeholders and institutional platforms involved in delivering services and support to individuals and households. It implements a comprehensive behavior change communication strategy and links to existing government nutrition and sanitation programs, alongside JEEViKA's income support efforts, such as promoting kitchen gardens and livestock for diet diversity. The strategy targets key behaviors: early pregnancy registration, ante and postnatal checkups, high-risk case identification; maternal nutrition counseling (iron folate intake, diet diversity, rest); institutional delivery and birth preparedness; early and exclusive breastfeeding, complementary feeding, immunization; and sanitation and hygiene.



**Fig. 4. 360° SBCC Initiative with JEEViKA (Dennyson, 2023)**

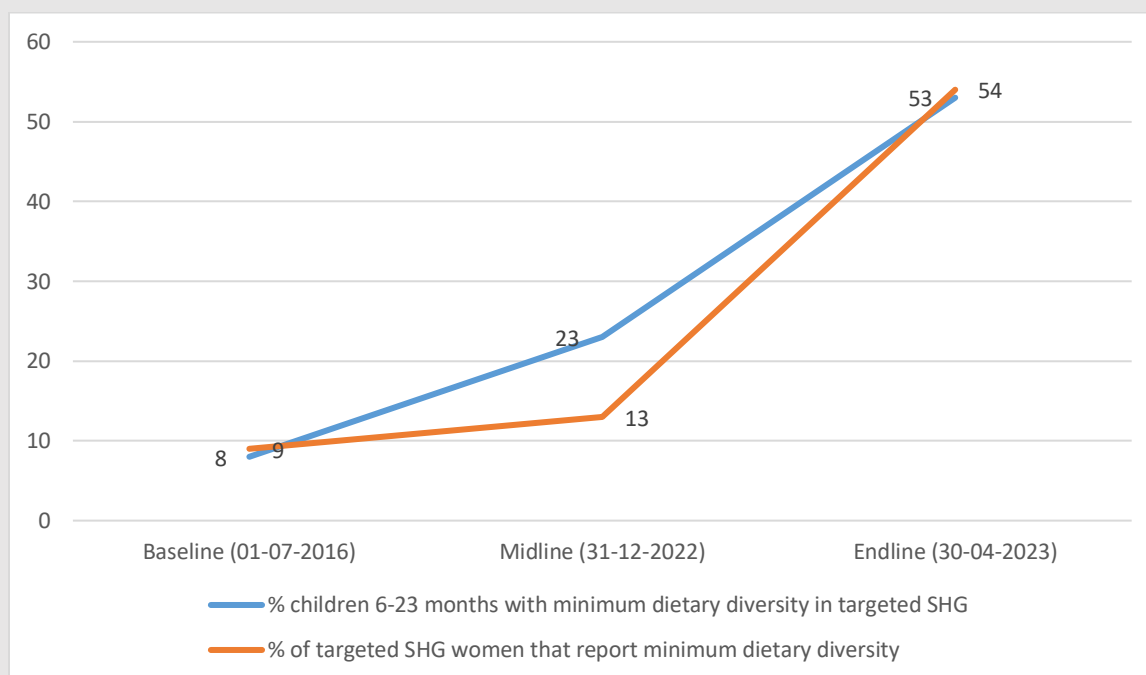
### **Poshan Sakhis: Local Heroes in Nutrition Education**

JEEViKA has trained and employed 7,500 *Poshan Sakhis* (nutrition friends), who educate rural women about the importance of maternal and child nutrition. These local health educators are essential in changing deep-seated beliefs about childbirth and nutrition, promoting healthy eating practices among pregnant women, and encouraging routine health check-ups. The success of these initiatives is reflected in the improved dietary diversity among Bihar's children and women of reproductive age. According to the report of JEEViKA's Bihar Transformative Development Project (BTDP) currently half the state's children under 5 years old consume a more varied diet, compared to only 2 out of 10 before 2018. The diet of women of reproductive age also improved between 2018 and 2022, with 6 out of 10 women now eating better, up from 2 out of 10 as represented in Fig. 6. The remarkable success of the Social Behavior Change Communication (SBCC) campaign led to its expansion across Bihar. The initial phase reached over 1 million beneficiaries in 35 districts, while the second phase extended to 1.393 million beneficiaries in 38 districts. Fig. 5 shows the increase in minimum dietary diversity children and SHG women.

Poshan Sakhis plays an important role in improving nutrition at the grassroots level, particularly in rural areas. Here are some of their roles: -



- **Community Engagement for Nutrition:** Poshan Sakhis work with rural communities, especially pregnant women, lactating mothers, and children, to promote nutrition and dietary practices.
- **Spreading Awareness:** They raise awareness about malnutrition, balanced diets, and the importance of breastfeeding, complementary feeding, and maternal health.
- **Supporting Government Schemes:** They help in the implementation of government nutrition programs like *Poshan Abhiyaan* and ensure community participation.
- **Monitoring Health:** Poshan Sakhis assists in monitoring the growth of children (weight and height) and provides counselling to mothers.
- **Data Collection and Reporting:** They collect data on the nutritional status of women and children in their assigned areas, contributing to health reports.



**Fig. 5. Increase in minimum dietary diversity children and SHG women**



**Fig. 6. More women of reproductive age are eating better (World Bank Group, 2023)**

The 360° SBCC initiative exemplifies how a thorough strategy can effectively tackle major health and nutrition issues. Empowering women and communities with essential knowledge and resources lays the foundation for a healthier, more prosperous Bihar and India.

### **Impact on Families: Personal Stories**

Women like Ruby Devi, a homemaker from Jehanabad district, have benefited significantly from these interventions. Ruby's first child, born in 2014, was underweight and frequently ill. After learning from her *Poshan Sakhi* about nutrition, ideal birth spacing, and proper feeding practices, Ruby's second child, born healthier in 2016, thrived. This story is emblematic of the broader success of JEEViKA in transforming maternal health outcomes across the state.

### **Swasthya Mitras: Bridging Gaps in Healthcare**

In addition to nutrition, JEEViKA has deployed 135 *Swasthya Mitras* (health friends) in hospitals and medical colleges. These individuals play a crucial role in assisting rural patients, many of whom are unfamiliar with hospital procedures, ensuring that they receive timely and appropriate

care. For instance, Shalini, a *Swasthya Mitra* at Bhagalpur Medical College, helps patients navigate the complex healthcare system, connecting them to the right departments and medical services. Her role is especially important for underprivileged individuals who often face anxiety and confusion when seeking treatment.

**Swasthya Mitras** play important roles in improving health at the grassroots level, particularly in rural areas. Here's an overview of their roles:

- **Healthcare Linkages:** Swasthya Mitras connect rural communities to healthcare services under the *Ayushman Bharat* scheme and facilitate access to health insurance benefits.
- **Health Awareness Campaigns:** They promote health awareness about hygiene, sanitation, disease prevention, and early detection of health issues.
- **Mobilizing Communities:** They mobilize communities for health check-ups, immunization drives, and other health camps.
- **Assistance in Availing Medical Services:** Swasthya Mitras assist families in availing services from empanelled hospitals, including claims under the Pradhan Mantri Jan Arogya Yojana (PM-JAY).
- **Health Education:** They educate people about chronic diseases, maternal and child health, and encourage preventive healthcare measures.

The JEEViKA program has emerged as a national model for improving health and nutrition outcomes, especially in impoverished regions. Through its multi-faceted approach, which includes community engagement, healthcare assistance, and affordable nutrition solutions, Bihar is setting an example of how grassroots efforts can significantly improve public health. The continued efforts of *Poshan Sakhis* and *Swasthya Mitras* promise to further enhance the well-being of families, reducing maternal and child mortality and fostering healthier futures for the state's rural population.

## **Technological Innovations in Agriculture**

The role of **technology** in nutri-sensitive agriculture cannot be overstated. Technological innovations have the potential to **transform traditional farming** practices, making them more efficient, sustainable, and nutrition-sensitive. In particular, the development of technologies that

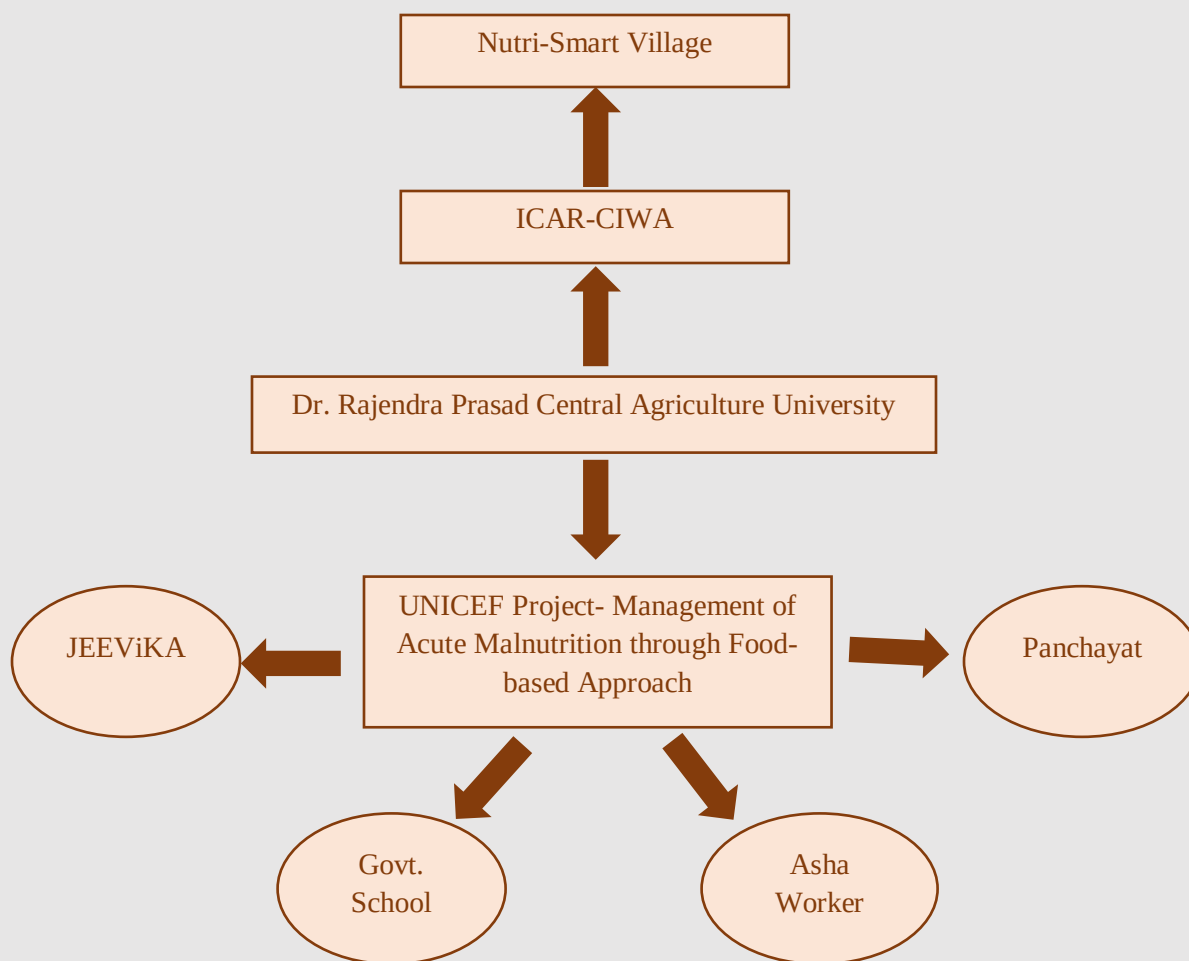
reduce the drudgery of farming and increase the **nutritional value of food** is essential for the success of nutri-sensitive agriculture.

### **Rajendra Hand-Cranked Chakki and Electric Okhali**

Two notable technologies developed by **Dr. Rajendra Prasad Central Agricultural University** include the **hand-cranked chakki** and the **electric Okhali**. These technologies are designed to make food processing more efficient and reduce the labor burden on rural women.

- **Hand-Cranked Chakki:** This manual device allows for the **processing of pulses**, grains at the household or cottage-industry level. It is particularly beneficial for **small-scale farmers** and **cottage industries**, as it reduces drudgery, improves productivity, and enables local production of value-added products such as **dal**, **sattu**, and **dalia**.
- **Electric Okhali:** This electric device performs three functions—**dehulling**, **winnowing**, and **grading**—making it a versatile tool for smallholder farmers. It is particularly useful for processing **millets**, as well as other coarse grains, enabling farmers to add value to their produce and increase their incomes.

These innovations also support the development of **cottage industries** by providing affordable and accessible tools for food processing. By keeping food processing local, these technologies not only reduce the need for large-scale industrial processing but also ensure that the **nutritional value of food is retained** and that the **economic benefits of food production** remain within the community.



**Fig. 7. Collaboration and Linkage of RPCAU with different stakeholders**

### **Addressing Malnutrition through Nutri-Sensitive Agriculture**

One of the central goals of nutri-sensitive agriculture is to **combat malnutrition**, which remains a pressing issue in many parts of the world. **Malnutrition** can manifest as **undernutrition** (including wasting, stunting, and micronutrient deficiencies) or **over-nutrition** (such as obesity and diet-related non-communicable diseases). Nutri-sensitive agriculture addresses these issues by ensuring that farming systems produce a diverse array of nutrient-rich foods that meet the dietary needs of all community members.

### **The Importance of Diet Diversity**

A **diverse diet** is critical for preventing malnutrition. Diets that rely heavily on staple crops like rice, maize, and wheat may provide sufficient calories but often lack the essential nutrients—such

as **vitamins, minerals, and proteins**—needed for healthy growth and development. Nutri-sensitive agriculture promotes the cultivation of a wide variety of crops, including:

- **Pulses and legumes:** Rich in protein and essential amino acids, pulses like **lentils, chickpeas, and black beans** are a key source of nutrition in many regions.
- **Leafy green vegetables:** High in vitamins A, C, and K, as well as iron and calcium, leafy greens like **spinach, kale, and amaranth** contribute to better immune function and overall health.
- **Fruits:** Fruits such as **mangoes, bananas, and oranges** are packed with vitamins and fiber, making them an important part of a balanced diet.

By promoting **diet diversity**, nutri-sensitive agriculture ensures that communities have access to a variety of foods that meet their nutritional needs.

### **Balahaar: A Community-Driven Nutrition Initiative**

A prime example of a community-driven initiative to combat malnutrition is **Balahaar**, a **ready-to-eat, energy-dense, protein-rich product** developed by **JEEViKA SHGs** in collaboration with **RPCAU**. Balahaar is designed to meet the nutritional needs of children aged six months and older, providing them with essential nutrients like **calcium, protein, and iron (Fig. 7)**.

Balahaar not only addresses the problem of **child malnutrition** but also empowers women economically by involving them in the production process. The income generated from Balahaar production helps improve the livelihoods of the women involved, enabling them to provide better care for their children and families.

### **Policy and Institutional Support for Nutri-Sensitive Agriculture**

The success of nutri-sensitive agriculture depends on strong **policy frameworks** and **institutional support** that incentivize sustainable and nutrition-sensitive practices. Governments, development agencies, and international organizations must work together to create policies that:

1. **Incentivize diversified farming:** Governments should provide subsidies and financial incentives to encourage farmers to grow a variety of crops, including **nutri-cereals**, pulses, and vegetables, rather than focusing solely on staple grains.

2. **Support local food systems:** By investing in local markets, processing facilities, and value chains, policymakers can help smallholder farmers produce and sell nutrient-rich foods in their communities.
3. **Ensure equitable access to nutritious food:** Public policies should focus on making nutritious foods affordable and accessible, particularly for vulnerable populations such as **children, pregnant women, and the elderly.**

### **The Role of International Organizations**

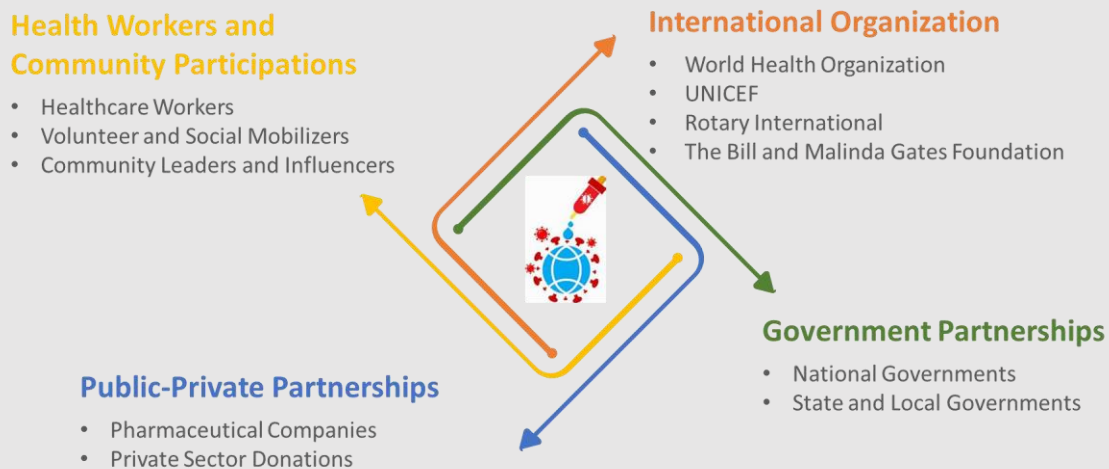
**International organizations** such as the **Food and Agriculture Organization (FAO)** and the **World Health Organization (WHO)** play a key role in supporting the transition to nutri-sensitive agriculture. These organizations provide technical assistance, research funding, and policy advice to governments and NGOs working on food security and nutrition.

One example of international support is the **Global Agriculture and Food Security Program (GAFSP)**, which provides funding to developing countries to support projects that improve food security, nutrition, and agricultural productivity. By working with local governments and NGOs, GAFSP helps implement **nutri-sensitive interventions** that increase the availability of nutritious foods.

### **Collaboration and Linkage involved in the Pulse Polio Eradication Initiative**

The Pulse Polio Eradication Initiative is one of the most significant global public health campaigns aimed at eliminating poliomyelitis. Its success relies on complex, multi-tiered collaborations between governments, international organizations, healthcare providers, community leaders, and the private sector. This section explores the key partnerships and community-driven approaches that form the backbone of this initiative, emphasizing their roles in ensuring widespread vaccination coverage and public engagement.





**Fig. 8. Collaborative Frameworks in the Pulse Polio Eradication Initiative**

## **Multi-Sectoral Collaboration in the Pulse Polio Initiative**

The Pulse Polio campaign is built on an intricate collaboration web among various stakeholders. The eradication of polio, a highly contagious viral disease, requires seamless integration between organizations operating locally, nationally, and globally. Four major sectors play pivotal roles in this framework: health workers and community participation, international organizations, government partnerships, and public-private partnerships (**Fig. 8**).

### **1 Health Workers and Community Participation**

At the grassroots level, health workers are the driving force behind the administration of the oral polio vaccine (OPV). Their role extends beyond mere vaccine delivery; they serve as the primary connection between the healthcare system and the community. In addition to healthcare professionals, volunteers, and social mobilizers are instrumental in spreading awareness about polio eradication campaigns. These mobilizers work to educate the public on the importance of immunization, often addressing local myths or misinformation that might hinder vaccine uptake.

In many instances, community leaders and influencers—such as religious figures, local elders, or cultural leaders—play a crucial role in persuading hesitant populations. By endorsing the program, they can shift public opinion and ensure greater participation, particularly in communities with historically low vaccination rates.

## **2 International Organizations**

The Pulse Polio Initiative is part of the broader Global Polio Eradication Initiative (GPEI), which is supported by key international organizations. The World Health Organization (WHO), UNICEF, Rotary International, and The Bill and Melinda Gates Foundation contribute both financially and technically. Their role includes providing vaccines, sharing best practices, and monitoring global progress toward eradication.

These international bodies act as the connective tissue that binds national programs to the global goal of polio eradication. The WHO, for example, plays a central role in surveillance and certification processes, ensuring that regions are polio-free. Similarly, UNICEF focuses on vaccine procurement and distribution, while Rotary International and the Bill and Melinda Gates Foundation bring in substantial financial resources, advocacy, and political support.

## **3 Government Partnerships**

National governments bear primary responsibility for implementing vaccination campaigns. Government bodies, particularly health ministries, oversee large-scale mobilization efforts and ensure that healthcare workers have the resources they need to deliver vaccines. They are responsible for coordinating with international organizations, setting policies, and aligning strategies for successful outreach.

State and local governments also play critical roles. Often, national campaigns are decentralized, and the responsibility of vaccinating children in hard-to-reach or remote areas falls to local government units. Effective collaboration at all levels of government ensures that no child is left unvaccinated, particularly in vulnerable or marginalized communities.

## **4 Public-Private Partnerships**

The fight against polio also depends heavily on public-private partnerships. Pharmaceutical companies, for instance, manufacture and supply vaccines at the scale required for global immunization efforts. These companies often work in conjunction with international organizations to ensure the availability and affordability of vaccines.

The private sector also plays a significant role by providing financial donations or in-kind support. Large corporations and philanthropic foundations contribute funding, technical expertise, and logistical support to enhance the impact of the campaign.

### **The 7 Cs of Community Approaches**

Beyond institutional partnerships, the Pulse Polio campaign emphasizes robust community involvement. The 7 Cs Framework (Fig. 9) offers a structured approach to foster community participation, which is critical to the success of mass vaccination programs. Each of these "Cs" contributes to creating an environment where communities are not just recipients of healthcare but active participants in achieving health goals.



**Fig. 9. Seven Cs Community Approaches frameworks**

#### **1. Culture**

Understanding and integrating into the local culture is essential for any public health initiative to succeed. Cultural sensitivities can influence public attitudes toward vaccination. Health workers

must be trained to respect local customs and religious beliefs, which can otherwise act as barriers to vaccination. Tailoring messages to resonate with cultural values ensures that campaigns are not rejected outright by the target population.

## **2. Connection**

Building connections within communities involves establishing trust between health authorities and local populations. Communities that trust their healthcare providers are more likely to participate in vaccination programs. This connection is fostered through consistent engagement, transparent communication, and addressing public concerns.

## **3. Community Engagement**

Community engagement goes beyond passive participation; it involves active collaboration with community members in planning and executing vaccination campaigns. When community members take ownership of the initiative, they are more likely to ensure its success. Local leaders, families, and social organizations work hand in hand with health authorities to mobilize resources and spread awareness about the importance of immunization.

## **4. Collaboration**

Effective collaboration between different community actors is crucial to creating a unified front against polio. In rural or underserved regions, collaboration among health workers, schools, local government, and non-governmental organizations (NGOs) amplifies outreach and ensures broader coverage. By coordinating efforts, these stakeholders reduce duplication and address any gaps in service provision.

## **5. Capacity Building**

Capacity building ensures that communities and local healthcare systems are equipped to sustain polio vaccination efforts over the long term. Training health workers and volunteers not only empowers them but also ensures that they can independently run immunization drives in the future. This approach fosters resilience and self-reliance in communities, reducing the dependency on external support.

## **6. Commitment**

Sustained commitment from all stakeholders is vital to eradicating polio. Governments, international organizations, healthcare workers, and local communities must remain focused on the goal of complete eradication, even in the face of challenges such as vaccine hesitancy or logistical difficulties. Long-term commitment is essential for reaching the final stages of polio elimination and maintaining a polio-free status.

## **7. Collective Impact**

The concept of collective impact recognizes that no single entity can achieve polio eradication alone. Success requires coordinated, multi-sectoral action. Public health efforts are far more effective when they are supported by governments, communities, international organizations, and private sector stakeholders working together. Collective action amplifies the reach of the campaign and ensures a more sustained impact.

### **Polio Outbreaks and Vaccine Myths in Pakistan**

As of October 20, 2024, multiple cases of polio were reported in various countries. Notably:

- Pakistan recorded four new cases of wild poliovirus type 1 (WPV1) and 15 WPV1-positive environmental samples.
- Ethiopia had two cases of circulating vaccine-derived poliovirus type 2 (cVDPV2).
- The Occupied Palestinian Territory identified five environmental samples positive for cVDPV2.

This highlights ongoing challenges in eradicating polio, especially in regions where vaccination campaigns face logistical or social barriers.

### **Myths and Misinformation about Oral Polio Vaccine (OPV)**

Poliomyelitis, commonly known as polio, is a viral disease transmitted through contact with infected fecal matter. It primarily affects children under five, and though incurable, it can be effectively prevented through immunization.

In Pakistan, where polio remains endemic, there are deep-rooted myths regarding the OPV. Two prominent myths include:

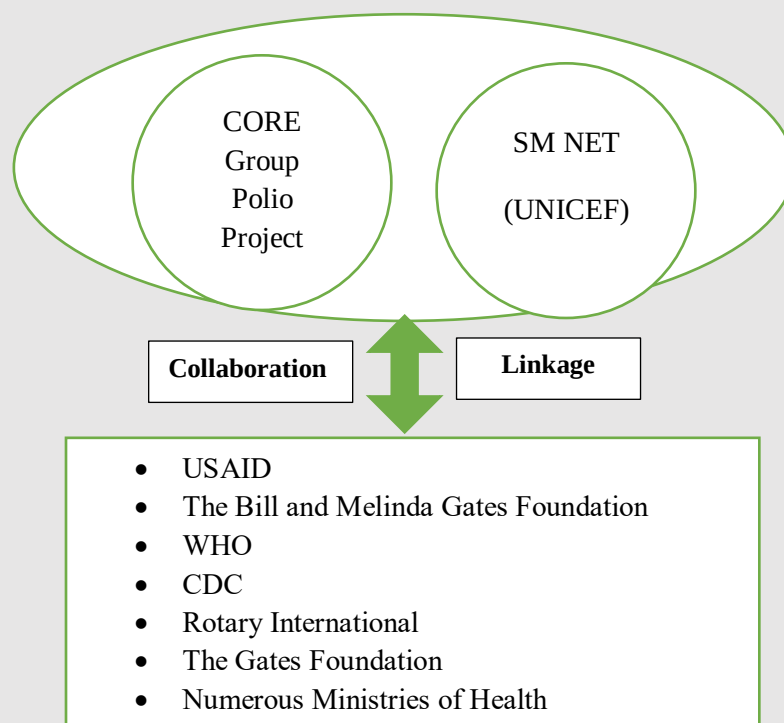
- **Polio Vaccine Boycotts:** Some communities in Pakistan have boycotted the OPV due to concerns that it may contain anti-fertility agents, falsely believing that the vaccine could cause sterility.
- **Misinformation on social media:** A few years ago, a viral fake video showed children falling ill after receiving the polio vaccine. This misinformation spread widely on social media, causing mass panic and significantly disrupting nationwide vaccination campaigns.

### **Impact of Misinformation**

The spread of false information regarding the safety of vaccines in Pakistan has significantly hindered efforts to eradicate the disease. Pakistan is one of only two countries where polio remains endemic. These setbacks have prolonged the fight against polio, making it harder to immunize children and achieve the global goal of complete polio eradication.

The situation underscores the importance of countering myths with accurate information and the need for sustained public health efforts to overcome resistance to vaccinations.

### **Coordination Mechanism and Gender Mainstreaming in the Global Polio Eradication Effort**



**Fig. 10. Coordination Mechanism for Polio Eradication apropos gender mainstreaming**

### **1. Coordination Mechanism in the Core Group Polio Project (CGPP)**

The Core Group Polio Project (CGPP) is a collaborative effort to combat polio, involving several international and national agencies working in a coordinated fashion (Fig. 10). The polio eradication program in India is a multi-stakeholder initiative, as depicted in the first diagram. The polio partners include:

- SM NET (Surveillance Medical Network), which plays a crucial role in monitoring and managing surveillance efforts on the ground.
- USAID (United States Agency for International Development)
- The Bill and Melinda Gates Foundation
- WHO (World Health Organisation)
- Rotary International
- CDC (Centre for Disease Control and Prevention)
- Rotary International
- The Gates Foundation
- Numerous Ministries of Health

This structure ensures a systematic flow of information and resources, enabling collaboration between various national and international partners. The Surveillance Medical Network (SM NET) forms the backbone of the field-level implementation.

### **2. Polio Gender Champions and Gender Mainstreaming**

A crucial aspect of polio eradication is recognizing and addressing gender disparities in health interventions. The Global Polio Eradication Initiative (GPEI) has identified that gender-responsive programming and gender-sensitive analysis are essential to effectively reach every last child.

The role of Polio Gender Champions is a way to incorporate sex-disaggregated data and apply gender mainstreaming to improve the reach and success of polio interventions. Without this focus,

efforts to eradicate polio may fail to engage certain populations, especially vulnerable groups such as women and children, who often face unique barriers to healthcare.

These insights emphasize the importance of using sex-disaggregated data and conducting gender-sensitive analysis to:

- Reach marginalized populations effectively
- Ensure interventions are tailored to the specific needs of both boys and girls
- Drive organizational change and ensure the gender mainstreaming approach is integrated across polio eradication programs.

This gender-responsive approach is crucial in ensuring that every child is reached, and the global goal of eradicating polio is achieved comprehensively.

## Conclusion

As the world continues to face the twin challenges of **malnutrition** and **climate change**, **nutri-sensitive agriculture** offers a promising solution. By integrating nutritional goals into agricultural systems, promoting diverse and nutrient-rich crops, and engaging communities through **collaborative efforts**, nutri-sensitive agriculture can improve both **food security** and **health outcomes**. Key to the success of nutri-sensitive agriculture is the role of collaborations and linkages. Governments, international organizations, private sectors, and local communities must work together to create a conducive environment for its implementation. Public-private partnerships can help provide the necessary financial resources, technological innovations, and market access to promote the widespread adoption of nutrition-sensitive farming. Similarly, policy frameworks that incentivize the cultivation of diverse crops, support local food systems, and ensure equitable access to nutritious food are essential for scaling up nutri-sensitive agricultural practices. Community engagement is another pillar of nutri-sensitive agriculture. Initiatives like JEEViKA in Bihar, which empowers women through self-help groups and promotes nutrition-sensitive farming practices, demonstrate the potential for local communities to drive sustainable change. The active participation of smallholder farmers, women, and marginalized groups ensures that agricultural interventions are not only inclusive but also culturally relevant and locally owned. By embracing community-driven approaches, nutri-sensitive agriculture strengthens rural economies,



enhances food security, and improves public health outcomes. Moreover, technological innovations play a crucial role in reducing the drudgery of farming, improving productivity, and ensuring that food retains its nutritional value. Tools such as the hand-cranked chakki and electric okhali, developed by institutions like Dr. Rajendra Prasad Central Agricultural University, offer practical solutions for smallholder farmers and cottage industries, enabling local food processing and value addition. These innovations make it possible to maintain the nutritional integrity of crops while creating economic opportunities for rural communities. As the world continues to grapple with the twin challenges of malnutrition and climate change, it is clear that nutri-sensitive agriculture offers a viable path forward. By integrating nutritional goals into agricultural systems and promoting a diverse array of nutrient-rich crops, we can create food systems that are not only sustainable but also capable of nourishing current and future generations. However, the road ahead requires sustained commitment from all stakeholders. Governments must continue to invest in policies that support diversified farming systems, while international organizations and the private sector must offer technical and financial support to facilitate the transition. In conclusion, nutri-sensitive agriculture is not just about producing more food—it is about producing better food, in ways that are ecologically sound, economically viable, and socially inclusive. With the right investments in partnerships, technology, and community engagement, nutri-sensitive agriculture can play a pivotal role in building resilient food systems that contribute to human health, economic empowerment, and environmental sustainability. By working together across sectors and at all levels—from local communities to global platforms—we can ensure that agriculture becomes a powerful tool for addressing both malnutrition and climate change, securing a healthier and more sustainable future for all.

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## **Recommended Practices to make agriculture Nutrition Sensitive**

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### **Abstract**

Nutritionally sensitive agriculture encompasses a comprehensive approach that aims to enhance food security and improve health outcomes by integrating agricultural practices with nutrition and health strategies. This framework recognizes the pivotal role of agriculture in addressing malnutrition and hidden hunger, particularly in regions where a significant portion of the population relies on agriculture for their livelihoods. Key strategies within this framework include food fortification, dietary diversification, homestead gardening, and livestock-oriented programs, all of which contribute to the availability and consumption of nutrient-rich foods. Despite their potential, these strategies face various challenges, including traditional farming practices, lack of nutritional awareness, economic constraints, limited access to resources, and cultural beliefs that influence dietary choices. Addressing these challenges requires targeted solutions, such as nutrition education initiatives, economic support programs, improved access to veterinary services, and community engagement to promote dietary diversity. An integrated approach that combines efforts from the agriculture, health, and nutrition sectors is essential for developing sustainable food systems that support both productivity and improved health outcomes. This approach not only fosters resilience among farming communities but also ensures that nutritional needs are met, thereby contributing to the overall well-being of populations.

### **Introduction:**

Undernutrition is a major global health challenge, contributing to approximately 45% of deaths among children under five years of age, with long-term consequences for both individuals and societies (Black *et al.*, ., 2013). The global burden of malnutrition continues to weigh heavily on developing nations, particularly in regions where food security is fragile and access to nutritious food is limited. Despite concerted efforts over the past decades to combat undernutrition, progress remains slow, and new challenges, such as the COVID-19 pandemic, have exacerbated the situation. The pandemic has further disrupted food systems, deepening food insecurity and threatening to reverse gains made in improving nutritional outcomes over the last twenty years

(Heidkamp *et al.*, ., 2021). As a result, the global community faces an even greater challenge in achieving the Sustainable Development Goals (SDGs), particularly SDG 2 (zero hunger) and SDG 3 (good health and well-being). These goals are critical for building a world where malnutrition, in all its forms, is eliminated. Malnutrition has multifaceted consequences, affecting health, cognitive development, and economic productivity. The impact of undernutrition goes beyond immediate health risks such as increased susceptibility to infections and higher mortality rates. It also undermines future potential by reducing educational attainment and long-term productivity. Undernourished children are more likely to experience cognitive delays, resulting in lower academic performance, which in turn limits their opportunities for economic success later in life. Prenatal malnutrition is particularly harmful, often resulting in low birth weight, which predisposes infants to lifelong health issues, including stunted growth and chronic diseases (Black *et al.*, 2013). This cyclical nature of malnutrition perpetuates poverty, reinforcing inequalities in health and economic outcomes across generations. In light of these challenges, governments, donor agencies, and development organizations are increasingly turning to nutrition-sensitive agriculture (NSA) as a strategy to address the root causes of malnutrition and support broader development goals. NSA involves leveraging the agriculture sector not only for increased food production but also for improving the nutritional quality of diets. By integrating nutrition goals into agricultural policies and practices, NSA seeks to enhance food security, promote dietary diversity, and improve health outcomes, particularly among vulnerable populations. Agriculture has strong potential to influence the underlying determinants of nutrition, including food availability, dietary quality, income generation, and women's empowerment (Ruel *et al.*, 2018). Given its central role in food production, agriculture can act as a powerful tool to address both undernutrition and the growing burden of diet-related non-communicable diseases (NCDs). The potential of agriculture to improve nutrition has been highlighted by several global initiatives and reports. For example, the EAT-Lancet Commission has drawn attention to the role of agriculture and the broader food system in contributing to poor health outcomes. The Commission's 2019 report called for a fundamental transformation of food production systems and dietary patterns to promote healthier, more sustainable diets (Sharma *et al.*, 2020). The report also shed light on the significant deviations between current food consumption patterns and the recommended dietary guidelines in many countries, including India. According to the 2011–2012 National Sample Survey Office data, except for the wealthiest 5%, most Indians consume fewer than the recommended 2503 kcal per

capita per day. The consumption of nutrient-rich foods such as fruits, vegetables, legumes, meat, fish, and eggs was significantly below recommended levels. The share of calories from protein sources was only 6–8%, compared to 29% in the reference diet (Sharma *et al.*, 2020). These findings underscore the urgent need for policies that promote the production and consumption of nutrient-dense foods across all socio-economic groups. Globally, the recognition of agriculture's potential to support better nutrition and health outcomes has been reflected in policy dialogues, particularly in the context of the United Nations' 2030 Agenda for Sustainable Development. Achieving the SDGs will require transformative changes in food systems, with agriculture playing a central role in addressing both hunger and malnutrition (United Nations, 2017). Nutrition-sensitive agriculture is increasingly regarded as a viable solution due to its ability to link agricultural production with improved nutrition, particularly in remote and rural areas where market access to diverse, nutrient-rich foods is often limited (Ruel *et al.*, 2018). Through improved agricultural practices, NSA can contribute to better food security and health outcomes by enhancing the availability, accessibility, and affordability of nutrient-dense foods. Moreover, by focusing on income generation and women's empowerment, NSA can address socio-economic barriers that limit access to nutritious diets, thereby improving overall health and well-being. NSA is also a critical component of the broader effort to create sustainable food systems that support healthy diets and long-term environmental sustainability. A key feature of NSA is its multi-level, inter-sectoral approach, which integrates agricultural, health, and social policies to maximize agriculture's contribution to nutrition. For instance, biofortification—enhancing the nutritional content of crops through breeding—is one of the many ways agriculture can be aligned with nutritional goals. The cultivation of biofortified crops such as vitamin A-enriched sweet potatoes and iron-rich beans has been shown to significantly improve nutrient intake in populations suffering from micronutrient deficiencies (Mishra *et al.*, ., 2019). Additionally, diversifying agricultural production to include more fruits, vegetables, legumes, and animal-source foods can improve dietary quality and reduce dependence on nutrient-poor staple crops. This review aims to highlight the practices and strategies that can be implemented to make agriculture more nutrition-sensitive, contributing to improved health and well-being. By examining the potential of NSA to drive positive change, we can better understand how agriculture can be harnessed to meet global nutrition challenges, particularly in rural and vulnerable populations.

## Strategies for nutrient sensitive agriculture

### Dietary Diversification

In the wake of the Green Revolution, India achieved remarkable self-sufficiency in the production of staple cereals such as wheat and rice. However, crops like millets and pulses were largely overlooked during this agricultural transformation, although recent efforts are beginning to address this gap. In addition to cereals, India has made significant strides in other areas, ranking among the top producers of milk (through the White Revolution) and fruits and vegetables (the Rainbow Revolution). Egg production has also witnessed a substantial increase, contributing to overall dietary improvements. Despite these achievements, most staple crops—such as rice and wheat—remain deficient in essential micronutrients like iron, zinc, iodine, and various vitamins. The limited micronutrient content in staple foods poses a risk of malnutrition, particularly when diets are overly dependent on a narrow range of food types. This can result in "hidden hunger," a condition where people may consume enough calories but suffer from a deficiency in essential vitamins and minerals. Dietary diversification emerges as a vital strategy to combat hidden hunger by encouraging the consumption of a wider variety of nutrient-dense foods. By including more fruits, vegetables, legumes, dairy, and animal proteins in the diet, individuals can address multiple nutrient deficiencies, bolster their immune systems, and improve overall health outcomes (Gani *et al.*, ., 2018). One of the primary advantages of dietary diversification is that it aligns with local cultural preferences, making it a sustainable and acceptable strategy in diverse communities. It offers a holistic solution by addressing a range of nutrient deficiencies and promoting better overall health. However, dietary diversification does come with certain challenges. Implementing this strategy requires substantial nutrition education to inform communities about the importance of balanced diets. Additionally, changes in dietary patterns can be difficult to achieve, especially in regions where certain foods are deeply ingrained in the local culture and food supply chains may not offer easy access to diverse food sources. Another challenge lies in the presence of anti-nutritional factors in some foods, which can inhibit the absorption of key nutrients. For instance, phytates in legumes and grains can reduce the bioavailability of iron and zinc. Moreover, achieving dietary diversification can be financially demanding, as it often requires households to purchase or produce higher-quality and more varied food items. In low-income regions, these costs can be

prohibitive, making dietary diversification a less feasible solution compared to other interventions (Jha & Warkentin, 2020).

As a result, while dietary diversification holds promise for addressing malnutrition and promoting better health, it is often challenging to implement in developing countries. For this reason, it is frequently complemented by other interventions such as food fortification and biofortification, which provide more immediate and cost-effective solutions to nutrient deficiencies. Nevertheless, dietary diversification remains an important long-term strategy for ensuring that people have access to a broad range of essential nutrients.

### **Food Fortification**

Food fortification is a key nutritional intervention aimed at improving public health by enhancing the nutrient profile of widely consumed foods. This process can either restore nutrients that are lost during food processing or add nutrients to foods that do not naturally contain them. Food fortification has been defined as the addition of one or more essential nutrients to a food product for the purpose of preventing or addressing nutritional deficiencies in a population or a specific subgroup (Rao *et al.*, 2016). This strategy is particularly beneficial due to its cost-effectiveness, wide reach, and ability to target large segments of the population, including economically disadvantaged groups. Fortification programs have been particularly successful with nutrients like vitamins A and D, certain B-complex vitamins, and essential minerals such as iron and zinc. The selection of a vehicle for fortification is critical, as it should be a staple food consumed by the majority of the population, including those in low-income brackets. Furthermore, the bioavailability of the added nutrients and their stability during storage and cooking must be ensured to maximize the program's effectiveness. In India, one of the most successful examples of food fortification is the iodization of salt, which has become a nationwide program aimed at preventing iodine deficiency disorders. In addition to iodine, efforts have been made to develop double-fortified salt with both iodine and iron, though its current use is still limited (WHO/FAO, 2006). Fat-soluble vitamins, such as vitamins A and D, are often added to cooking oils, while wheat flour is frequently fortified with minerals and B vitamins. The fortification of wheat flour with iron and folic acid has been a key intervention in many countries, following WHO and FAO guidelines (WHO/FAO, 2006). In India, the fortification of oil with vitamins A and D is

mandatory, as is the addition of iodine to salt and iron and folic acid to wheat flour. Fortified processed foods such as iodized salt, vitamin D- and calcium-fortified milk, and vitamin A-enriched rice and oil are common examples (Ofori *et al.*, 2022).

However, despite the widespread use of fortified foods, their higher cost can make them less accessible to consumers in developing countries, limiting their impact on nutritional outcomes. Given the limitations of food fortification, particularly in low-income regions, biofortification has emerged as a complementary strategy for addressing micronutrient deficiencies and combating hidden hunger.

## **Biofortification**

Biofortification is a cutting-edge agricultural strategy aimed at breeding staple crops with higher concentrations of essential micronutrients such as vitamin A, iron, and zinc. This method involves enhancing the nutritional content of crops while maintaining agronomic traits like high yield, pest resistance, and adaptability to different environmental conditions (Ofori *et al.*, ., 2022). Unlike traditional food fortification, which involves adding nutrients to food products during post-harvest processing, biofortification enhances the nutrient levels of crops during their growth and development, making this approach sustainable and cost-effective in the long term. Biofortification holds promise as a solution to the widespread problem of malnutrition and micronutrient deficiencies, particularly in regions where access to nutrient-rich foods is limited. By increasing the levels of essential nutrients directly in food crops, biofortification can reduce the prevalence of deficiencies in vulnerable populations. For instance, vitamin A deficiency, which is a leading cause of preventable blindness in children, can be mitigated through the consumption of biofortified crops like orange-fleshed sweet potato (OFSP) and golden rice, both of which are enriched with beta-carotene, a precursor to vitamin A. Similarly, crops such as zinc- and iron-enriched wheat and rice offer solutions to common deficiencies that affect millions worldwide, especially in developing countries (Bouis *et al.*, 2019). The **HarvestPlus** initiative, launched in 2003, is one of the most significant biofortification programs. It focuses on improving the nutritional quality of staple crops in regions like Asia and Africa, where malnutrition is most prevalent. The program's goal is to develop biofortified varieties that are not only accessible to local farmers but also retain high bioavailability of nutrients after consumption. This is crucial to



ensure that the micronutrients are effectively absorbed by the body. Some examples of successful biofortified crops include vitamin A-enriched orange and yellow maize, zinc-enriched rice and wheat, and iron-enriched beans (Bouis, 2018). These biofortified crops are designed to thrive in various agro-ecological zones, ensuring that they can be adopted by farmers in diverse regions.

Biofortification offers a sustainable and scalable solution to address nutrient deficiencies at the source, making it an essential part of the broader strategy to combat malnutrition and improve food security in developing regions. Unlike food fortification, which relies on industrial processes and post-harvest interventions, biofortified crops provide long-term nutritional benefits directly through agricultural production. This makes biofortification particularly effective in rural areas, where access to fortified foods and supplements may be limited. As the global agricultural community continues to focus on sustainability and food security, biofortification is likely to play an increasingly important role in promoting better health outcomes and reducing the burden of malnutrition.

### **Homestead Gardening**

Homestead gardening, also referred to as household gardening or backyard gardening, involves cultivating vegetables, fruits, and sometimes small livestock close to the home or within the farm premises. This traditional practice, often seen in rural areas, can be a key strategy in promoting micronutrient security, particularly for low-income households. One of the earliest notable studies on homestead gardening focused on enhancing the intake of provitamin A ( $\beta$  carotene) by encouraging families to grow vegetables rich in this vital nutrient, such as green leafy vegetables (GLVs), orange, and yellow vegetables. Conducted by the National Institute of Nutrition in Hyderabad and the All India Institute of Hygiene and Public Health in Kolkata, this initiative was a pioneering attempt to tackle vitamin A deficiency by integrating agriculture with nutrition education (Vijayaraghavan *et al.*, 1997). Homestead gardening has demonstrated numerous benefits for nutrient-sensitive agriculture, especially in improving access to micronutrients. By growing a variety of vegetables and fruits, households can improve their dietary diversity and intake of essential vitamins and minerals, such as vitamin A, iron, and zinc. These nutrients are often deficient in cereal-based diets, particularly in developing countries. For example, studies conducted in India have shown that promoting the cultivation and consumption of  $\beta$  carotene-rich

crops significantly enhanced awareness of vitamin A deficiency, along with increasing the intake of foods rich in this nutrient. In some regions, there was a marked improvement in the prevalence of vitamin A deficiency-related conditions, such as Bitot's spots and night blindness (Murthy *et al.*, 2016). Beyond just providing micronutrients, homestead gardens contribute to household food security by giving families access to fresh produce throughout the year. This helps reduce dependence on market-bought vegetables and fruits, which can be expensive or scarce, particularly in remote areas. Moreover, the practice encourages sustainable agriculture by promoting biodiversity and the use of indigenous plants, which are often well-adapted to local environmental conditions. Integrated farming approaches, such as combining gardening with poultry rearing, have been shown to further improve maternal and child micronutrient intake, particularly during critical periods like pregnancy and early childhood (Murthy *et al.*, ., 2016). Homestead gardening programs like those led by the M.S. Swaminathan Foundation in India have demonstrated tangible impacts on household food consumption. In regions like Wardha district in Maharashtra and Koraput district in Odisha, households practicing homestead gardening reported a substantial increase in both the frequency and quantity of fruits and vegetables consumed monthly, as observed in a longitudinal study from 2014 to 2017 (Bhaskar *et al.*, ., 2017). This highlights the potential of homestead gardening as a low-cost, sustainable approach to combating malnutrition and hidden hunger, particularly in rural settings where market access to nutrient-rich foods may be limited.

However, homestead gardening does face several challenges that can limit its broader adoption and effectiveness. One key drawback is the need for technical knowledge and consistent agricultural inputs. While many households may have space for gardens, not all possess the skills or resources to grow nutrient-dense crops effectively. Access to quality seeds, saplings, and fertilizers can be barriers, especially in resource-poor settings. Additionally, while homestead gardens can contribute to dietary diversity, they may not fully meet the nutritional needs of the household without complementary interventions such as nutrition education and market access to other diverse food sources. Moreover, homestead gardening may not always provide year-round access to a balanced variety of foods, especially in regions with harsh climatic conditions or water scarcity.

## **Livestock-Oriented Programs**

Ownership of livestock provides households with a reliable source of high-quality protein and bioavailable micronutrients, essential for addressing malnutrition. Additionally, livestock serves as a productive asset, generating income through the sale of products. For instance, milk is particularly beneficial for young children, promoting linear growth thanks to its rich content of high-quality proteins, minerals, and insulin-like growth factor-I (Mølgaard *et al.*, ., 2011). Livestock-oriented programs play a crucial role in poverty alleviation by facilitating livestock transfers and enhancing livelihoods. While their primary focus is on economic improvement, these initiatives also contribute to nutritional enhancement by increasing the availability and consumption of animal-source foods such as milk, eggs, and meat. These foods are rich in essential nutrients, including proteins, iron, and zinc, which are vital for overall health. These programs often aim to raise household income; however, the impact on nutrition can be limited if increased income is not directed toward purchasing nutrient-rich foods. Therefore, incorporating nutrition education within these programs is essential to encourage the consumption of animal-source foods. However, it is important to consider the potential health risks associated with livestock ownership, such as increased exposure to animal faeces. Recent studies have highlighted the need to balance the benefits of livestock with these risks, as they can negatively impact child health and nutrition outcomes. To fully realize the benefits of livestock-oriented programs, it is crucial to address these concerns while promoting responsible livestock management and consumption practices.

## **Challenges and Solutions of Nutritionally Sensitive Agricultural Strategies**

The transition from agriculture to nutrition is commonly perceived as primarily driven by agricultural income. While income is undeniably important, it cannot guarantee dietary diversification unless communities are educated about the significance of a balanced diet and nutrition for health and productivity. Traditional agricultural practices often emphasize the production of calories to alleviate hunger, primarily through staples like cereals and legumes, leaving hidden hunger largely unaddressed and overlooked by both the public and policymakers. Implementing strategies aimed at making agriculture more nutritionally sensitive presents several challenges that need to be addressed for effective outcomes. One significant challenge is the reliance on traditional agricultural practices, which can hinder the adoption of more diverse and

nutrient-rich crops. In India, where agriculture is the primary occupation for over 60% of households, adopting a nutritionally sensitive and environmentally sustainable agricultural approach is crucial. Farmers are often reluctant to deviate from established cropping patterns. Farmers often prioritize staple crops, such as rice and wheat, due to their established economic value, leaving little room for the cultivation of pulses, millets, and other micronutrient-rich crops. To overcome this challenge, it is essential to provide farmers with education and training that highlights the benefits of dietary diversification and the potential economic returns from growing a variety of crops. Another challenge lies in the lack of nutritional awareness among communities. Many households may not understand the importance of a balanced diet or the nutritional value of animal-source foods, leading to underutilization of available resources. To address this, targeted nutrition education initiatives can be implemented, focusing on the benefits of consuming diverse foods and the relationship between diet and health. Workshops, community demonstrations, and informational materials can help raise awareness and change dietary behaviors. Economic constraints also pose a significant barrier. Even when households experience an increase in income from livestock or crop sales, they may prioritize immediate financial needs over investing in nutrient-rich foods. This challenge can be mitigated through economic support programs, such as access to microcredit and financial literacy training, which empower households to make informed decisions about their spending, prioritizing investments in health and nutrition. Access to resources is another critical issue, particularly for smallholder farmers who may face difficulties in obtaining quality feed, veterinary services, and markets for their products. Establishing cooperative structures can enhance resource access, enabling farmers to pool resources, share knowledge, and improve productivity. Additionally, improving infrastructure and market access can facilitate the sale of nutrient-rich foods, making them more readily available to consumers. Cultural beliefs and practices can also influence dietary choices and the consumption of certain animal-source foods. In some communities, traditional attitudes may discourage the inclusion of these foods in diets. Addressing cultural barriers through respectful dialogue and community engagement is vital for promoting dietary change. Engaging community leaders and stakeholders in discussions about the nutritional benefits of diverse foods can help shift perspectives and encourage more inclusive dietary practices. Finally, health risks associated with livestock ownership, such as exposure to zoonotic diseases and pathogens from animal waste, must be carefully managed. Educational programs focused on proper waste management and hygiene practices can help mitigate these risks.

and promote safer livestock management. By addressing these challenges with targeted solutions, we can foster a more nutritionally sensitive agricultural framework that enhances food security, improves health outcomes, and empowers communities.

## **Conclusion**

Transitioning towards nutritionally sensitive agricultural practices is vital for addressing the dual challenges of food security and malnutrition. While agricultural income is a significant factor in improving dietary diversity, it alone cannot ensure proper nutrition without community education and awareness about the importance of balanced diets. Traditional agricultural practices, which prioritize staple crops, often overlook the need for diverse and nutrient-rich foods, perpetuating hidden hunger among populations. The implementation of strategies such as homestead gardening, livestock-oriented programs, and dietary diversification can play a crucial role in enhancing nutritional outcomes. These initiatives not only contribute to improving household food security but also provide access to essential micronutrients through the integration of pulses, millets, and animal husbandry. However, challenges such as traditional cropping patterns, lack of nutritional awareness, economic constraints, and cultural beliefs must be addressed to maximize the effectiveness of these strategies. Ultimately, fostering a nutritionally sensitive agricultural framework requires an integrated approach that combines the agriculture, health, and nutrition sectors. By collaborating across these domains, we can develop food systems that not only enhance agricultural productivity but also support improved health outcomes for communities. This holistic approach will empower households to make informed dietary choices, reduce malnutrition, and promote sustainable practices, leading to healthier, more resilient populations.

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## **Role of Extension Advisory Services (EAS) in Promoting Nutrition Sensitive Agriculture**

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Extension Advisory Services (EAS) are recognized as a vital component of agricultural development. EAS are the different activities and sets of organizations that provide the information and services needed and demanded by farmers and other actors in rural settings. This assists them in developing their own technical, organizational, and management skills and practices, so as to improve their livelihoods and wellbeing. At present, EAS are increasingly recognized by many development actors as an essential vehicle to ensure that research, development of farmer organizations, improved inputs, and other elements of rural development support actually meet the needs and demands of farmers and other rural actors.

Traditionally, agricultural EAS involved the application of scientific research and new knowledge to agricultural practices through farmer education. However, EAS are no longer limited to the transfer of technology and education. Agents now have broader objectives beyond providing technical solutions; they assist farmers in organizing and acting collectively, they address processing and marketing issues, and they partner with other service providers and rural institutions. It should be noted that EAS are still an underfunded area of rural development due to structural adjustment pressure to reduce publicly funded services, and in those countries with EAS, operational and human capacity is limited in what it can provide to the millions of farmers, many of them marginalized and in geographically challenging areas, who are in need of technology, knowledge, and assistance. This presents a challenge in considering EAS as a vital delivery platform. EAS continue to place a high value on low-cost solutions for resource-constrained, smallholder farmers.

This is why EAS need to identify and address the nutritional needs of rural households and to mainstream nutrition sensitive messages in their service provision. This note reviews selected instruments that EAS can use for this purpose.



## Nutrition-Sensitive Agriculture

Agriculture and nutrition share a common entry point: “food.” Food is a key output of agricultural activities, and also a key input into good nutrition. The absence of agriculture will result in the inexistence of food or nutrition, but the availability of food from agriculture also does not ensure good nutrition. A critical outlook would consider a reinforcing relationship between the two fields of agriculture and nutrition but, in reality, there is often a significant disconnect. This led to the advent of Nutrition-sensitive agriculture to combat the discrepancy and provide a multidisciplinary approach to tackle hunger and malnutrition. The Global Nutrition Report, 2023 suggests that food security interventions should focus on maintaining diet quality, a perfect blend of food security alongside nutritional security is essential. In addition, drastic changes in the food system policies with the inclusion of crop diversification, promotion of reformulation and fortification of products are considered imperative. Nutrition-sensitive agriculture perfectly fits into this solution as it focuses on the unique and critical role that agriculture can provide in improving nutritional status.

The Second International Conference on Nutrition (ICN2), hosted by the Food and Agriculture Organization (FAO) in 2014 in Italy, emphasized on a multidisciplinary approach to combat hunger and malnutrition. The role of agriculture as a sector for spearheading these goals was highlighted, leading to the emergence of Nutrition-sensitive agriculture. Food and Agriculture Organization (FAO) defined Nutrition-sensitive agriculture (NSA) as a “food-based approach to agricultural development that puts nutritionally rich foods, dietary diversity, and food fortification at the heart of overcoming malnutrition and micronutrient deficiencies”. This approach emphasizes the multiple advantages availed through consuming a variety of foods, identifying the nutritional value of food for good nutrition, and the social significance of the food and agricultural sector for supporting rural livelihoods. The overall objective of nutrition sensitive agriculture is to make the global food system more resilient and better equipped to produce good nutritional outcomes.

Nutrition-sensitive agricultural production can be implemented in three main areas:

**1. Availability and accessibility of food.** The increase in agricultural production is directly proportional to the rise in food availability and affordability, which influences both the health and

the economic status of the community. Sustained income growth in turn will have a sizeable effect on reducing malnutrition.

**2. Diversification and sustainability of food.** An increase in the diversity of food produced along with sustainable production practices like conservation agriculture, water management and integrated pest management can aid in improving the nutrition levels of the food without depleting natural resources. Promotion of family farming, home gardens and homestead food production projects can make a significant impact on the variety of crops produced at the local level.

**3. Upscaling of the nutrient content of the food.** Food Fortification can aid in preventing micronutrient deficiencies by improving the micronutrient content in foods through processing, plant breeding and improved soil fertility.

Herforth & Harris, 2014 developed the agriculture-nutrition pathway that represents how agriculture can impact nutrition. Three impact pathways have been identified and are illustrated as under

- **Food production** pathways govern the consumption, income and local food availability. Food production affects the diversity and quantity of food available to farming households and also impacts the food prices at local markets.
- **Agricultural income** can be used for food and non-food purchases. Reliable and sustainable incomes can help rural households buy more nutritious and stable diets and other goods and services, like health care, education or clean water, that support them to have healthier lives.
- **Women's empowerment** is a meaningful addition to improving nutritional status through agricultural livelihoods.

Women who are empowered have:

- better decision-making power;
- greater access to, and control over, resources; and
- more control over time and labour allocation. Women's income facilitates expenditures on food and health care, which in turn affects diet and health status (GFRAS, 2018).

## Philosophy and principles

To develop nutrition-sensitive extension messages and disseminate them effectively, EAS should take account of the following principles.

- **Context:** nutrition-sensitive messages should build on analyses of dietary patterns and deficits of rural households. The household dietary diversity score of FAO and national food-based dietary guidelines, if available, are helpful to identify nutrition gaps.
- **Adaptation to literacy levels:** where smallholders' literacy levels are low, visual tools, interactive methods, and simple language should be used to enhance the understanding of extension messages.
- **Balanced/equitable participation:** women play a major role in channeling household resources to food, health services, and education. However, women are subject to the influence and decision-making authority of other family members such as male partners and the elderly. Nutrition-sensitive extension should engage both men and women, as well as household members across generations (youth and elderly), fostering more harmonious intra-household communication and decision making, and more equitable power relations.
- **Business orientation:** smallholders are entrepreneurs and invest in production based on profit outlooks. Cost– benefit analysis should be used to enable smallholders to make well-grounded decisions on their investments in production and consumption while taking the nutritional implications into account.
- **Scale:** the content of nutrition-related extension messages should be relevant for a large number of households. The methods of delivery need to be easy and low-cost, otherwise resource constraints will limit the outreach. Keep it simple, and focus on do-able actions.
- **Coordination:** to enhance impact, coordination with government or donor programs that address nutrition, such as health systems, maternal care, and water supply, will be necessary.

## Role of Extension Advisory Services

Extension advisory services can support smallholders to improve their nutrition through a set of three interventions: nutrition education, diversification of production, and off farm income generation.

## **Nutrition education**

Extension advisory services can integrate nutrition education in their service using key messages that promote behaviour change. Such messages should:

- be adapted to the characteristics of agro-ecologies and established dietary patterns
- focus on diversification of diets (not only staples, but also food containing proteins and vitamins) and on hygienic practices of food preparation and consumption
- promote the consumption of food crops and animal products that are available at farm level to ensure they are used not only as sources of cash but also as food sources.

## **Diversification of production**

Extension advisory services can promote diversification of production to increase the range of food available at household level through the cultivation of nutrient-rich food crops (e.g. leafy vegetables, biofortified crops) and through animal-rearing practices (e.g. poultry, snails, small livestock).

### **What principles drive diversification?**

- Promote the production of food that meets the dietary deficits of households.
- Do not lose sight of the marketability of food products. Collect and disseminate information on markets and quality requirements.
- Consider the opportunity to grow food products in the off-season of the lead crops. The additional income from selling food crops has an income-smoothing effect, especially in regions where rainfed agriculture predominates.

### **What challenges are linked to production diversification?**

Diversification requires investments of land, water, inputs, and working time. Smallholders can face a dilemma in terms of whether to allocate resources to producing plant or animal-based food for their own consumption, or to invest in cash crops or animal rearing for sale. The following approaches help to tackle these challenges in a targeted manner.

- Compare gross margins of food crops and cash crops, and help smallholders make informed decisions.
- Check that the planting and harvesting seasons of different crops do not overlap. Rural households might face labour shortages.
- If the burden of additional farming activities – including animal husbandry and activities linked to diversification – is put on women, time available for care-giving will be reduced (e.g. cooking, breastfeeding, care of the sick and elderly). It is important to make communities and households aware of this risk and encourage more equitable division of labour among household members.

### **Off-farm income generation for women**

In many regions of the world, commercial agriculture is a male-dominated activity. Women frequently lack the assets needed to engage in commercial farming, or are employed as unpaid labour force on their household fields. Cultural and traditional patterns holding back the economic empowerment of women take time to break. At the same time, women invest a lot of their resources to improve the food security and nutrition of their families. While cash crop production might not be possible for women, opportunities for income generation can be found in off-farm activities. Women often purchase, process, and trade in local food products. However, they may operate outdated technologies, resulting in high labour intensity, low profits, poor quality, and low marketability of their produce. To improve women's incomes, EAS can identify additional income sources and promote technical and technology improvements that decrease costs and workloads while increasing revenues.

### **Strengths and weaknesses**

The major strengths and weaknesses of integrating nutrition-sensitive advisory services in extension are shown as under.

| <b>Strength</b>                                                                                                                                                                            | <b>Weakness</b>                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Crop diversification through rotation, intercropping, and offseason production is a recognised strategy to preserve soil fertility and</li> </ul> | <ul style="list-style-type: none"> <li>• The approach does not address causes of malnutrition beyond the household level (e.g. high incidence of illness; lack of infrastructure</li> </ul> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>reduce pest incidence in cash-crop production. It does not conflict with the mandate of EAS.</p> <ul style="list-style-type: none"> <li>• Nutrition-sensitive extension messages are available and can be adopted and adapted to context with relatively low investments.</li> <li>• The approach responds to a systemic weakness of agricultural extension services through building the capacity of extension agents to integrate business and nutritional skills in their services</li> </ul> | <p>to access clean water) nor does it inherently focus on better nutrition during the important first 1,000 days of a child's life.</p> <ul style="list-style-type: none"> <li>• EAS services are highly relevant for emerging farmers and smallholders with the potential to produce at commercial level. These services are not sufficient to address the needs of resource-poor (e.g. landless) households or subsistence producers, who are often the most affected by food insecurity.</li> </ul> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Opportunities and challenges

The extent to which public and private sector-led EAS can integrate nutrition-sensitive measures in their work depends on their mandate. Following are some opportunities and challenges of the two sectors. In any case, EAS must consider that integrating nutrition sensitive measures in their services will put additional strain on staff time and resources. Conflicts in staff deployment between technical advisory and nutrition-sensitive measures are to be avoided.

| Type of EAS | Opportunity                                                                                                                                                                                                                | Challenges                                                                                                    |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Public      | <ul style="list-style-type: none"> <li>• Large presence in rural areas</li> <li>• Existing relations to smallholders and broad outreach</li> <li>• Often a mandate to improve nutrition and women's empowerment</li> </ul> | <ul style="list-style-type: none"> <li>• Resource constraints</li> <li>• Management inefficiencies</li> </ul> |
| Private     | <ul style="list-style-type: none"> <li>• More resources available</li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>• Companies need to be convinced of return on investment</li> </ul>    |

|  |                                                                                                                  |                                                                                            |
|--|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>• Access to information, communication, and other technologies</li> </ul> | <ul style="list-style-type: none"> <li>• Intervention limited to specific crops</li> </ul> |
|--|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|

Facilitate provision of nutrition-sensitive EAS Promoting NSA implies considering the nutrition situation of the target population and planning accordingly, making healthy diets more available and accessible, making food more diverse and production more sustainable, and making food itself more nutritious. This translates into important services that can easily be incorporated into EAS mandates and activities:

- Adopt a food-system approach rather than focusing on production alone.
- Promote sustainable ways to increase and diversify production (cultivation of nutritious crops, animal rearing practices, fast-growing, locally available and indigenous or off-season varieties, etc.). This can improve availability of diversified food at household, community, and perhaps national level.
- Adapt every intervention and promoted practice to the dietary issues of households, local dietary preferences, agricultural calendar and agro-ecological conditions. Keep in mind feasibility, marketability and access to post-harvest operations.
- Promote home/kitchen/school gardens and homestead food production and processing. Integrated pest management is also key.
- Raise awareness of nutrition and basic dietary principles in line with national food-based dietary guidelines (if available), hygiene, food preservation and preparation.
- Facilitate access to markets and promote on- and off-farm income generation activities. Additional income can have a consumption smoothing effect and improve access to nutritious foods that cannot be produced on farm.
- Empower women: they are often responsible for household food production and nutrition and are more likely to use their income for the well-being of children. Gender-based division of tasks must also be considered.
- Target both men and women and all community members. Women are more often targeted by nutrition interventions, but sometimes neglected by agricultural ones.

- Work with influential community members and health workers to raise awareness and refer cases of malnutrition.

**Table 2. Practices Promoted by EAS Broken Down by the Three Major Pillars of Food Security.**

| Pillar       | Practice                                                                                                                   |
|--------------|----------------------------------------------------------------------------------------------------------------------------|
| Availability | Crop diversification and increased nutrient-dense foods through the introduction of nutritious food and biofortified crops |
|              | Home gardening systems: urban, container, and small plot gardening                                                         |
|              | Effective farming techniques to raise quality of production and yield (drip irrigation, intercropping, and inputs)         |
|              | Reduction of postharvest losses (improved techniques for harvesting, drying, and storage)                                  |
|              | Enhancement of nutritional quality through postprocessing techniques to remove antinutrients                               |
| Access       | Breeding animals for protein sources                                                                                       |
|              | Enhanced marketing strategies for nutrient-rich vegetables                                                                 |
|              | Improved linkages to markets                                                                                               |
| Utilization  | Increased availability of missing sources of nutrition through tracking of seasonal foods                                  |
|              | Income generation                                                                                                          |
|              | Increased dietary diversity                                                                                                |
|              | Use of complementary foods rich in nutrients and Infant and Young Child Feeding (IYCF) counseling                          |
|              | Recipes and food preparation techniques that maximize nutritional benefits of local foods                                  |

## Models of Integration

Integration of nutrition with extension services has been tried in many countries.

1. **Generalist:** Have a broad range of agriculture-based knowledge relating to farming systems, rural poverty alleviation, development issues and nutrition.
2. **Nutrition Specialist:** Focus on nutrition and services as technical backstops, providing ongoing training to frontline extension agents. They are responsible for relaying relevant information



from the research to frontline agents and in turn gather feedback from frontline agents concerning the local needs of the community.

3. **Generalist with access to nutrition specialists:** With a understanding of the potential causes of malnutrition, they assists the community in accessing nutrition resources and/or services including nutrition specialists.
4. **Home economic extension agent:** Nutrition specialist, typically female who are responsible for addressing the nutritional needs of vulnerable family members, care the feeding practices, food preparation and intra-household distribution of food.
5. **Lead farmer/Community volunteer:** Community members who are trained by EAS agents to be farmer-to-farmer “promoters” within their own community. Assisting with agriculture training and/or the dissemination of nutrition messaging they serve to extend the reach of EAS agents. The approach aims to move away from a dependence model towards one where community members are learning the skills and methods to share them.
6. **Farmers Field School (FFS):** Typically local, national and international NGOs that lead community farmers in experiential group learning activities, including experiments with different cultivation practices, field observations and group analysis. While the focus primarily on agricultural production, the participatory nature of FFS provides an entry point to the discussion of the priority issues such as HIV, gender and nutrition.
7. **Health Sectors Extension Agent/Community Health Workers (CHW):** Considered to be the main source of nutrition education by the female beneficiaries. CHWs offer a direct entry point for nutrition message. They provide nutrition counselling that touches upon components of a balanced diet, the importance of kitchen gardens and appropriate feeding practices for children.
8. **Educators:** Teachers and Professors can play an important role in nutrition messaging, however the emphasis on nutrition with school curricula varies across country.

#### **Successful Initiatives:**

#### **'System of Promoting Appropriate National Dynamism for Agriculture and Nutrition' (SPANDAN):**

The objective of the initiative 'System of Promoting Appropriate National Dynamism for Agriculture and Nutrition' (SPANDAN) is to undertake research on understanding the linkages between agriculture, nutrition and health in India. SPANDAN is supported by a grant from Bill

and Melinda Gates Foundation and is housed in Indira Gandhi Institute of Development Research, Mumbai. Institute of Human Development, National Institute of Nutrition, IRIS Knowledge Foundation and a few independent researchers collaborated with faculty from Indira Gandhi Institute of Development Research on this initiative.

### **POSHAN (Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition)**

POSHAN (Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India) is a 4-year initiative (2011-2015) that aims to reduce the evidence gap in nutrition in India by supporting a process of synthesizing, generating, and mobilizing nutrition evidence of diverse types to support decisions. POSHAN is funded by the Bill & Melinda Gates Foundation. The goal of POSHAN is to bring up-to-date evidence on nutrition to decision makers and stakeholders and to facilitate decision-making that can support actions to improve maternal and child nutrition in India.

### **Strengthening Partnerships, Results, and Innovations in Nutrition Globally project (SPRING)**

The Strengthening Partnerships, Results, and Innovations in Nutrition Globally project (SPRING) is dedicated to strengthening global and country efforts to scale up high-impact nutrition practices and policies. SPRING provides state-of-the-art technical support focused on preventing stunting and maternal and child anemia in the first 1,000 days, linking agriculture and nutrition, and creating social change and behaviour change through communication. SPRING's mission supports two major U.S. Government initiatives: Ending Preventable Child and Maternal Deaths and Feed the Future. SPRING is funded by USAID under a seven-year cooperative agreement. SPRING's experienced implementation team consists of experts from JSI Research & Training Institute, Inc., Helen Keller International, The International Food Policy Research Institute, Save the Children, and The Manoff Group.

## **Nutri Smart Villages**

The Nutri-smart village concept was launched by the Madhya Pradesh Government with the conviction that creating a resilient and well-functioning local harvest through agriculture and subsidiary activities like animal husbandry and fisheries can aid in combating the malnutrition problems of the villagers. The plan is to develop one village in each project as a nutrition-smart village in association with the Krishi Vigyan Kendra. These initiatives are practical implications of the unique role played by various platforms and agencies to bridge the agriculture-nutrition pathway but for the smooth functioning of the pathway and the factors associated to reach its fullest potential in the contribution to the agriculture-nutrition linkage; agricultural extension is required as a catalyst. Agricultural extension is a reckoning force that provides a cohesive interaction between the different factors of the agriculture-nutrition pathway to create a greater impact on the nutrition profile. This in turn led to the advent of the concept of nutrition-sensitive extension.

## **Designing effective NSA activities Villages**

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### **NSA: An Introduction**

Worldwide attention on hunger and poverty has focused on increasing agriculture productivity besides enhancing rural livelihood opportunities. However, according to FAO (2019), the global challenges of food insecurity and malnutrition remains pervasive, particularly in rural communities, where agriculture is often the primary source of sustenance and livelihood. *Fanzo et al.* (2020) observed that despite advancements in agricultural productivity, undernutrition, micronutrient deficiencies, and diet-related diseases persist due to limited access to diverse, nutrient-rich foods. Hertforth & Ballard (2016) reiterated that traditional agri-food systems have largely prioritized crop yield and economic outputs over nutritional outcomes, often leading to calorie-dense but nutrient-poor diets that fail to meet the health needs of rural populations.

Consequently, Nutrition-Sensitive Agriculture (NSA) has emerged as a transformative approach aimed at integrating the nutritional objectives directly into agricultural interventions (Ruel et al., 2018). This approach emphasizes not only the quantity but the quality of food production, advocating for agricultural practices that enhance dietary diversity, food accessibility, and nutritional awareness among rural communities (Burchi, Fanzo, & Frison, 2011). By leveraging agricultural extension services - long-established conduits between rural populations and knowledge resources - NSA seeks to shift the traditional focus from pure production targets to food security with a holistic nutritional outcome that support community health (Fanzo et al., 2021). Agriculture is said to be nutrition sensitive when it seeks to address the nutritional aspects of agriculture in order to combat hidden hunger among the disadvantaged sections of the society. Nutritional deficiency is more pronounced and evident among the people who are living at the bottom of social pyramid.

**Definition:** Nutrition Sensitive Agriculture (NSA) refers to an approach that seeks to address the underlying causes of malnutrition by integrating nutrition goals into agricultural production

systems. It emphasizes the production, availability, and accessibility of diverse, nutritious, and safe foods. Further, Nutrition Sensitive Agriculture (NSA) can also be defined as an approach that incorporates nutrition objectives into agriculture, focusing on enhancing the quantity, quality, and diversity of foods produced and consumed, thus directly contributing to better nutritional outcomes.

### **NSA - Key features**

The situation regarding nutritional deficiency is more acute in rural communities, especially among the weaker section of the society. NSA, therefore, goes beyond just increasing food production, it emphasizes producing diverse, nutrient-rich foods and improving the livelihoods of farmers and vulnerable populations. Some of the key features of NSA are:

- **Food and Nutrition Security:** NSA addresses both food security (sufficient, safe, and nutritious food) and nutrition security (sufficient intake of essential nutrients). It seeks to bridge the gap between agriculture and nutrition.
- **Diversified Food Systems:** The core principle of NSA is to promote the production and consumption of diverse and nutrient-dense foods, such as fruits, vegetables, legumes, and animal products, instead of just staple crops like rice and wheat.
- **Nutrient-Rich Crops and Livestock:** NSA emphasizes cultivating biofortified crops (e.g., Vitamin A-rich sweet potatoes, iron-rich beans) and encourages livestock production (e.g., poultry, dairy) that can provide and supplement the protein and micronutrients essential for balanced diets.
- **Women's Empowerment:** Women are often the primary caregivers and food providers in households, so empowering them through increased access to resources, knowledge, and decision-making in agricultural practices is critical for improving family nutrition.
- **Environmental Sustainability:** NSA promotes sustainable farming practices such as agroforestry, integrated pest management (IPM), and organic farming that not only support agricultural productivity but also preserve the environment and ensure long-term food availability.

### 3. Why NSA is Important?

Nutrition-sensitive agriculture is a food-based approach to agricultural development that puts nutritionally rich foods, dietary diversity, and food fortification at the heart of agriculture development thereby overcoming malnutrition and micronutrient deficiencies. This approach stresses the multiple benefits derived from enjoying a variety of foods, recognizing the nutritional value of food for good nutrition, and the importance and social significance of the food and agricultural sector for supporting rural livelihoods. The overall objective of nutrition-sensitive agriculture is to make the global food systems better equipped to produce good nutritional outcome.

The importance of NSA emerges therefore from its ability to address the following issues which are critical for rural communities, especially for the people living at the bottom of social pyramid. NSA can take care of the following issues:

**a) Addressing Malnutrition:** Malnutrition, especially in developing countries like India, is a significant challenge. NSA seeks to address multiple forms of malnutrition—undernutrition, micronutrient deficiencies, and over-nutrition thereby ensuring that healthy & nutritious food is available, accessible, and affordable to all.

**b) Linking Agriculture to Health:** While agriculture plays a critical role in food production, its potential to impact health and nutrition outcomes is often underutilized. NSA highlights the role agriculture can play in improving the public health by promoting nutrient-rich diets.

**c) Sustainable Development Goals (SDGs):** NSA contributes to several SDGs, particularly SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being), by promoting sustainable and scientific agricultural practices that directly support food security and nutrition.

**d) Economic Benefits:** NSA can lead to improved incomes for farmers by promoting value-added products (e.g., processed fruits, dairy products) and opening new market avenues for nutrient-dense crops. This economic growth, in turn, enhances food security.

**Components of NSA:** It comprises the following aspects of food and agriculture promotional strategies:

- i. **Production Diversification:** Encourages the cultivation of a variety of crops, including vegetables, fruits, pulses, and biofortified varieties, alongside traditional staple crops of wheat, rice, maize & sugarcane to improve the nutrient availability.
- ii. **Home and School Gardens:** Gardening has been one of the favorite pastime of people. These initiatives promote the cultivation of small gardens at the household and community levels to increase access to fresh, nutritious food and to improve dietary diversity.
- iii. **Livestock and Aquaculture:** Diversification of farming has long been recognized and practiced. However, the promotion of small-scale livestock farming (e.g., poultry, goats, dairy) and fish farming, which contribute to improved protein and micronutrient intake.
- iv. **Post-Harvest Handling and Storage:** Ensures that the nutrients in harvested crops are preserved through proper storage techniques, reducing post-harvest losses and maintaining food quality.
- v. **Market Access and Value Chains:** Access to market and maintaining an efficient supply value chain has been critical for farm profitability. Supporting the integration of nutrient-rich crops into local markets, linking farmers to buyers, and promoting the sale of diverse and nutritious food products.
- vi. **Nutrition Education and Behavior Change:** Behavior change communication emphasizing the value of nutrition rich food is the key to behavior change among the target audience. NSA efforts need to Integrate educational programs and campaigns to promote healthy eating habits, thereby enhancing the understanding of balanced diets, and encourage the consumption of locally available nutritious foods.

### **Role of Extension in Nutrition Sensitive Agriculture:**

Extension advisory services serve as a crucial link between agriculture and nutrition by promoting Nutrition Sensitive Agriculture by transferring knowledge, technologies, and resources to farmers and connecting the target people to understand the necessity of improving the nutritional deficiency for better health metrics. By integrating nutrition goals into agricultural practices, extension services can contribute to improved food security, dietary diversity, and health outcomes. Strengthening these services through capacity building, innovation, and multi-sectoral

approaches is essential to achieving sustainable nutrition outcomes, particularly in rural and underserved areas.

The role of extension services in NSA can be summarized as follows:

**a) Disseminating Knowledge:** Extension services are critical in raising awareness among farmers about nutrition-sensitive agricultural practices. They provide knowledge on:

- The importance of dietary diversity.
- Nutrient-rich crop varieties and livestock.
- Sustainable farming practices that improve soil health and crop quality.

**b) Capacity Building of Farmers:** Extension agents organize capacity-building activities like training programs, field demonstrations, and workshops to:

- Teach farmers about new cultivation techniques (e.g., intercropping, biofortification).
- Introduce post-harvest technologies that preserve the nutritional quality of crops.
- Encourage the use of organic and sustainable farming practices to enhance long-term food and nutrition security.

**c) Promoting Diversified Crop Systems:** Extension services help farmers transition from traditional mono-cropping systems (growing only staple crops) to diversified systems that include nutrient-rich crops like fruits, vegetables, pulses, and oilseeds. This diversification improves household food security and nutrition.

**d) Linking Farmers to Markets:** By establishing linkages between farmers and markets, extension services enable farmers to sell nutrient-dense crops, which improves their income and incentivizes the cultivation of these crops. This also increases the availability of diverse foods in local markets.

**e) Facilitating Partnerships and Collaboration:** Extension agents can act as liaisons between farmers, government programs, NGOs, and health services to create an integrated approach to food and nutrition security. Collaborations between agriculture and health sectors can provide more comprehensive solutions to malnutrition.



**f) Behavior Change Communication (BCC):** Extension services also play a role in delivering behavior change communication related to nutrition. This includes educating communities about:

- The benefits of consuming balanced diets.
- The role of nutrient-rich foods in preventing malnutrition and improving health.
- The importance of gender equality in agricultural decision-making, as women are often the gatekeepers of household nutrition.

**g) Incorporating Nutrition into Extension Curricula:** In many regions, traditional agricultural extension programs focus on improving productivity and yields. However, to align with NSA goals, extension curricula must be reoriented to include nutrition education and the promotion of diversified farming systems. This could involve:

- Training extension officers on the nutrition-sensitive aspects of agriculture.
- Developing NSA-specific extension materials, manuals, and guidelines.

### **Role of Extension in NSA Implementation - Challenges Faced**

Agricultural extension services play a crucial role in implementing Nutrition-Sensitive Agriculture (NSA) by serving as a bridge between research institutions, policymakers, and farmers. However, in order to improve the adoption of nutrition sensitive agriculture, some of the potential challenges faced are listed below

- **Lack of Training and Resources:** Extension agents may lack the necessary training in nutrition-sensitive practices, limiting their ability to promote NSA effectively.
- **Limited Farmer Awareness:** Many farmers, especially smallholders, may not be aware of the link between agriculture and nutrition, requiring more intensive outreach and education.
- **Gender Barriers:** In many cultures, women, who are central to food preparation and childcare, may have limited access to extension services, even though they play a critical role in household nutrition.

- **Market and Infrastructure Constraints:** Without access to markets and proper storage infrastructure, farmers may not be incentivized to grow and sell nutrient-rich crops, as they may face post-harvest losses or low demand for their products.

## CONCLUSION:

Nutrition Sensitive Agriculture is a holistic approach that connects agriculture, health, and nutrition to improve the well-being of rural populations. Extension services are vital in this agenda of transformation, helping farmers adopt diversified cropping systems, sustainable practices, and improved nutrition awareness. By promoting the consumption and production of nutrient-rich foods, NSA can contribute to breaking the cycle of malnutrition and poverty, leading to healthier, more resilient communities. The success of NSA depends on strong partnerships, continuous capacity building, and an integrated approach that links agriculture with nutrition and health sectors.

Further, agricultural extension services are indispensable in the promotion and implementation of Nutrition-Sensitive Agriculture. Their multifaceted role in education, resource provision, market access, policy advocacy, and monitoring ensure that agricultural practices not only increase food production but also improve the nutritional well-being of rural populations. For NSA to achieve its full potential, it is essential to strengthen and support extension and advisory services (EAS) through adequate funding, training, and policy support. This expanded role of EAS is critical for integrating nutrition-sensitive approaches into agricultural practices, thereby promoting food and nutritional security.

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## **Trends of Labelling Functional Foods – Nutritional and Health Claims as per Indian and International Regulations**

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Functional foods are also sometimes called dietary supplements, nutra- or nutraceuticals, medical foods, vita foods, pharma foods, phytochemicals, myco-chemicals, biochemo preventatives, designer foods and foods for specific health uses (Hasler, 1996; Head *et al.*, 1996). Such complex designations could well be an impediment to their rightful maturation and consumer acceptance (Zeisel, 1999, Anon, 2012). In order to have better understanding of the topic, let us first define the important terms or buzz words used to denote health promoting foods.

### **Claims**

Functional foods cannot claim to cure diseases but, increasingly, evidence is being produced that supports the role of some functional foods in disease prevention (Steinmetz and Potter, 1991). The concept of foods as medicine does not fit easily within the current expertise of either pharmaceutical or food companies and the full creative development of functional foods may well require new alliances between these companies with respect to regulatory issues (Anon 2012). Functional food science is now considered as a part of nutritional science in which the primary objectives are to maintain good health, improve homeostasis and to create the conditions for disease risk reduction. In this way it should be seen to be quite distinct from the medical and pharmaceutical sciences where the objectives are mainly to cure or control diseases (Saris *et al.* 1998; Diplock *et al.* 1998).

Functional foods are set to play an increasingly important role in national efforts in developed nations to curtail medical expenditure and also to improve the dietary habits of the populace. Consumers are becoming increasingly more health conscious and discerning in the types of foodstuffs that are purchased. It is now not possible to overlook the critical role that diet, including functional foods, can play in general health and well-being. Many types of cancer can now be linked to inappropriate diets. In contrast, regular consumption of fruits and vegetables

(now viewed as classical examples of functional foods) are now considered as essential ingredients in cancer prevention programs (Steinmetz and Potter, 1991, Anon 2012).

### **Conditions a functional food must satisfy**

1. They are necessarily foods not capsules, tablets or powder which are derived from naturally occurring ingredients.
2. Should be consumed in daily diet as full or part
3. Should contain the functional ingredient(s) in sufficient quantities so as to significantly influence the occurrence / cure of disease.
4. Should generally perform a particular function of prevention or cure of diseases when ingested.

### **CLASSIFICATION OF CLAIMS**

Claims on health foods can be classified in various categories as given below

Because of increasing interest in the concept of "Functional Foods" and "Health Claims", the European Union set up a European Commission Concerted Action on Functional Food Science in Europe (FUFOSE). The European Union Concerted Action supports the development of two types of health claims relevant to functional foods, which must always be valid in the context of the whole diet and must relate to the amounts of foods normally consumed (EUFIC 2006).

These are:

1. TYPE A: "Enhanced function" claims that refer to specific physiological, psychological functions and biological activities beyond their established role in growth, development and other normal functions of the body.

This type of claim makes no reference to a disease or a pathological state, e.g. certain non-digestible oligosaccharides improve the growth of a specific bacterial flora in the gut; caffeine can improve cognitive performance.

2. TYPE B "Reduction of disease-risk" claims that relate to the consumption of a food or food component that might help reduce the risk of a specific disease or condition because of specific nutrients or non-nutrients contained within it (e.g. folate can reduce a woman's risk of having a child with neural tube defects, and sufficient calcium intake may help to reduce the risk of osteoporosis in later life).

**Table 1: Classification of health claims of foods**

| Type / Class                                                           | Description                                                                                                                                                                                                                                                       | Example                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Health Claims</b>                                                   | Describe a relationship between a food substance (a food, food component, or dietary supplement ingredient), and reduced risk of a disease or health-related condition.                                                                                           | adequate calcium throughout life may reduce the risk of osteoporosis<br>A diet low in total fat may reduce the risk of some cancers.<br>Diets low in sodium may reduce the risk of high blood pressure, a disease associated with many factors |
| <b>Nutrient Content Claims</b>                                         | Describe the level of a nutrient in the product, using terms such as <i>free</i> , <i>high</i> , and <i>low</i> , or they compare the level of a nutrient in a food to that of another food, using terms such as <i>more</i> , <i>reduced</i> , and <i>lite</i> . | Low fat , fat free, high fibre                                                                                                                                                                                                                 |
| <b>Structure/Function Claims and Related Dietary Supplement Claims</b> | Describe the role of a nutrient or dietary ingredient intended to affect the normal structure or function of the human body. In addition, they may characterize the means by which a nutrient or dietary ingredient acts to maintain such structure or function.  | Calcium builds strong bones<br>"fiber maintains bowel regularity," or "antioxidants maintain cell integrity."                                                                                                                                  |

Sources: FSSAI 2012b, FDA 2013, Health Canada 2016

Codex has also explained claims on health foods in its “guidelines for use of nutrition and health claims” summarized as follows (Codex 2009).

Nutrition claim means any representation which states, suggests or implies that a food has particular nutritional properties including but not limited to the energy value and to the content of protein, fat and carbohydrates, as well as the content of vitamins and minerals.

The following do not constitute nutrition claims:

- (a) the mention of substances in the list of ingredients;
- (b) the mention of nutrients as a mandatory part of nutrition labelling;
- (c) quantitative or qualitative declaration of certain nutrients or ingredients on the label if required by national legislation.

**Nutrient content claim** is a nutrition claim that describes the level of a nutrient contained in a food. (Examples: “source of calcium”; “high in fiber and low in fat”.)

**Nutrient comparative claim** is a claim that compares the nutrient levels and/or energy value of two or more foods. (Examples: “reduced”; “less than”; “fewer”; “increased”; “more than”.)

**Non-addition claim** means any claim that an ingredient has not been added to a food, either directly or indirectly. The ingredient is one whose presence or addition is permitted in the food and which consumers would normally expect to find in the food.

**Health claim** means any representation that states, suggests, or implies that a relationship exists between a food or a constituent of that food and health. Health claims include the following:

**(i) Nutrient function claims** – a nutrition claim that describes the physiological role of the nutrient in growth, development and normal functions of the body. Example: “Nutrient A (naming a physiological role of nutrient A in the body in the maintenance of health and promotion of normal growth and development). Food X is a source of/ high in nutrient A.”

**(ii) Other function claims** – These claims concern specific beneficial effects of the consumption of foods or their constituents, in the context of the total diet on normal functions or biological activities of the body. Such claims relate to a positive contribution to health or to the improvement of a function or to modifying or preserving health. Examples: “Substance A (naming the effect of substance A on improving or modifying a physiological function or biological activity associated with health). Food Y contains x grams of substance A.”

**(iii) Reduction of disease risk claims** – Claims relating the consumption of a food or food constituent, in the context of the total diet, to the reduced risk of developing a disease or health-related condition. Risk reduction means significantly altering a major risk factor(s) for a disease or health-related condition. Diseases have multiple risk factors and altering one of these risk factors

may or may not have a beneficial effect. The presentation of risk reduction claims must ensure, for example, by use of appropriate language and reference to other risk factors, that consumers do not interpret them as prevention claims. Examples: “A healthful diet low in nutrient or substance A may reduce the risk of disease D. Food X is low in nutrient or substance A.” “A healthful diet rich in nutrient or substance A may reduce the risk of disease D. Food X is high in nutrient or substance A.”

### **Misbranding and Mislabeling**

Section 502 of the Federal Food, Drug and Cosmetic Act (FFDCA) of US contains provisions on misbranding including some that relate to false or misleading labelling (FDA 2015). It states that a device’s labelling misbrands the product if:

- Its labeling is false or misleading in any particular;
- It is in package form and its label fails to contain the name and place of business of the manufacturer, packer, or distributor and an accurate statement of the quantity of the contents in terms of weight, measure, or numerical count;
- Any required wording is not prominently displayed as compared with other wording on the device, or is not clearly stated;
- Its label does not bear adequate directions for use including warnings against use in certain pathological conditions or by children where its use may be dangerous in health or against unsafe dosage, or methods, or duration of administration or application;
- It is dangerous to health when used in the dosage or manner or with the frequency or duration prescribed, recommended or suggested in the labeling; or
- It does not comply with the color additives provisions listed under Section 706 of the FFDCA;
- The device's established name (if it has one), its name in an official compendium, or any common or usual name is not prominently printed in type at least half as large as that used for any proprietary name;
- The establishment is not registered with FDA as required by Section 510 of the FFDCA and has not listed the device as required by Section 510(j) of the FFDCA or obtained applicable premarket notification clearance as required by Section 510(k) of the FFDCA;
- The device is subject to a performance standard and it does not bear the labeling prescribed in that standard;



- There is a failure or refusal to comply with any requirement related to notification and other remedies prescribed under Section 518 of the FFDCa, if there is a failure to furnish any materials or information required by, or requested by the Secretary pursuant to, Section 519 of the FFDCa, or if there is a failure to furnish materials or information relating to reports and records required by Section 522 of the FFDCa; or
- There is any representation that creates an impression of official approval because of the possession by the firm of an FDA registration number.

### **False or Misleading Labeling**

If an article is alleged to be misbranded because the labelling or advertising is misleading, then in determining whether the labelling or advertising is misleading, there shall be taken into account (among other things) not only representations made or suggested by statement, word, design, device, or any combination thereof, but also the extent to which the labelling or advertising fails to reveal facts material in the light of such representations or material with respect to consequences which may result from the use of the article to which the labelling or advertising relates under the conditions of use prescribed in the labelling or advertising thereof or under such conditions of use as are customary or usual (FDA 2015).

FSSAI has also notified an “Advisory on Misbranding/ Misleading claims” and has indicated that various false claims made by the Food Business Operator about food articles and consequent violation, if any, are punishable under the provisions of FSS Act, 2006 (FSSAI 2012a). Violations related to food items, seriously jeopardize public health as well lead to unfair gains to Food Business. Misleading advertisement related to food items are imputed with malafide intent on the part of person making the claim and is normally made to misguide a consumer to purchase food item without disclosing the complete details on the advertisement. The burden of proof lies on the person willfully making false claims or engaged in misleading advertisement.

As per section 23, Packaging and Labeling of Foods of FSS Act, 2006; 1. No person shall manufacture, distribute, sell or expose for sale or dispatch or deliver to any agent or broker for the purpose of sale, any packaged food products which are not marked and labelled in the manner as may be specified by regulations. Provision that the labels shall not contain any statement, claim, design or device which is false or misleading in any particular concerning the food products

contained in the package or concerning the quantity or the nutritive value implying medicinal or therapeutic claims or in relation to the place of origin of the said food products. 2. Every food business Operator shall ensure that the labelling and presentation of food, including their shape, appearance or packaging, the packaging materials used, the manner in which they are arranged and the setting in which they are displayed, and the information which is made available about them through whatever medium, does not mislead consumers. As per section 24, Restrictions of advertisement and prohibition as to unfair trade practices of FSS Act, 2006; (1) No advertisement shall be made of any food which is misleading or deceiving or contravenes the provisions of this Act, the rules and regulations made thereunder. (2) No persons shall engage himself in any unfair trade practice for purpose of promoting the sale, supply, use and consumption of articles of food or adopt any unfair or deceptive practice including the practice of making any statement, whether orally or in writing or by visible representation which a. Falsely represents that the foods are of a particular standard, quality, quantity or grade- composition; b. Makes a false or misleading representation concerning the need for, or the usefulness; c. Give to the public any guarantee of the efficacy that is not based on an adequate or scientific justification thereof; Provided that where a defense is raised to the effect that such guarantee is based on adequate or scientific justification, the burden of proof of such defense shall lie on the person raising such defense. Further, any person who publishes, or is a party to the publication of an advertisement, which, falsely describes any food; or b. is likely to mislead as to the nature or substance or quality of any food or gives false guarantee, shall be liable to a penalty which may extend to ten lakh rupees. 8. All Food Business Operators as well as any person dealing with food articles are advised to be careful as well as alert and must strictly follow provisions contained in Food Safety and Standards Act, 2006 and Regulations thereof eschewing misleading claims which is not established by scientific evidence and validated by science as proof beyond reasonable doubts. Food items under section 22 of FSS Act, 2006, including Nutra-ceuticals, health supplements, functional food which have not taken product approval or operating only on the basis of NOC pending approval of sale cannot make any claim in their advertisement with any Health Claim, Nutra-ceuticals Claims or Risk Reduction Claim.

## REGULATORY SYSTEMS FOR HEALTH FOODS

Health foods/ functional foods, nutraceuticals, dietary supplements etc. as the name given in various countries are regulated different systems across the world

### Indian regulations

Over the past few decades, food safety has become a big concern for consumers as well as government and regulatory bodies across different countries. This has resulted into formulation and enactment of different acts and regulations. Some of these are HACCP, GAP, GMP, etc. Prevention of food Adulteration Act, 1954 has also been amended many times Food Safety and Standards Authority of India has enacted the Food Safety and Standards Act 2006 which has notified the following regulations in the Gazette of India dated 1<sup>st</sup> Aug 2011 and these Regulations have come in force on or after 5<sup>th</sup> Aug 2011.

- Food safety and Standards (Licensing and Registration of Food businesses) regulation, 2011
- Food Safety and standards (Packaging and Labelling) regulation, 2011
- Food safety and standards( Food product standards and food additives) regulation, 2011
- Food safety and standards (Prohibition and Restriction on sales) regulation, 2011
- Food safety and standards (contaminants, toxins and residues) regulation, 2011
- Food Safety and Standards (Laboratory and sampling analysis) regulation, 2011

Food Safety and Standard Act (2006) of India does not differentiate functional food, nutraceutical, dietary supplements and instead classifies all these products as food for special dietary application. Therefore, there is further need to clarify and formulate the regulatory framework (Kaushik and Kaushik, 2010).

**Table 2: Standards for Functional, Nutritional / health claims as per draft regulations 2012 of the FSSAI**

| Claim                        | Indian Regulations                                                                                                                                                                                              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LOW OR REDUCED ENERGY</b> | Product does not contain energy more than 40 kcal (170 kJ)/100 g (for solids or not more than 20 kcal (80 kJ)/100 ml for liquids. For table-top sweeteners the limit of 4 kcal (17 kJ)/portion, with equivalent |

|                                                                                             |                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                             | sweetening properties to 6 g of sucrose (approximately one teaspoon of sucrose), applies.                                                                                                                                                                                                                                                                         |
| <b>ENERGY FREE</b>                                                                          | Product does not contain energy more than 4 kcal /100 g (liquids)                                                                                                                                                                                                                                                                                                 |
| <b>LOW-FAT</b>                                                                              | Product contains no more than 3 g of fat per 100 g for solids or 1.5 g of fat per 100ml for liquids (1.8 g of fat per 100 ml for semi-skimmed milk).                                                                                                                                                                                                              |
| <b>FAT-FREE</b>                                                                             | Product contains no more than 0.5 g of fat per 100 g or 100 ml. Claims expressed as 'X % fat-free' shall be prohibited.                                                                                                                                                                                                                                           |
| <b>LOW CHOLESTEROL</b>                                                                      | <ul style="list-style-type: none"> <li>• Product contains not more than 20 mg cholesterol / 100g (solids) or 10mg per 100 ml (liquids) of food.</li> <li>• Food shall not contain more than 1.5 g saturated fat per 100 gm (solids) or 0.75 gm of saturated fat per 100 ml (liquids) or 10% of energy of saturated fat and shall be trans-fat free.</li> </ul>    |
| <b>CHOLESTEROL free</b>                                                                     | Product contains not more than 5 mg cholesterol / 100g /ml of food. Additionally the food shall not contain more than 1.5 g saturated fat per 100 gm (solids) or 0.75 gm of saturated fat per 100 ml (liquids) or 10% of energy of saturated fat and shall be trans-fat free. and not less than 40% of cis – polyunsaturated or cis – monounsaturated fatty acids |
| <b>LOW SATURATED FAT</b>                                                                    | Saturated fat does not exceed 1.5 gm per 100 gm (solids) or 0.75 gm per 100 ml (liquids) and shall be trans-fat free.                                                                                                                                                                                                                                             |
| <b>SATURATED FAT FREE</b>                                                                   | Saturated fat does not exceed 0.1 gm per 100 g or 100 ml. of food and shall be trans-fat free.                                                                                                                                                                                                                                                                    |
| <b>TRANS FAT FREE</b>                                                                       | Less than 0.2gm trans-fat is present per serving of the product                                                                                                                                                                                                                                                                                                   |
| <b>RICH IN MUFA (mono unsaturated fatty acid) AND/ OR PUFA(poly unsaturated fatty acid)</b> | At least 45% of the fatty acids present in the product derive from monounsaturated fat under the condition that saturated fat must not provide more than 10% of energy                                                                                                                                                                                            |
| <b>Contains Omega3 fatty acids</b>                                                          | (1)Total saturated fatty acids and trans fatty acids is no more than 28% of total fatty acid content of the food, or food contains no more than 5 g of saturated fatty acids and trans fatty acids per 100 g of the food.                                                                                                                                         |

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <p>(2)No less than 200 mg alpha linolenic acid ( ALA) per serving , or 30 g of total EPA and DHA per serving</p> <p>(3)Specify the source of omega fatty acid present</p> <p>(4) Indicate the source of omega -3 fatty ALA, DHA and /or EPA.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>SOURCE OF OMEGA 3 FATTY ACIDS</b>             | <p>(1)Total saturated fatty acids and trans fatty acids is no more than 28% of total fatty acid content of the food, or food contains no more than 5 g of saturated fatty acids and trans fatty acids per 100 g of the food.</p> <p>(2)No less than 60 mg total EPA and DHA per serving.</p> <p>(3)Indicate the source of omega -3 fatty acid namely alpha linolenic acid, DHA and /or EPA.</p>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Omega 6 Source</b>                            | Total saturated fatty acids and trans fatty acids is no more than 28% of total fatty acid content of the food and fatty acid in respect of which the nutrition claim is made comprises no less than 40 % of total fatty acid content of the food.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>LOW SUGAR</b>                                 | Product contains not more than 5g of sugar per 100 g for solids or 2.5 g of sugar per 100 ml for liquids.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>SUGAR-FREE</b>                                | Product contains not more than 0.5 g of sugar per 100 g or 100 ml.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>WITH NO ADDED SUGAR / WITHOUT ADDED SUGAR</b> | <p>Product does not contain any added mono- or disaccharides or any other food used for its sweetening properties like sucrose, fructose, lactose, honey etc. If sugars are naturally present in the food, the following indication should also appear on the label: ‘CONTAINS NATURALLY OCCURRING SUGARS’.</p> <p>It should also comply with the following conditions:-</p> <p>(a). No sugars of any type have been added to the food (examples: sucrose, glucose, honey, molasses, corn syrup, etc.);</p> <p>(b) The food contains no ingredients that contain sugars as an ingredient (examples: jams, jellies, sweetened chocolate, sweetened fruit pieces, etc.); sugars that functionally substitute for added sugars (examples: concentrated fruit juice not reconstituted, dried fruit paste, etc.);</p> |

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | <p>(c) The sugars content of the food itself has not been increased above the amount contributed by the ingredients by some other means (examples: by enzymes);</p> <p>(d) The food that it resembles and for which it substitutes normally contains added sugars</p>                                                                                                                                                                                        |
| <b>LOW SODIUM/SALT</b>                                | Product contains no more than 0.12 g of sodium, or the equivalent value for salt, per 100 g or per 100 ml.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Very low sodium/salt</b>                           | Product contains no more than 0.04 g of sodium, or the equivalent value for salt, per 100 g or per 100 ml                                                                                                                                                                                                                                                                                                                                                    |
| <b>Sodium free</b>                                    | Product contains no more than 0.005 g of sodium, or the equivalent value for salt, per 100 g or per 100 ml                                                                                                                                                                                                                                                                                                                                                   |
| <b>No added salt</b>                                  | <p>(a) The food contains no added sodium salts</p> <p>(b) The food contains no ingredients that contain added sodium salts (examples: Worcestershire sauce, condiments, pickles, pepperoni, soya sauce, etc.);</p> <p>(c) The food contains no ingredients that contain sodium salts that functionally substitute for added salt (like seaweed);</p> <p>(d) The food that it resembles and for which it substitutes normally contains added sodium salts</p> |
| <b>SOURCE OF DIETARY FIBRE</b>                        | Product contains at least 3 g of fibre per 100 g                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>HIGH IN DIETARY FIBRE OR RICH IN DIETARY FIBRE</b> | Product contains at least 6 g of fibre per 100 g or 100 ml or 20% of RDA per serving.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Low Protein</b>                                    | <p>Food contains not more than 1gm of protein per 100 gm or 100 ml.</p> <p>Also energy from protein should not be more than 5% of total energy</p>                                                                                                                                                                                                                                                                                                           |
| <b>SOURCE OF PROTEIN</b>                              | <p>At least 12 % of the energy value of the food is provided by protein or the food contains at least</p> <p>10% of RDA per 100 g (solids) or</p> <p>5% of RDA per 100 ml (liquids) or</p> <p>5% of RDA per 100 kcal or</p>                                                                                                                                                                                                                                  |

|                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                         | 10% of RDA per serving                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>RICH IN PROTEIN /<br/>HIGH PROTEIN</b>                               | At least 20 % of the energy value of the food is provided by protein or has 2 at least or the food contains at least<br>20% of RDA per 100 g (solids) or<br>10% of RDA per 100 ml (liquids) or<br>10% of RDA per 100 kcal or<br>20% of RDA per serving                                                                                                                                                      |
| <b>SOURCE OF (NAME OF<br/>VITAMIN/S) AND/OR<br/>(NAME OF MINERAL/S)</b> | Product contains at least<br>15% of RDA per 100 g (solids) or<br>7.5% of RDA per 100 ml (liquids) or<br>5% of RDA per 100 kcal or<br>15% of RDA per serving                                                                                                                                                                                                                                                 |
| <b>HIGH (NAME OF<br/>VITAMIN/S) AND/OR<br/>(NAME OF MINERAL/S)</b>      | Product contains at least<br>30% of RDA per 100 g (solids) or<br>15% of RDA per 100 ml (liquids) or<br>10% of RDA per 100 kcal or<br>30% of RDA per serving                                                                                                                                                                                                                                                 |
| <b>CONTAINS (NAME OF<br/>THE NUTRIENT OR<br/>OTHER SUBSTANCE)</b>       | A claim that a food contains a nutrient or other nutritive substance, for which specific conditions are not laid down in this Regulation, may only be made where the product complies with all the applicable provisions of this Regulation, and in particular, for vitamins and minerals the conditions of the claim ‘source of’ shall apply                                                               |
| <b>INCREASED (NAME OF<br/>THE NUTRIENT)</b>                             | Increase in content is at least 30 % compared to a same or a similar category product, provided the increased nutrient / s content have positive beneficial effect on the target consumer.                                                                                                                                                                                                                  |
| <b>REDUCED (NAME OF<br/>THE NUTRIENT)</b>                               | Reduction in content is at least 30 % compared to a same or a similar category product, except for micronutrients where a 10 % difference in the reference values shall be acceptable and <b><u>for sodium, or the equivalent value for salt, a 25 % difference shall be acceptable,</u></b> provided that the reduction in the nutrient / nutrients has positive beneficial effect on the target consumer. |

|                          |                                                                                                                                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NATURALLY/NATURAL</b> | Where a food naturally meets the condition(s) like pure, fresh, real or without addition or deletion of any nutrient substances and additives excluding natural additives for the use of a nutritional claim, the term ‘naturally/ natural’ may be used as a prefix to the claim.                                  |
| <b>LIGHT/ LITE</b>       | A claim stating that a product is ‘light’ or ‘lite’, and any claim likely to have the same meaning for the consumer, shall follow the same conditions as those set for the term ‘reduced’; the claim shall also be accompanied by an indication of the characteristic(s) which make(s) the food ‘light’ or ‘lite’. |

**Source: FSSAI 2012b.**

### 8.3 International regulations

There are several regulatory agencies for foods, functional foods and nutraceuticals in different countries.

**Table 3: Regulatory systems of various countries**

| <b>Country</b> | <b>Regulation</b>                                                                                       | <b>Remarks</b>                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Japan          | ‘Foods for Specified Health Use’ (FOSHU) in 1991 through Ministry of Health, Labour, and Welfare (MHLW) | Approve the statements made on food labels concerning the physiological effects of the food on the human body.                                                                                                                                                                                                                                                                     |
|                | Foods with Health Claims’ 2001                                                                          | Foods with Nutrient Function Claims’ (FNFC). FNFC refers to all food that is labeled with the nutrient function claims specified by the MHLW. Under the FNFC, twelve vitamins (vitamins A, B1, B2, B6, B12, C, E, D, biotin, pantothenic acid, folic acid, and niacin) and two minerals (Ca and Fe) are standardized along with their upper and lower levels of daily consumption. |



|                           |                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USA                       | Food and Drug Administration (FDA) has regulated the nutraceutical industry since 1947                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                              |
|                           | Under the Nutrition Labeling and Education Act (NLEA), 1990, Dietary Supplement Act of 1992, and the Dietary Supplement Health and Education Act of 1994 (DSHEA)                                                                                                         | FDA may authorize a health claim for a food or dietary supplement based on an extensive review of the scientific literature, generally as a result of the submission of a health claim petition, using the significant agreement standard to determine the nutrient/disease relationship is well established |
| Europe                    | Regulation COM/2003/0424 on the use of nutrition and health claims for foods proposed by European Commission was adopted by the Council and Parliament of Europe in December 2006. The European Food Safety Authority (EFSA) is involved in implementing this regulation |                                                                                                                                                                                                                                                                                                              |
| Canada                    | Health Canada regulates the health food industry and the Canadian Food Inspection Agency enforces these regulations.                                                                                                                                                     | In Canada, the most of nutraceuticals fall under the Natural Health Products Regulations of the Food and Drugs Act which came into effect on January 1, 2004.                                                                                                                                                |
| New Zealand and Australia | Food Standards Australia and New Zealand (FSANZ) (FSAN 1991                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                              |
| China                     | Food Hygiene Law of People's Republic of China and the Administrative licensing law of                                                                                                                                                                                   | Effective from July 1, 2005.                                                                                                                                                                                                                                                                                 |

|       |                                                                                                                                                                |                                                                                                                                                                                                       |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | People's Republic of China, the interim administrative measures for the health food registration were promulgated by State Food and Drug Administration (SFDA) |                                                                                                                                                                                                       |
| Korea | The Korean Health/Functional Food Act that came into effect in 2004                                                                                            | There are 37 ingredients listed in the act for generic HFFs, and if an HFF contains a new active ingredient that is not included in the generic 37 products, it is considered a product-specific HFF. |

Source: Sharma et al 2012.

**Table 4: International Standards of Codex: Conditions for nutrient Content Claims**

| Components    | Claims | Conditions (not more than)                                                                                                                             |
|---------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Energy        | Low    | 40 kcal (170 kJ) per 100 g (solids) or 20 kcal (80 kJ) per 100 ml (liquids)                                                                            |
|               | Free   | 4 kcal per 100 ml (liquids)                                                                                                                            |
| Fat           | Low    | 3 g per 100 g (solids) or 1.5 g per 100 ml (liquids)                                                                                                   |
|               | Free   | 0.5 g per 100 g (solids) or 100 ml (liquids)                                                                                                           |
| Saturated Fat | Low    | 1.5 g per 100 g (solids) or 0.75 g per 100 ml (liquids) and 10% of energy from saturated fat                                                           |
|               | Free   | 0.1 g per 100 g (solids) or 0.1 g per 100 ml (liquids)                                                                                                 |
| Cholesterol   | Low    | 0.02 g per 100 g (solids) or 0.01 g per 100 ml (liquids)                                                                                               |
|               | Free   | 0.005 g per 100 g (solids) or 0.005 g per 100 ml (liquids)                                                                                             |
|               |        | and, for both claims, less than: 1.5 g saturated fat per 100 g (solids) 0.75 g saturated fat per 100 ml (liquids) and 10% of energy from saturated fat |
| Sugars        | Free   | 0.5 g per 100 g (solids) or 0.5 g per 100 ml (liquids)                                                                                                 |
| Sodium        | Low    | 0.12 g per 100 g                                                                                                                                       |

|                       |        | Very Low                                                                                                                                    | 0.04 g per 100 g       |
|-----------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
|                       |        | Free                                                                                                                                        | Free 0.005 g per 100 g |
| Components            | Claims | Conditions (not less than)                                                                                                                  |                        |
| Protein               | Source | 10% of NRV per 100 g (solids), 5% of NRV per 100 ml (liquids), or 5% of NRV per 100 kcal (12% of NRV per 1 MJ) or 10% of NRV per serving    |                        |
|                       | High   | 2 times the values for “source”                                                                                                             |                        |
| Vitamins and Minerals | Source | 15% of NRV per 100 g (solids), 7.5% of NRV per100 ml (liquids), or 5% of NRV per 100 kcal (12% of NRV per 1 MJ) , or 15% of NRV per serving |                        |
|                       | High   | 2 times the value for “source”                                                                                                              |                        |
| Dietary Fiber         | Source | 3 g per 100 g3 or 1.5 g per 100 kcal or 10 % of daily reference value per serving                                                           |                        |
|                       | High   | 6 g per 100 g3 or 3 g per 100 kcal or 20 % of daily reference value per serving4                                                            |                        |

Source: Codex 2009.

## CONCLUSION

In an era of advertisements and growing concern for healthy and health promoting foods, it is utmost necessary to protect consumer interests. Regulations for functional and health foods are still in infancy in India. It is of great concern that industry has created a huge pressure on FSSAI not to implement regulations for functional foods. This is the reason why the draft regulation notified in December 2012 has not been implemented till June 2016. In order to protect consumer interests, the government should establish an independent broadcast regulator(s) for various channels of marketing and advertising. As on today the claim of FSSAI of aiming the comparable standards as the international ones seem to fail. Instead of monetary fines, a compulsion of corrective advertisements on the companies involved in misleading advertisements is another practical solution. Consumers should be educated frequently about the products and the consumer rights, and their organizations must assert their rights against dishonest businessmen and false claims.

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## **Nutritive Sensitive Value Chain and Marketing Opportunities in Indian Context**

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### **Abstract**

The present agriculture is based on production improvement and sufficiency in different cereal and pulses in the country but less attention about nutrition, hygiene, nutrition values chain, marketing linkages, e marketing etc. are the center subject to talk all over the country. Although, nutrition sensitization is the prime factor for assessing the growth and development of the human health, happiness and welfare of the society. Agriculture research, development programs and policy have not focused on maximizing nutrition outputs from farming systems rather only production and in the same line the world's farmers have more than doubled cereal production in last four decades.

### **Introduction**

The agriculture is the backbone for providing edible food materials and energy to survive vast living population on the earth since inception of the humanity. The multi-dimensional needs of human ranging from form health, medical products, foods, shelter, clothing and luxury life styles can be fulfilled by the agriculture sector. So, there is wide scope for marketing to assure supply and reach upto consumers of these related products in the society. Now numerous startups have been emerged in agriculture sector to deals with the demand and supply of innovative products and being successful at large scale not only in India but at international repute.

The future of agriculture in our country is on the threshold of a technological revolution, with several advancements to transform the agriculture sector. In Indian context the agri-tech startups have gained a lot of potential and will get reached its market of worth \$24 billion by 2025. The agricultural marketing generally covers the services which are facilitating to moving an agricultural product from the farm to the ultimate consumers in the country. These services also involve the planning, organizing, directing and handling of agricultural produce in such a way as to satisfy the farmers, intermediaries and consumers respectively.

To ensure the fair prices for the farmers and also to prevent the exploitation of producers or farmers by middlemen in this sector regulation were made followed by development of infrastructural facilities are also very much required in the country. In agricultural marketing transportation cost, inadequate market infrastructure, lack of market information, lack of

processing units, storage facility, price fluctuation are the major problems that must be sorted out soon to make a healthy marketing management and global supply system.

Agricultural marketing plays very important role not only in stimulating production and consumption channel but it provides a better opportunity to accelerating the pace of agricultural based growth and development of rural economy in India. Therefore to strengthen the marketing network in country the cooperative marketing may also be promoted for harnessing the marketing opportunities realization of the better price by farming community in the country.

## **Discussion of Value Chain Development and Marketing Opportunities**

### **1. Challenges ahead:**

Global burden of under nutrition caused 1 over 3 million child deaths per year and stunting prevalence in children under 5 affected at least 165 million children (Black *et al.*, 2013). The reason is lack of attention to the relatively higher prices of micronutrient-dense food such as fruits, vegetables, and livestock products. The need of hour is “sensitization of farming community towards entire agricultural value chain to increase the availability of safe and nutritious foods linking smallholder farmers and their associations to markets through inclusive business models and reducing post/harvest losses”.

### **2. Need of nutritive sensitive value chain:**

The need of nutritive sensitive value chain is to increase the production and consumption of more diverse, safe and nutrient-dense foods to improve the food security, nutrition and income of smallholder farmers, peri-urban and urban populations of any locality.

### **3. What does sensitivity mean in nutrition?**

The people, who suffer from an intolerance or sensitivity, can't break down certain foods. They develop gas, diarrhea and other problems. An intolerance or food sensitivity is inconvenient but not life-threatening.

### **4. The Components of Nutrition Sensitive Agriculture:**

There are the 5 key major pathways:

1. Food production,
2. Nutrition-related knowledge,
3. Agricultural income,
4. Women's empowerment,
5. Strengthening of local institutions.

## **6. What is a nutrition sensitive value chain?**

Nutrition Sensitive Value Chain is a food value chain consisting in all the stakeholders participating in the coordinated production and value-adding activities that are needed to make food products. A nutrition-sensitive approach considers how developing food value chains can also contribute to improving nutrition. As core elements of food systems, value chains influence supply and demand of foods.

Addressing malnutrition requires profound changes in the way food is produced, but also in the way it is processed, distributed, marketed and consumed. Capacity development for nutrition-sensitive value chains supports national and local actors in finding their own way to: create inclusive markets, accessible to all producers and consumers; make nutritious and diversified food available, accessible, affordable; and desirable to people. Capacities for nutrition-sensitive value chains are developed through resources and interventions that support local stakeholders in driving change from within—through locally based processes that include, but are not limited to, decision-making, policy-making, investments, research, innovation and learning [FAO]

## **7. Sustainable food value chains for nutrition:**

Food and agriculture make a vital contribution to improving nutrition, by ensuring the availability and accessibility of diverse, safe and nutritious food. Adopting sustainable food value chains approaches is critical to improve nutrition through agriculture and food systems.

## **8. What are the basic components of food and nutrition security?**

The three components of food security:

1. Availability (having sufficient quantities of appropriate food available)
2. Access (having adequate income or other resources to access food)
3. and utilization/consumption (having adequate dietary intake and the ability to absorb and use nutrients in the body)

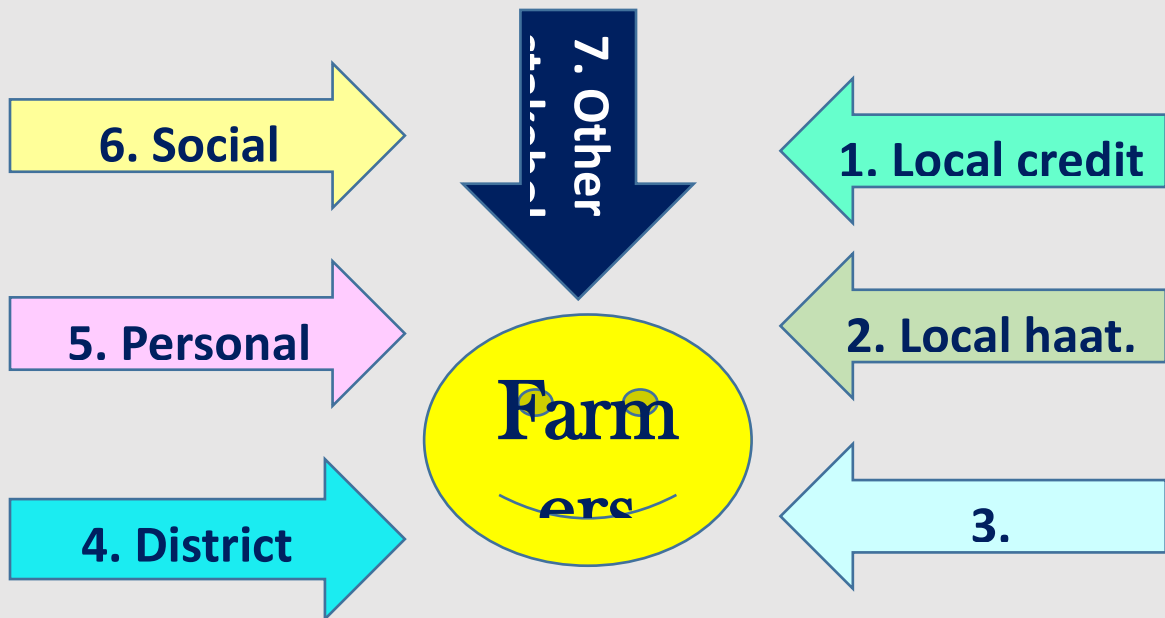
## **Market linkages & Market Opportunities**

1. Market linkage refers to the connection between different markets.
2. Market also refers to the connection between producers and consumers, or the connection between farmers and markets.
3. Facilitate market linkages between farmers and various markets e.g. processors, local supermarkets, municipal markets, international markets, etc.
4. Potential linkages of producers with overseas markets are also supported through market development.



5. Producers are also assisted with logistical arrangements.

#### Market linkage development Model



#### Market Opportunities:

At present agriculture is booming and full of diversified products, produces, crops and other allied outcomes in India. The different estimates are showing big opportunities in agriculture sector for covering quality, healthy and nutritive sensitive based agriculture growth and marketing in the country. The given data is being presented to show its expected scope or potentiality in future.

Table-1: The status of Indians who are unable to afford healthy food

| S. No. | Year of estimation | % of population unable to afford healthy food |
|--------|--------------------|-----------------------------------------------|
| 1      | 2017               | 78.80%                                        |
| 2      | 2018               | 73.20%                                        |
| 3      | 2019               | 71.40%                                        |
| 4      | 2020               | 76.20%                                        |
| 5      | 2021               | 74.10%                                        |

Source: India today, 2022

This data may be treated as the opportunity to supply the nutritive food supply in affordable price through different commodity or product based agri-startups in the country for rural and urban unemployed youth.

## **Findings and conclusion:**

1. Value chain for nutrition and food safety offers a great opportunity for strengthening the food systems to reduce malnutrition in all its forms.
2. Value chains can also help to address the emerging constraints to supply and intake of healthy foods
3. It also helps to create an enabling environment for healthier choices of the public for better dietary needs and supply in food system.

The salient benefits for nutritive value chain and market linkages development are being observed in different researches and studies are as it is

- Improving nutrition
- Food security
- Economic status
- Supporting rural livelihoods
- Prioritizing nutrition in agricultural policies
- Diversifying cropping systems
- Intensifying cropping systems
- Integrating allied enterprises
- Participating in post-harvest value addition activities and Practicing good agriculture methods
- Overall good income generation for better livelihood security and inclusive development of farmers

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## **Effective Communication Skills for Field Functionaries: Enhancing Outreach and Impact at the Grassroots Level**

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### **Abstract**

Effective communication is fundamental to human interaction, serving as the foundation for building trust, fostering collaboration, and achieving progress across social, professional, and personal spheres. For field functionaries operating at the grassroots level, particularly in rural development and community engagement, strong communication skills are indispensable for achieving meaningful outreach and impact. This chapter highlights the critical importance of communication, emphasizing its role in cultivating trust, enhancing teamwork, and facilitating informed decision-making. It examines the communication process in detail, outlining essential components such as the sender, message, channel, encoding, decoding, and feedback. The chapter also addresses challenges specific to rural communication, including infrastructural limitations, socio-economic constraints, and cultural barriers. Strategies to overcome these obstacles are explored, with a focus on leveraging technology and employing participatory approaches to ensure inclusivity and effectiveness. Key communication skills, such as active listening, emotional intelligence, and clarity of expression, are presented as vital for personal growth, professional success, and community empowerment. Additionally, the transformative potential of technology in bridging communication gaps and enhancing connectivity across diverse contexts is examined. Through well-structured messaging and robust feedback mechanisms, communication emerges as a powerful tool for driving innovation, fostering trust, and empowering individuals and communities to achieve shared objectives. This chapter highlights that effective communication is not merely a skill but a catalyst for sustainable development and collective progress.

### **Introduction**

Communication is a vital component of human interaction, serving as the conduit for exchanging ideas, information, emotions, and experiences. It is indispensable in every aspect of life, from nurturing personal relationships to thriving in professional settings, as it fosters understanding, collaboration, and meaningful connections. Rebores (2003) defines communication as a process through which information generates a response in individuals, influencing their understanding of both the message and the sender. Effective communication extends beyond speaking or writing; it integrates verbal, non-verbal, and written methods to ensure clarity, relevance, and engagement.

A successful communication process carefully considers the audience, message, medium, and context, ensuring that the intended meaning is conveyed and understood with precision. In today's interconnected world, effective communication skills are more critical than ever. These skills include active listening, clarity of expression, empathy, adaptability, and the ability to provide and receive feedback. Together, they contribute to building trust, strengthening relationships, and achieving shared objectives. Whether resolving conflicts, facilitating decision-making, or inspiring action, effective communication empowers individuals and teams to collaborate productively and excel in diverse settings. As Beattie and Ellis (2014) noted, to communicate effectively requires more than organizing thoughts and presenting them accessibly. It involves expressing ideas in a manner that captures the recipient's attention and fosters engagement. Communication is not merely an exchange of words; it is a dynamic process that drives success, innovation, and meaningful human connection.

### Importance of communication



**[1] Builds Trust and Rapport with Communities:** Effective communication fosters trust by ensuring transparency, honesty, and empathy. When people feel heard and valued, they are more likely to trust the communicator. Building rapport with communities creates a foundation for strong relationships, enabling individuals and groups to work together more effectively. For instance, in rural development, open dialogue with community members ensures their active participation and trust in the programs.

**[2] Essential for Collaboration and Coordination:** Communication acts as a bridge for connecting individuals and organizations, ensuring everyone works toward a common goal. Clear and timely communication allows for better coordination of tasks, resource sharing, and the alignment of efforts. This is especially critical in multi-stakeholder projects like SHG-led initiatives, where smooth collaboration can significantly impact outcomes.

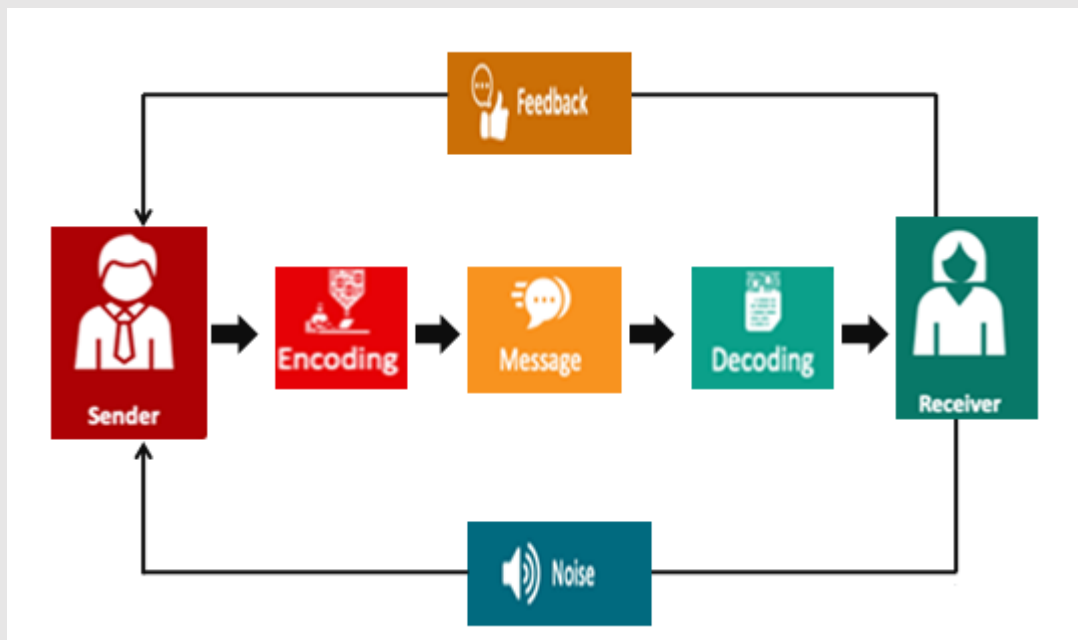
**[3] Enhances Service Delivery and Decision-Making:** Transparent and consistent communication ensures that people receive accurate information about services, policies, and opportunities. It enables beneficiaries to provide feedback, thereby improving service quality. Additionally, effective communication facilitates informed decision-making by sharing relevant data, insights, and ideas among stakeholders, which can lead to more practical and impactful solutions.

**[4] Improves Understanding and Problem-Solving:** Communication ensures that diverse perspectives are understood and considered. Communication mostly involves trust and acceptance of others; their different feelings and ideas which they perceive as equally valid (Ruck & Welch, 2012). When challenges are clearly described, stakeholders can identify the root causes of problems and collaborate to address them. Active listening, dialogue, and knowledge-sharing enhance mutual understanding and foster innovative approaches to resolving challenges in a timely and effective manner.

## **The Communication Process**

The communication process is a dynamic sequence of steps that facilitates the transfer of information between individuals and groups. Below are the key stages: [1] **Sender** The sender is the person or entity that initiates the communication. They are responsible for encoding the message and ensuring it aligns with their intent. The sender creates and transmits the message based on their intention or purpose. Effective communication begins with the sender's clarity regarding their intended message and the manner of its expression. [2] **Message** The message constitutes the fundamental information, concept, or notion that the sender intends to communicate. It can be verbal, written, or non-verbal and should be clear and well-structured to minimize misunderstanding. The message must be clear, concise, and tailored to the needs of the audience to guarantee effective communication. [3] **Channel:** The channel serves as the medium for message transmission. Communication can occur through in-person discussions, emails, telephone calls, social media platforms, or visual aids. The selection of channel is contingent upon the audience, context, and urgency of the communication. [4] **Receiver:** The receiver is the individual or group for whom the message is designed. They must interpret and process the message accurately. Understanding the receiver's background, preferences, and communication needs is crucial for ensuring the message is received and understood successfully. [5] **Encoding:** Encoding is the process of transforming the sender's ideas into a comprehensible format for the receiver. This may involve the utilization of language, symbols, or gestures. Encoding is the process via which the sender converts their thoughts or ideas into a transmittable format, such as words, symbols, or images. The efficacy of communication is contingent upon the alignment of encoding with the receiver's decoding capabilities. [6] **Decoding:** Decoding is the process by which the recipient interprets and comprehends the message. It involves interpreting the encoded material and ascertaining its significance. Miscommunication frequently arises when

the receiver's interpretation diverges from the sender's purpose. Successful decoding relies on the recipient's linguistic proficiency, cultural awareness, and contextual knowledge. [7] **Feedback:** Feedback is the response from the receiver, which helps the sender know whether the message was understood as intended. It closes the communication loop, enabling adjustments or clarifications to improve the exchange. Feedback may be conveyed verbally (e.g., questions, comments) or non-verbal (e.g., nodding, facial expressions). [8] **Context:** Context denotes the environment or circumstances around communication. It encompasses physical, social, cultural, and psychological elements that can affect the transmission, reception, and interpretation of the message. [9] **Noise:** Noise is any disruption or barrier that interferes with the communication process. It can be physical (ambient noise), technical (poor signal), semantic (language differences), or psychological (stress or prejudice). Managing noise is crucial to ensure effective communication.



**Fig. 2. Components of communication process**

This cyclic process ensures that communication is continuous, with feedback serving as the basis for improvement or clarification. Any break or inefficiency in one step can disrupt the overall process.

## Communication Methods

Communication methods refer to the tools, techniques, and processes used to convey messages between individuals or groups. They can be categorized based on **mode**, **medium**, and **context**.

## 1. Based on Mode of Delivery

**a. Verbal Communication-** Verbal communication involves the utilization of spoken or written language to transmit messages. **Spoken Communication-** includes direct interactions, including face-to-face conversations, phone calls, video conferencing, speeches, interviews, and discussions. **Written Communication-** uses written language via emails, letters, reports, memos, and text messages to document or convey information.

**b. Non-Verbal Communication-** Non-verbal communication utilizes gestures, body language, facial expressions, vocal tone, and posture to convey meaning.

**c. Visual Communication-** Visual communication utilizes images, graphics, and visual aids such as charts, infographics, videos, and presentations to deliver messages effectively.

## 2. Based on Medium or Channel

**a. Face-to-Face Communication-** Direct, in-person interaction that allows for immediate feedback and observation of non-verbal cues.

**b. Digital Communication-** Using digital platforms and tools to exchange messages. Like emails for formal business communication, video calls for virtual meetings and messaging apps for quick updates or casual interactions.

**c. Written Communication-** Messages sent in a documented form, which can be preserved and referred to later. Such as official letters, contracts, instruction manuals.

**d. Telecommunication-** Communication over long distances using phones or other electronic devices. Like phone calls, SMS, and voice messages.

**e. Broadcast Communication-** Disseminating information to a wide audience via mediums such as television, radio, or online platforms.

**f. Group Communication-** Interaction that occurs within a group setting to share ideas or collaborate. Such as team meetings, workshops, brainstorming sessions.

**g. Mass Communication-** Communication designed for large audiences through media like newspapers, magazines, social media, or public speeches. For example politicians addressing the nation through a televised speech.

### 3. Based on Context

**a. Formal Communication Methods-** It includes structured communication following predefined protocols, typically used in professional or organizational settings, like Official reports, presentations and business proposals.

**b. Informal Communication Methods-** These are casual and spontaneous communication methods without rigid protocols. It includes coffee-break conversations, friendly chats and informal group discussions.

**c. One-Way Communication-** It is the type of communication that flows in a single direction, without provision for immediate feedback. Example includes public announcements, lectures and news broadcasts.

**d. Two-Way Communication-** It is the communication that involves an exchange of messages, enabling feedback. Such as, interactive sessions and customer support chats.

### 4. Emerging Communication Methods

**a. Social Media Communication-** Sharing information through platforms like Facebook, Twitter, LinkedIn, and Instagram.

**b. Multimedia Communication-** Combining text, images, audio, and video to create more engaging and impactful messages. Like educational YouTube videos, webinars, podcasts.

By selecting the appropriate communication method based on the audience, context, and objectives, individuals and organizations can achieve more effective and meaningful exchanges.

### Effective Communication: A Key to Success

Effective communication is the process of conveying information, ideas, or emotions in a way that is clear, understandable, and achieves its intended purpose. It involves a two-way exchange of messages where both the sender and receiver actively participate, ensuring clarity, mutual understanding, and appropriate feedback. In personal, professional, and social settings, effective communication fosters understanding, builds relationships, and enhances productivity. It bridges gaps, strengthens bonds, drives action, and ensures alignment toward shared goals. In rural contexts, effective communication plays a pivotal role in empowering communities, improving livelihoods, and advancing sustainable development. It facilitates knowledge sharing, promotes collaboration, and supports initiatives that address the unique challenges faced by rural populations. Conversely, ineffective communication can lead to a lack of motivation, diminished well-being, and reduced job satisfaction among subordinates. As Mishra *et al.* (2014) note, poor communication is both a cause and a consequence of such outcomes, underscoring its critical



importance. Effective communication lies at the core of successful facilitation. Whether leading a workshop, managing a team meeting, or guiding a community organization, your ability to communicate effectively significantly influences participation and engagement. By fostering clarity, connection, and collaboration, effective communication becomes a driving force behind achieving meaningful outcomes and building resilient communities.

## Key Components of Effective Communication

[1] **Clarity and Simplicity:** Messages should be clear, concise, and free from jargon to ensure they are easily understood by the audience. [2] **Active Listening:** Listening attentively to the speaker not only helps in understanding their message but also demonstrates respect and interest. [3] **Feedback:** Providing feedback ensures that the message has been understood correctly and gives the sender an opportunity to clarify if necessary. [4] **Emotional Awareness:** Being sensitive to the emotions of others helps in tailoring messages appropriately and avoiding misunderstandings. [5] **Appropriate Medium:** Selecting the right medium—whether verbal, non-verbal, written, or digital—is essential for effective communication. [6] **Body Language and Tone:** Non-verbal cues like gestures, facial expressions, posture, and tone of voice play a significant role in reinforcing or contradicting the spoken message. [7] **Cultural Sensitivity:** Recognizing and respecting cultural differences in communication styles helps avoid unintentional offense and enhances mutual understanding.

## Importance of Effective Communication

[1] Builds Strong Relationships- Promotes trust and understanding between individuals and groups and encourages teamwork and collaboration. *Example: Regular and open communication between SHG members fosters unity and shared goals.* [2] Enhances Productivity and Effectively- Effective communication provides clear instructions and feedback that can reduce errors and save time. Teams can work more effectively toward common objectives. *Example: Farmers receiving precise guidance on best agricultural practices improve yields.* [3] Facilitates Decision-Making- Sharing accurate and timely information leads to informed choices. Along with this it helps in encouraging brainstorming and problem-solving in group settings. *Example: Transparent communication during community meetings ensures better allocation of resources.* [4] Resolves Conflicts- Effective communication encourages open dialogue to address misunderstandings or disagreements and also helps in finding mutually acceptable solutions. *Example: Resolving disputes among SHG members through constructive discussions.* [5] Empowers Individuals and Communities- Effective communication equips individuals with knowledge and fostering self-reliance. It also promotes active participation in decision-making processes. *Example: Rural women gaining awareness about government schemes through workshops.* [6] Strengthens Leadership- Leaders who communicate effectively inspire confidence and motivate their teams. They also ensure alignment with organizational or community goals. *Example: A village leader effectively mobilizing community members for a development project.* [7] Enhances Adaptability

and Change Management- Smooth communication eases transitions and reduces resistance to change. Example: Adopting new technologies like mobile apps for agricultural planning. [8] Improves Service Delivery- Clear communication ensures that beneficiaries understand and access services. Example: Explaining healthcare programs to rural communities through local dialects. [9] Fosters Innovation- Encourages sharing of ideas, leading to creative solutions to challenges. Example: Farmers innovating sustainable practices after interactive workshops. [10] Builds Reputation and Credibility- Transparent and consistent communication enhances trust and credibility. Example: NGOs maintaining open communication with rural stakeholders build long-term partnerships.



**Fig. 3. Communication skills**

### **Goals of Communication Skills**

Communication skills are essential for facilitating the effective exchange of information, ideas, and emotions. These skills encompass personal and interpersonal qualities, along with social abilities, that contribute to achieving specific objectives. Often referred to as "soft skills," they enable individuals to interpret others' sentiments, intentions, and perspectives (Al-Alawneh et al., 2019). The goals of communication skills vary based on context but generally align with the following key objectives: [1] **Achieving Clarity and Understanding:** Effective communication ensures that the message is accurately conveyed and understood, reducing ambiguity, confusion, or misinterpretation. [2] **Building Relationships and Rapport:** Strong communication fosters trust, empathy, and mutual respect, strengthening connections in both personal and professional settings. [3] **Influencing and Persuading:** Communication skills are crucial for convincing others to adopt viewpoints, take action, or change behavior. This is often essential in leadership,

marketing, and conflict resolution. [4] **Facilitating Decision-Making:** Providing relevant information and insights helps individuals or groups make informed choices. Good communication also encourages dialogue and collaboration to explore alternatives. [5] **Encouraging Participation and Engagement:** Effective communication promotes active involvement in discussions or activities, creating a sense of belonging and shared purpose. [6] **Educating and Informing:** Communication is vital for disseminating knowledge, skills, or updates. It simplifies complex ideas, making them accessible and understandable to the audience. [7] **Resolving Conflicts and Misunderstandings:** Addressing differences or disagreements through dialogue and negotiation fosters mutual understanding and helps find common ground. [8] **Enhancing Collaboration and Teamwork:** Good communication encourages the sharing of ideas and responsibilities among team members, strengthening coordination to achieve common goals. [9] **Inspiring and Motivating:** Communication skills play a crucial role in encouraging individuals or groups to take action and work toward shared objectives. They help instill a sense of purpose and enthusiasm. By mastering these goals, individuals can effectively navigate diverse personal, social, and professional contexts, fostering growth, understanding, and meaningful connections.

## Active Listening

Active listening is a vital communication skill where the listener attentively focuses on, comprehends, and responds to the speaker, fostering mutual understanding and building trust. It involves more than merely hearing words; active listening engages with both the verbal and non-verbal aspects of the speaker's message. This skill enhances comprehension, strengthens relationships, and supports effective conflict resolution. By employing active listening techniques, individuals can significantly improve their communication, fostering an environment of trust, respect, and collaboration in any context.



## Importance of Active Listening

[1] **Builds Trust and Rapport:** Active listening demonstrates respect and empathy, fostering deeper connections and trust between individuals. *Example:* A manager who attentively listens to employees gains their confidence and loyalty. [2] **Enhances Understanding:** It helps listeners grasp the speaker's perspective, reducing misunderstandings and fostering clarity. *Example:* Farmers sharing their challenges with an agricultural officer to co-develop practical solutions. [3] **Improves Problem-Solving:** By fully understanding an issue, listeners can propose more effective and relevant solutions. *Example:* Resolving conflicts in Self-Help Groups by listening to all members' concerns. [4] **Encourages Open Communication:** Active listening makes speakers feel valued and respected, motivating them to share their thoughts freely. *Example:* A teacher who actively listens to students encourages greater class participation. [5] **Strengthens Relationships:** It builds mutual respect and understanding, enhancing relationships in both personal and professional settings. *Example:* Active listening between spouses helps resolve disagreements amicably. [6] **Facilitates Learning:** By focusing entirely on the speaker, individuals can absorb information more effectively and improve knowledge retention. *Example:* Attentively listening during training sessions leads to better understanding of new concepts. [7] **Reduces Conflict and De-Escalates Tensions:** Active listening shows empathy and helps address the root causes of disagreements, fostering resolution. *Example:* Mediation in community disputes benefits from actively listening to both sides' concerns.

## 7C's of Effective Communication

The 7C's of Effective Communication is a widely recognized model designed to ensure that messages are conveyed clearly and efficiently, minimizing misunderstandings and enhancing the quality of interactions. These principles serve as guidelines for individuals and organizations to refine their communication processes for better outcomes.

**Clarity** is the foundation of effective communication. A message should be clear and easy to understand, avoiding the use of jargon, complex terms, or ambiguous language. It is important to stay focused on the main idea and communicate directly to ensure the recipient comprehends the intended meaning. For instance, instead of saying, "We need to work on the optimization of the content structure for better performance," one can simplify it to, "We need to simplify the content structure to improve performance."

**Conciseness** emphasizes the importance of brevity. Messages should exclude unnecessary information while retaining all essential details. Eliminating wordiness and sticking to the main purpose ensures efficiency in communication. For example, instead of saying, "I would like to inform you about the fact that the deadline for the report submission has been extended," a concise alternative is, "The report submission deadline has been extended."

**Concreteness** ensures that messages are specific, solid, and backed by facts or examples. Using precise terms and avoiding vague statements prevent misinterpretation. For example, instead of saying, "Sales are improving," a concrete message would be, "Sales have risen by 15% in the last quarter."

**Correctness** focuses on grammatical accuracy and factual reliability. A message should be free of spelling and punctuation errors, with verified information that aligns with the audience's level of understanding. For instance, instead of incorrectly stating, "The annual report is due next Monday, October 15," when the date is different, the correct version would be, "The annual report is due next Tuesday, October 16."

**Consideration** highlights the need to tailor messages to the audience's needs, background, and emotions. Being empathetic and respectful ensures that communication resonates with the recipient. For example, rather than saying, "You failed to meet the deadline," a considerate approach would be, "I understand you faced challenges meeting the deadline. Let's discuss how we can improve the timeline going forward."

**Completeness** involves including all necessary details to ensure the recipient has sufficient information to understand or take action. Messages should provide relevant context, answer potential questions, and include instructions or next steps if needed. For example, instead of saying, "Please submit your report," a complete message would specify, "Please submit your report by Friday, 5 PM, including the updated data for Q3."

**Courtesy** underscores the importance of politeness and respect in communication. Messages should be free of negative emotions or bias and express appreciation where appropriate. For instance, instead of demanding, "I need this now," a courteous message would be, "Could you please provide this by the end of the day? Thank you!"

By adhering to these 7C's, communication becomes more effective, fostering understanding, collaboration, and stronger relationships in personal, professional, and social contexts.

## **Challenges in Communication in Rural Areas**

Communication in rural areas faces distinct challenges arising from infrastructural, socio-economic, cultural, and environmental constraints. Addressing these barriers is crucial to ensure inclusive and effective information exchange, particularly for developmental and governmental initiatives. [1] **Infrastructural Challenges:** Many rural areas struggle with limited access to modern communication technologies such as the internet, smartphones, and computers, making digital interactions challenging. Poor transportation infrastructure further hinders physical communication by restricting face-to-face interactions due to inadequate roads or transit facilities. Additionally, unreliable power supply disrupts electronic communication, including phone and

internet services, exacerbating the challenges. [2] **Socio-Economic Barriers:** Low literacy levels, particularly among women and marginalized groups, impede understanding of written and complex verbal communication. Economic constraints often limit rural residents' ability to afford communication tools like smartphones or internet plans, creating a digital divide that marginalizes these populations further. [3] **Cultural and Social Factors:** Language barriers pose a significant challenge, as rural areas are often home to diverse dialects. Communication in official or urban-centric languages may fail to reach or resonate with local populations. Traditional beliefs and resistance to change, fuelled by distrust of external sources or new technologies, can act as additional hurdles. Gender inequality also limits women's access to information, as patriarchal norms often exclude them from decision-making and communication processes. [4] **Lack of Awareness and Exposure:** Many rural communities are unaware of modern communication tools like email, social media, or agricultural apps. This lack of awareness diminishes their ability to leverage available resources effectively. Minimal exposure to urban lifestyles or advanced technologies further constrains their understanding and adaptation to modern communication methods. [5] **Environmental and Geographic Challenges:** Remote and isolated locations, such as those in mountainous, forested, or desert terrains, make communication logistics complex. Natural disasters like floods, landslides, and droughts frequently disrupt communication networks, delaying message delivery and hindering timely responses. [6] **Technological Barriers:** Rural areas often face inadequate ICT infrastructure, with poor internet penetration and mobile network connectivity limiting access to digital communication. Even when technology is available, digital illiteracy prevents effective usage. For instance, rural residents may struggle to use mobile apps or online portals for accessing government schemes. [7] **Information Gaps:** Information flow in rural areas is often inconsistent or delayed. Messages from governments or NGOs may take longer to reach these communities, affecting timely decision-making. Furthermore, generic communication strategies fail to address the specific needs of rural populations, requiring localized and customized messaging to ensure relevance and effectiveness.

To overcome communication challenges in rural areas, enhancing ICT infrastructure and mobile connectivity is crucial. Training and awareness programs can help improve digital and general literacy, empowering communities to utilize modern tools effectively. Using local languages and culturally sensitive messaging ensures that communication resonates with the audience, fostering better understanding and acceptance. Employing participatory communication approaches, where community members are directly involved, builds trust and improves the effectiveness of the messaging. Additionally, leveraging mass media like radio and localized tools such as Self-Help Groups (SHGs) can enhance information dissemination and engagement. By implementing these strategies, the barriers to effective communication in rural settings can be addressed, paving the way for better integration and developmental outcomes.

### **Strategies for Effective Communication for Field Functionaries**

Building rapport with participants is vital for establishing a connection and creating a friendly atmosphere. Ice-breaker activities and sharing personal experiences can make the interaction relatable, encouraging active engagement. Managing group dynamics is equally



important; monitoring participant interactions and ensuring balanced contributions through methods like round-robin sharing or small group discussions helps regulate participation. Providing constructive feedback is another key aspect, as precise, actionable, and positively conveyed feedback enhances engagement and motivates participants to improve.

Adapting to different communication styles is critical to address the diverse learning preferences of individuals, such as visual, auditory, or kinesthetic methods. Tailoring facilitation techniques to these preferences enhances comprehension and engagement. Utilizing technology, such as online whiteboards, chat functions, or breakout rooms, can make virtual communication more interactive and collaborative, enabling participants to share ideas more effectively. Incorporating storytelling into communication adds a relatable and memorable dimension, helping participants emotionally connect with the material. Practical examples or situations relevant to their experiences further enrich the storytelling approach, making it a powerful tool for communication.

## **The Power of Non-Verbal Communication**

Non-verbal communication is an influential tool that plays a vital role in how messages are conveyed and interpreted. It encompasses various cues such as body language, facial expressions, gestures, posture, eye contact, vocal tone, and even physical proximity. Here's a closer look at key aspects of non-verbal communication and its impact:

**1. Enhancing or Contradicting Verbal Communication:** Non-verbal cues can either reinforce or contradict verbal messages. When they reinforce verbal communication, they make the message clearer and more impactful. For example, nodding while saying "yes" reinforces agreement. On the other hand, non-verbal signals can sometimes contradict what is being said. Saying "I'm fine" while slouching or avoiding eye contact might suggest the opposite, leading to confusion or mistrust.

**2. Conveying Emotions:** Non-verbal cues are essential in expressing emotions. Facial expressions like smiling, frowning, or raising an eyebrow communicate feelings such as happiness, sadness, surprise, or anger without the need for words. Similarly, gestures, body posture, and tone of voice also convey emotions. A warm tone of voice combined with an open posture can express friendliness, while a cold tone and closed posture might suggest defensiveness or disinterest.

**3. Building Relationships and Trust:** Eye contact is a key element in building trust. Direct eye contact often indicates confidence and sincerity, while avoiding eye contact can be seen as evasive or dishonest. Positive body language—such as leaning in, maintaining an open posture, and actively listening—helps build rapport, trust, and a sense of connection, fostering better relationships.

**4. Influence and Persuasion:** Non-verbal communication often holds more weight than verbal communication, especially when it comes to persuasion. A firm handshake, confident posture, and steady eye contact can establish authority and credibility, making it easier to persuade others. In presentations, gestures and other non-verbal cues can make the message more engaging and powerful.

**5. Cross-Cultural Communication:** In cross-cultural interactions, non-verbal communication can carry different meanings. Gestures, facial expressions, and body language may vary from one culture to another, leading to potential misunderstandings. Being aware of cultural differences in non-verbal communication can enhance understanding and help avoid misinterpretation.

**6. Managing Communication in Different Contexts:** Non-verbal communication becomes particularly important in contexts where verbal communication is limited or unavailable. In conflict resolution, for instance, the tone of voice and physical presence can significantly affect the outcome. In the workplace, leaders often use non-verbal cues to motivate teams, assert authority, and give feedback without speaking.

**7. Clarity and Emphasis:** Non-verbal communication can add emphasis to key messages. Raising one's voice, using hand gestures, or leaning forward can highlight the importance of a point. Silence, too, can be a powerful non-verbal tool, allowing for reflection and underlining critical messages.

**8. Communication in Digital Spaces:** While non-verbal cues are less prominent in digital communication, elements like emojis, GIFs, and tone in text (through punctuation or formatting) still play an important role in conveying emotions and intentions, helping to clarify the sender's message.

Non-verbal communication significantly influences how we interpret and respond to messages. Being mindful of these cues can improve our communication and strengthen our relationships.

## **Giving and receiving feedback**

Giving and receiving feedback are essential components of effective communication, personal growth, and organizational development. When done well, feedback can improve performance, boost morale, and foster learning. However, poor feedback practices can lead to confusion, defensiveness, or disengagement. Below are key aspects of both giving and receiving feedback effectively.

### **Giving Feedback**

Effective feedback is essential for growth and improvement, and it should be constructive, clear, and action-oriented. Here are some key strategies for providing effective feedback:

#### **1. Be Specific and Clear**

- **Describe behaviour, not personality:** Focus on the specific actions or behaviours rather than making generalizations about someone's character. For example, instead of saying "You're disorganized," say "I noticed the project timeline was missed last week."
- **Give examples:** Provide concrete examples to help the person understand what exactly needs improvement. This makes the feedback actionable and easier to comprehend.



## 2. Use the "SBI" Model (Situation-Behaviour-Impact)

- **Situation:** Describe the context in which the behaviour occurred. For example, "During the team meeting yesterday..."
- **Behaviour:** Specify the observed behaviour, such as "You interrupted others while they were speaking."
- **Impact:** Explain the effect of the behaviour, like "This made it difficult for others to share their ideas."

## 3. Be Timely

- Provide feedback as soon as possible after the behaviour occurs. Immediate feedback helps the recipient connect the feedback to their actions and encourages quick improvement.

## 4. Use "I" Statements

- Frame feedback using "I" statements to avoid sounding accusatory. For example, say "I noticed that the report was submitted late, and it caused delays in the project timeline," rather than "You always submit reports late."

## 5. Balance Positive and Constructive Feedback

- **Use the "sandwich" approach:** Start with positive feedback, followed by constructive feedback, and end with encouragement. This ensures that the recipient feels supported and motivated.
- Example: "I really appreciate how thorough your analysis was on the project. The only area for improvement is the timeline management, but I know you can handle that. Keep up the great work!"

## 6. Focus on Growth and Development

- Frame your feedback to emphasize learning and development. Encourage improvement and offer suggestions for new strategies rather than focusing solely on mistakes.

## 7. Be Empathetic and Respectful

- Show empathy for the recipient's perspective and be mindful of their emotional state. Feedback should be perceived as a tool for growth rather than criticism. Adjust your tone and approach accordingly.

## Receiving Feedback

Being open to receiving feedback is equally important for personal and professional growth. It allows you to learn, adjust, and improve. Here's how to receive feedback effectively:

**1. Be Open and Receptive:** Listen carefully to the feedback without becoming defensive. Avoid interrupting or arguing, as this can shut down the conversation and prevent learning. Approach feedback with a growth mindset: view it as an opportunity to improve, not as a personal attack.

**2. Ask Clarifying Questions:** If the feedback is unclear, ask for specific examples or clarification. For example, "Can you give me an example of how I can improve this?" This will help you understand exactly what you need to change.

**3. Show Appreciation:** Thank the person for their feedback, even if it's difficult to hear. This shows that you value their input and are committed to improving. For example, "Thank you for the feedback; I appreciate your perspective."

**4. Don't Take It Personally:** Focus on the content of the feedback rather than how it's delivered. Remember, feedback is about behaviour or actions, not who you are as a person. Try to separate your self-worth from the feedback being given.

**5. Reflect on the Feedback:** Take time to reflect on the feedback, and think about how you can apply it. Be honest with yourself about areas of improvement and recognize opportunities for growth.

**6. Ask for Solutions or Suggestions:** If the feedback is about an area you need to improve, ask the giver for advice or suggestions on how you can do better. For example, "What could I have done differently to manage the project timeline more effectively?"

**7. Follow-Up:** After receiving feedback, take action on it. Implement the suggested changes, and follow up with the person who gave the feedback to let them know how you've improved. This shows that you value their input and are committed to growth.

**8. Manage Emotional Reactions:** Feedback, especially if it's critical, can be emotional. Take a moment to process your feelings before reacting. It's okay to feel upset or frustrated, but try to stay focused on the learning process.

## **Role of Feedback in Personal and Organizational Growth**

- **Personal Growth:** Feedback helps individuals gain insight into their strengths and weaknesses, providing clear guidance on areas that need improvement. Regular feedback can accelerate learning, boost self-awareness, and enhance performance.
- **Team Development:** Feedback promotes trust, collaboration, and accountability within teams. When feedback is exchanged openly and constructively, it fosters a culture of continuous improvement and mutual support.

- **Organizational Impact:** Feedback contributes to better decision-making, innovation, and efficiency. It can help organizations identify performance gaps, improve processes, and align individual actions with organizational goals.

## **Using technology for better communication**

Using technology for better communication has become essential in both personal and professional settings, as it offers tools that facilitate faster, clearer, and more efficient exchanges. Leveraging the right technologies can enhance connectivity, streamline workflows, and help overcome barriers like geographical distance. Below are ways to use technology for better communication:

### **1. Mobile Communication Tools**

- WhatsApp, Telegram: Instant messaging apps allow quick, real-time communication and the sharing of photos, videos, and documents, even in areas with limited internet access.
- SMS & Voice Calls: For areas with poor internet connectivity, SMS and voice calls remain essential tools for reaching team members or communities.

### **2. Video Conferencing**

- Zoom, Microsoft Teams, Google Meet: These platforms enable remote teams to hold face-to-face meetings, conduct training sessions, or share project updates, reducing the need for physical travel.
- Recording Features: Sessions can be recorded for those who cannot attend live meetings, ensuring they stay informed.

### **3. Social Media & Community Platforms**

- Facebook Groups, WhatsApp Groups, LinkedIn: These platforms can be used to share updates with larger teams, stakeholders, or community members. They foster collaboration and engagement, especially in community development projects.
- Online Forums: Platforms like Slack or Discourse can be used for ongoing discussions, Q&A, and information sharing within teams.

### **[i] Translation and Language Apps**

- Google Translate, Microsoft Translator: These tools can help break language barriers in teams working across linguistic borders or with communities that speak different dialects.

### **[ii] Online Training & Learning Platforms**

- Moodle, SWAYAM, Coursera, Udemy: These platforms can be used for remote training and skill-building for team members or beneficiaries, enabling continuous learning and capacity development.
- Webinars and eLearning: Live and recorded webinars allow for knowledge sharing and development, particularly for large and dispersed team.

### **Conclusion**

Effective communication is integral to fostering understanding, collaboration, and empowerment in all spheres of life. By addressing barriers and leveraging modern tools and techniques, it is possible to create inclusive, transparent, and impactful communication processes. In rural contexts, where infrastructural and socio-economic challenges are prevalent, culturally sensitive and localized approaches play a pivotal role in enhancing message delivery and reception. The adoption of digital technologies further bridges gaps, promoting timely access to information and collaborative problem-solving. Ultimately, communication is not merely about the exchange of information but about building connections that inspire action, resolve conflicts, and drive progress. In personal interactions, professional settings, or community development projects, understanding good communication is essential for attaining durable and significant results.

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## **Introduction**

Gender analysis is the first and the foremost critical step towards gender-responsive planning and programming. It involves collection and analysis of sex-disaggregated information. It examines the differences, commonalities and interactions between women and men. Gender analysis examines women's and men's specific activities, conditions, needs, access to and control over resources, access to development benefits and decision-making.

## **What is Gender Analysis?**

Gender analysis helps to clarify the specific and often different capacities, vulnerabilities, needs and coping strategies of men and women, and indicates where opportunities for targeting effective strategies lie. Established patterns of gender inequality and inequity can be explored, exposed and addressed. This may provide opportunities and entry points to develop programs that support efforts to build more equitable gender relations.

### **Gender analysis essentially**

- examines the differences in women's and men's lives, including those which lead to social and economic inequity for women and applies this understanding to policy development and service delivery
- is concerned with the underlying causes of these inequities
- aims to achieve positive change for women

## **Elements for consideration in Gender Analysis**

a) **Natural:** Land, water, forests, rivers etc.

b) **Economic:** Work opportunities, wages and remuneration, remittance, credit and production inputs.

c) **Social:** Formal and informal education and social services- religion and cultural norms like dress, defining private and public spaces.

d) **Infrastructure:** Bridges, roads and markets.

e) **Political:** Access and participation, opportunities for organization and decision making at community, regional and national levels.

f) **Time:** Work time and free time.

g) **Personal:** Self-esteem abilities, communication capacity and individual decision making capability.

## **Gender Analysis Guidelines**

## **What to Ask**

- Who is the target (both direct and indirect) of the proposed policy, programme or project? Who will benefit and who will lose?
- Have women been consulted in the intervention?
- Does the intervention challenge the existing gender division of labor, tasks, responsibilities and opportunities?
- What is the relationship between intervention and other activities and organizations- national, regional and international?
- What specific ways can be proposed to encourage/ enable women to participate in the policy /program/ project, despite their traditional roles?
- What specific ways can be proposed to encourage men to send their women to participate in the policy/program/project, despite the traditional roles?
- What is the long term impact with regard to women's increased ability to take charge of their own lives and to take collective action to solve problems?

## **4.1.5 Gender Analysis**

### **What to Do?**

- a. Gain an understanding of gender relations, division of labor and who has access to and control over resources.
- b. Include domestic / reproductive and community work in the work profile.
- c. Recognize ways that men and women can contribute to the economy and their family.
- d. Use participatory processes and include wide range of female and male stakeholders at the government level and from civil society including women's organizations and gender equality experts.
- e. Consider women's ability to come at the given time, how they would get there or whether you need to go to them, would they speak up in a meeting that might be dominated by men or might it be better initially to meet women separately, present their inputs to the male group, to raise their awareness of women's contribution which might lead to a mixed group next time. It should be borne in mind that this is often a long process that cannot be forced quickly.
- f. Gain an understanding of women's practical and strategic needs and identify opportunities to support both.

g. Consider the differential impact of initiative on men and women and identify consequences to be addressed.

h. Outline expected risks and develop strategies to minimize those risks.

Thus gender analysis is a process of understanding the different activities and responsibilities of women and men, their access to resources and decision making. Gender analysis helps us understand the roles and relations of men and women. It frames questions about who does what, when and why. In this analysis, factors such as class (social position, wealth), age and education will also influence gender roles. In turn, these roles are major factors in defining and determining men's and women's specific needs as well as their respective access to power and resources.

### **Why Gender Analysis in Agriculture**

Women's involvement in agriculture is not supported by a corresponding recognition as key stakeholders in agriculture. Women continue to have limited access to productive resources (land, water, credit, agricultural inputs, training and extension services), services, markets & marketing facilities and business development services. Involvement of women in agriculture and their status in households also have implications for access to food for them and their children, since women are a gateway to both household food security and child health and nutrition.

In the changing agricultural scenario and socio-cultural backdrop, it is important to have gender disaggregated data and analyze the role of women throughout the agricultural value chain (from seed collection, to crop production, marketing and consumption; primarily in animal husbandry, fisheries and dairy). These changes have significant implications for women and such analysis can help identify key issues, opportunities and constraints of women in agriculture. In spite of women being a major contributor to the economy, both through their remunerative work on farms and the unpaid work at home and community, they are systematically excluded from access to decision making and essential resources and services.

Considerations related to gender issues and women's participation influence success and sustainability of projects and programs. These considerations include the different roles, needs and perceptions of women and men in agriculture, taking into account the gender-based constraints that women face. Better access to resources also facilitates women to devote more time to income-generating activities and cater to their own needs, as well as of their children and families. This leads to the economic benefits for the society as a whole.

### **Gender Analysis Tools & Frameworks**

There are many tools that have been developed with a different focus. Each tool is different with some advantages. Some account for other social characteristics and factors better, while others are more participatory. Following are the commonly used tools -

#### **Harvard Analytical Framework**

**The Harvard Analytical Framework** is also called as Gender Roles Framework or Gender Analysis Framework. This is based on 'Women In Development' (WID) efficiency approach. It is

one of the earliest gender analysis and planning framework. The framework consists of a matrix for collecting data at the micro (community and household) level. It has four interrelated components:

**Activity profile** - which answers the question, “who does what?” including gender, age, time spent and location of the activity.

**Activity Profile Chart**

| Type of activity | Who<br>(Gender/ Age) | When | How Often | Where | How | Why that Activity<br>(Gender/ Age) |
|------------------|----------------------|------|-----------|-------|-----|------------------------------------|
| Productive       |                      |      |           |       |     |                                    |
| Reproductive     |                      |      |           |       |     |                                    |
| Community        |                      |      |           |       |     |                                    |

**KEY:**

**Who** - Male Adult, Female Adult, Male Child, Female Child

**What**- Activities carried out

**When**- Time of the year/day

**Where**- Location of the activity, i.e. at home or away

**How**- Means of doing the activity, i.e. is it manual or technological

**How often**- Number of times it is done over a period of time

**Why**- What reason justifies the gender that does that activity?

**Access and control profile** - identifies the resources used to carry out the identified work in the activity profile and access to and control over their use by gender

**Access and Control Profile Chart**

|           | Who has Access | Who has Control |
|-----------|----------------|-----------------|
| Resources |                |                 |
| Benefits  |                |                 |

**Analysis of influencing factors** - which charts factors that influence gender differences in the above two profiles.

**Influencing Factors Chart**

| Influencing factors | Impact | Constraints | Opportunities |
|---------------------|--------|-------------|---------------|
| Political           |        |             |               |
| Demographic         |        |             |               |
| Economic            |        |             |               |
| Cultural            |        |             |               |
| Educational         |        |             |               |



|               |  |  |  |
|---------------|--|--|--|
| Environmental |  |  |  |
| Legal         |  |  |  |
| International |  |  |  |
| Policies      |  |  |  |
| Other         |  |  |  |

**Project cycle** – analyzes or examines a project or intervention in light of gender-disaggregated information.

Firstly, information is collected for the Activity Profile and the Access and Control Profile. Then this information is used in the analysis of factors and trends influencing activities, access and control and in the project cycle analysis.

### **Strengths of Harvard framework**

- Once the data have been collected, it gives a clear picture of who does what, when and with what resources. It makes women's role and work visible.
- It distinguishes between access to and control over resources.
- It can be easily adapted to a variety of settings and situations.

### **Moser (triple roles) Framework**

This framework has been developed by Caroline Moser and is based on the concepts of gender roles & gender needs and policy approaches to gender & development planning.

#### **Gender Roles**

- i) **Productive roles** (paid work, self-employment and subsistence production)
- ii) **Reproductive roles** (domestic work, child care and care of the sick & elderly)
- iii) **Community participation/self-help** (voluntary work for the benefit of the community as a whole)
- iv) **Community politics** (decision-making/representation on behalf of the community as a whole)

#### **Gender Needs**

- i) **“Practical” gender needs** (i.e. in the context of the existing gender roles and resources e.g. more convenient water point to save women time and energy)

ii) **“Strategic” gender needs** (i.e. requiring changes to existing gender roles and resources to create greater equality of opportunity and benefit e.g. increasing women’s access to land ownership).

### Strengths of Moser’s framework

- Recognizes transformative potential of gender planning.
- Makes all work visible and valuable to planners through the concept of triple roles.
- Conceptualizes planning as aiming to challenge unequal gender relations and support women’s empowerment.
- Distinguishes between types of gender needs: those that relate to women’s daily life (practical gender needs) and those potentially transform existing gender subordination (strategic gender needs)
- Categorizes policy approach

### Levy (web of institutionalization) Framework

Caren Levy framework (1996) or 'web of institutionalization', is a widely-recognized tool for analyzing gender mainstreaming. The tool enables staff (and partners) to view their organizational structures and practices through a critical gender lens, and to understand where there are strengths and where improvements are needed.



*Diagram representing gender mainstreaming in one of the World Food Program country offices*

### METHOD

The Levy Framework comprises of 13 elements related to the conditions needed for effective gender mainstreaming. These are organized into four spheres:

**i) Beneficiaries Sphere:** roles, needs and perspectives; representative structures, active participation and influence

**ii) Policy Sphere:** resources, political commitment, policy

**iii) Organizational Sphere:** responsibility for gender mainstreaming, procedures for gender mainstreaming, staff development

**iv) Delivery Sphere:** delivery of programs and projects, methodology, research, theory building

Participants work in groups, using guiding questions to discuss whether the elements of each sphere are strong, medium or weak in terms of gender mainstreaming. The groups use blue to indicate strong gender dimensions, green for medium and red for weak. If time is short each group may focus on one sphere, but where there is sufficient time, they may discuss the whole framework.

The participants then come together to share their insights.

### **Gender Analysis Matrix (GAM)**

The framework aims to find out the differential impacts of development interventions on women and men by providing a community-based technique for identification and analysis of gender differences. Secondly, it assists the community to identify and challenge their assumptions about gender roles in a constructive manner. It may be used for different purposes, for example, transformatory gender training or as a participatory planning tool. The analysis is conducted at four levels of society- women, men, household and community. The GAM examines impact on four areas: labor, time, resources and socio-cultural factors.

### **Uses and potential Limitations**

- It is simple, systematic and uses familiar concepts.
- It encourages bottom-up analysis, through community participation.
- It is transformatory and technical in approach, combining raising awareness about gender inequalities with development of practical skills.
- It includes men as a category and therefore can be used in interventions that target men.

### **GENDER ANALYSIS MATRIX (GAM) Worksheet**

#### **Project Objectives:**

|                  | <b>Labor</b> | <b>Time</b> | <b>Resources</b> | <b>Culture</b> |
|------------------|--------------|-------------|------------------|----------------|
| <b>Women</b>     |              |             |                  |                |
| <b>Men</b>       |              |             |                  |                |
| <b>Household</b> |              |             |                  |                |
| <b>Community</b> |              |             |                  |                |

Source: March, C, Smyth, I. Mukhopadhyay, M. (1999) A Guide to Gender-Analysis Frameworks, Oxfam, Oxford.

### **Equality and Empowerment Framework (Longwe)**

The Women's Equality and Empowerment Framework aims to assist planners' question - what women's equality and empowerment means in practice and to what extent a development intervention is supporting empowerment. Women's empowerment is defined as enabling women to take an equal place with men and to participate equally with men in the development process in order to achieve control over the factors of production on an equal basis with men.

The Longwe framework introduces the concept of five levels of equality by which to assess the level of women's empowerment, in any area of economic and social development.

#### **Levels of Equality**

- Control
- Participation
- Conscientisation
- Access
- Welfare

These levels of equality are hierarchical, suggesting that a development intervention that focuses on the higher levels are more likely to increase women's empowerment than the one focusing on the lower levels. Equal control over resources such as land is on a higher level (control) than access to land, which is a lower level (welfare). This approach takes into view that if equality is intrinsic to the definition of women's development, this brings with it the necessary corollary of women's empowerment as the means to overcoming obstacles to the achievement of equality between men and women. The framework suggests that women's advancement can be understood in terms of concern with the five levels of equality. Empowerment is a necessary component of the development process at each level for women to advance to the next level; and for them to advance progressively through all the levels towards equal status with men.

**Conscientisation:** This concept relates to being aware of the difference between sex and gender, and to recognize that gender roles are cultural and can change. Sexual division of labor should be fair for women and men both and they should agree with it. Neither women nor men should dominate the other, economically or politically. The basis of gender awareness is a belief in sexual equality.

**Participation:** This is defined as women's equal participation with men at all levels of decision-making, policy development, planning and administration. It relates particularly to the development projects where participation of women at all stages of the project cycle is essential.

**Control:** Women's conscientisation and mobilization can contribute in achieving control over the decision-making process, in order to achieve a balance of control between women and men over resources and benefits.

**Access:** This is understood as women's equal access to the factors of production such as land, credit, labor, training, marketing facilities and all public services and benefits, at par with men. Equality of access is linked to equal opportunity, which usually needs reform in the law to remove all forms of discrimination against women.

**Welfare:** This is defined as the level of women's material welfare (income, food supply, health care) relative to men.

### Capacities and Vulnerabilities Framework (CVA)

The CVA is designed on the premise that people's existing strengths (or capacities) and weaknesses (or vulnerabilities) determine the impact, that a crisis has on them, as well as the way they respond to the crisis.

**Capacities:** This term refers to the existing strengths of individuals and social groups. They are related to people's material and physical resources, social resources, and their beliefs and attitudes. Capacities are built over time and determine people's ability to cope up with crisis and recover from it.

**Vulnerabilities:** This term refers to the long term factors which weaken people's ability to cope up with the sudden on-set of disaster, or withdrawn-out emergencies. They also make people more susceptible to disasters. Vulnerabilities exist before disasters, contribute to their severity, makes effective disaster response more difficult and continue after the disaster.

#### CVA Matrix disaggregated by gender

|                                                                                                                      | Vulnerabilities |     | Capacities |     |
|----------------------------------------------------------------------------------------------------------------------|-----------------|-----|------------|-----|
|                                                                                                                      | Women           | Men | Women      | Men |
| <b>Physical/material</b><br>(What productive resources, skills and hazards exist?)                                   |                 |     |            |     |
| <b>Social/organizational</b><br>(What relationships exist between people? What are their organizational structures?) |                 |     |            |     |
| <b>Motivational/attitudinal</b><br>(How does the community view its ability to create change?)                       |                 |     |            |     |

### Social Relations Framework (SRF)

The social relation framework was developed by the academician Naila Kabeer at the Institute of Development Studies at Sussex, UK. The framework is based on the idea that the aim of development is human well-being. Poverty is seen to arise out of unequal social relations which results in unequal distribution of resources, claims and responsibilities. Gender relation is one of such type of social relations. Institutions ensure production, reinforcement and reproduction of social relations and thereby, social difference and inequality. Gender inequality exists not just in household but at various other institutions like market, State and international community.

Gender analysis therefore entails looking at how institutions create and reproduce inequalities. There are four key institutional sites- State, market, community and family/kinship.

| <b>Institutional location</b> | <b>Organizational/structural form</b>                                                          |
|-------------------------------|------------------------------------------------------------------------------------------------|
| State                         | Legal, military, administrative organizations                                                  |
| Market                        | Firms, financial corporations, farming enterprises, multinationals                             |
| Community                     | Village tribunals, voluntary associations, informal networks, patron-client relationship, NGOs |
| Family/kinship                | Household, extended families, lineage groupings                                                |

Five relevant dimensions of institutional social relationships are:

- i) **Rules** or how things get done? Do they enable or constrain?
- ii) **Activities** or who does what? Who gets what and who can claim what? Activities may be productive, regulative or distributive.
- iii) **Resources** or what is used and what is produced, including human (labor, education), material (food, assets, capital) or intangible resources (goodwill, information, networks)?
- iv) **People**- who is in, who is out and who does what? Institutions are selective in the way they include or exclude people, assign resources, responsibilities and position
- v) **Power**- who decides and whose interests are served?

The social relation framework analyses immediate underlying and structural causes of gender specific issues and their effects at household, community, market and state level. Policies are seen as gender blind, gender neutral and gender redistributive.

### **Strengths of the framework**

- i) Sees poverty as material deprivation and social marginalization.
- ii) Conceptualizes gender as central to development thinking and not as an add-on.
- iii) Links micro to macro factors.
- iv) Highlights interactions between various forms of inequality- gender, class and race.
- v) Centres analysis on institutions.
- vi) Tries to uncover processes of impoverishment and empowerment.

## SEAGA Approach of FAO

SEAGA stands for Socio-Economic and Gender Analysis. This is an FAO approach to development, based on an analysis of socio-economic patterns and participatory identification of women's and men's priorities. It is quite similar to Participatory Rural Appraisal (PRA). The objective of the SEAGA approach is to close the gap between what people need and what development delivers. The following table illustrates some PRA methods used by FAO for socio economic and gender analysis in agricultural development planning.

### SEAGA PRA & Gender analysis tools

| Name of tool                | Purpose                                                                                                                                                                                                                                                                                             |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Social and resource mapping | <ul style="list-style-type: none"><li>- Indicates spatial distribution of roads, forests, water resources, institutions,</li><li>- Identifies households, their ethnic composition and other socio-economic characteristics/ variables.</li></ul>                                                   |
| Seasonal calendar           | <ul style="list-style-type: none"><li>- Assesses workload of women and men by seasonality</li><li>- Understands cropping patterns, farming systems, gender division of labor, food scarcity, climatic conditions and so forth.</li></ul>                                                            |
| Economic well-being ranking | <ul style="list-style-type: none"><li>- Understands local people's criteria of wealth</li><li>- Identifies relative wealth and the different socio-economic characteristics of households and classes.</li><li>- Facilitates formation of focused groups to work with other PRA/ GA tools</li></ul> |
| Daily activity schedule     | <ul style="list-style-type: none"><li>- Identifies daily pattern of activity based on gender division of labor on an hourly basis and understands how busy women and men are in a day, how long they work for and when they have spare time for social and development activities.</li></ul>        |
| Resource analysis           | <ul style="list-style-type: none"><li>- Indicates access to and control over private, community and public resources by gender.</li></ul>                                                                                                                                                           |
| Mobility mapping            | <ul style="list-style-type: none"><li>- Understands gender equity in terms of contact of men and women with the outside world.</li><li>- Plotting the frequency, distance and purpose of mobility.</li></ul>                                                                                        |
| Decision making matrix      | <ul style="list-style-type: none"><li>- Understands decision making on farming practices by gender.</li></ul>                                                                                                                                                                                       |
| Venn diagram                | <ul style="list-style-type: none"><li>- Identifies key factors and establish relationship between the village and the local people</li></ul>                                                                                                                                                        |
| Pair wise ranking           | <ul style="list-style-type: none"><li>- Identifies and prioritize problems as experienced by men and women</li></ul>                                                                                                                                                                                |

|                        |                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Benefits Analysis Flow | <ul style="list-style-type: none"> <li>- Understands benefit of various resources and distribution by gender</li> </ul>                                                                                                                                                                                                                                           |
| Community action plan  | <ul style="list-style-type: none"> <li>- Assesses extent to which women's voices are respected when men and women sit together to identify solutions for the problems prioritized by the latter</li> <li>- Understands development alternatives and options and give opportunity to men and women to learn from each other's experiences and knowledge</li> </ul> |

## **Gender Budgeting and Auditing**

### **Importance of Gender Mainstreaming and Gender Responsive Budgets**

The conventional approach to gender budgeting, i.e., isolating public expenditure, direct and indirect - for women, would continue to be a core activity under the broad gender budgeting exercise with future action concentrating on fine tuning methodology and universalizing the tools for application at all levels of public expenditure.

However, a broader perspective is emerging under the concept of Gender Budgeting. The gender perspective on Public Expenditure and Policy is no longer restricted to the realm of social sector or Departments like Education, Health, Rural Development etc. All areas of public expenditure, Revenue and Policy need to be viewed with a gender perspective.

It is necessary to recognize that women are equal players in the economy whether they participate directly as workers or indirectly as members of the core economy. Thus it is not adequate to analyze in detail, allocation of resources for a few sectors of the economy only, which are traditionally considered as women related. The analysis should cover every rupee of public expenditure. It should cover the ways in which the schemes are conceptualized and the extent to which they are women-friendly in implementation and targeting of beneficiaries. It has to embrace a gender sensitive analysis of monetary policies, covering impact indicators like inflation, interest rates etc. and fiscal policies covering taxation, excise etc. Thus gender budgeting analysis has to go hand -in -hand with gender mainstreaming.

### **Gender Responsive Budgets**

Government needs to think about gender and sex when making policies and allocating budgets to implement the policies. In respect of sex, government needs to ensure that policies and programs are available and adequately financed to address the different biological needs of women and men, including child bearing for women. With respect to gender, government needs to have a vision for the type of roles, responsibilities and relationships that it wants to see in the country for women and men, girls and boys and design, fund and implement policies & programs to move towards this goal.



A gender responsive budget is a budget that acknowledges the gender patterns in society and allocates money to implement policies and programs that will change these patterns in a way that moves towards a more gender equal society. Gender budget initiatives are exercises that aim to move the country in the direction of a gender responsive budget.

### **Gender Budgeting (GB)**

Gender Budgeting (GB) is a powerful tool for achieving gender mainstreaming so as to ensure that the benefits of development reach women as much as men. It is not an accounting exercise but an ongoing process of keeping gender perspective in policy/program formulation, its implementation and review. GB entails dissection of the Government's budget to establish its gender differential impacts and to ensure that gender commitments are translated into budgetary commitments.

### **Purpose of Gender budgeting**

- Identifying felt needs of women and re-prioritizing and /or increasing expenditure to meet these needs
- Supporting gender mainstreaming in macro-economics
- Strengthening civil society participation in economic policy making
- Enhancing linkages between economic and social policy outcomes
- Tracking public expenditure towards gender and development policy commitments and
- Contributing to the attainment of the Millennium Development Goals (MDGs)

Gender Budgeting can help improve economic governance and financial management. It can provide feedback to government on whether it is meeting the needs of different groups of women and men, girls and boys.

### **Why does Gender Budgeting Focus on Women**

Around the world, Gender Budgeting tends to focus on women because-

- Nearly two-thirds of the illiterate people in the world are women.
- In developing countries, maternal mortality continues to be a leading cause of death for women of reproductive age.

- Women are under-represented in decision-making, both in government and business sectors, especially at senior levels.
- Women's economic contribution continue to be very different in nature than men's. Women are engaged in less formal, lower status type of works and continue to receive less pay than men for the same work.
- Women also continue to do most of the unpaid work of bearing, rearing and caring for children and other citizens.

### **Data Needs for Gender Budgeting**

Gender Budgeting relies heavily on data, so that policies, programs and budgets can be evidence based rather than based on myths or assumptions. Data are needed at different stages of budgeting process.

1. Initially data are needed to describe the situation of women and men, girls and boys.
2. Subsequently, such data are needed that reflect delivery of the programmes and projects i.e., how many women and men, girls and boys are reached.
3. Data are also needed to show the impact of the policies and programmes i.e., whether they have made a difference to the existing situation of the people of a country. Thus sex disaggregated data is a basic requirement for GB which can be collected using different gender analysis tools.

### **Entry points for Gender Budgeting**

The five step entry points and associated tools are considered most appropriate in Indian context for Gender Budgeting, as promoted by Ministry of Women and Child Development. This process of Gender Budgeting, in fact, underlie any budgeting process, as they ensure that the budget addresses real needs, and that the money allocated is used for the intended purpose.

### **The Five Steps Framework for Gender Budgeting**

**Step 1:** An analysis of the situation for women and men; girls and boys (and the different sub groups) in a given sector.

**Step 2:** An assessment of the extent to which the sector's policy addresses gender issues and gaps described in the first step. This step should include an assessment of the relevant legislation, policies, programs and schemes. It includes an analysis of both the written policy as well as the implicit policy reflected in government's activities. It should examine the extent to which the above meets socio-economic and other rights of women.

**Step 3:** An assessment of the adequacy of budget allocations to implement gender sensitive policies and programs identified in step 2 above.

**Step 4:** Monitoring to ensure whether the money was spent as planned, what was delivered and to whom. This involves checking both financial performance and the physical deliverables (disaggregated by sex).

**Step 5:** An assessment of the impact of the policy / program / scheme and the extent to which the situation described in step 1 has changed, in the direction of greater gender equality.

Govt. of India requires Govt. officials to use a two-category format as the basis of presentation in the Gender Budget statement in the Union Budget. The two categories cover:

- Pro-women allocations, where 100% of the allocation is meant for women
- Pro-women allocations where between 30 to 99% of the allocation is meant for women

Some Gender Budgeting initiatives across the globe have focused on the first category because they are easier to identify and measure than the gender-responsiveness of non-targeted allocations. These targeted allocations can be an important form of affirmative action or positive discrimination. However, focusing on the first category alone often means focusing on a small part of the budget meant exclusively for women while the main budget is ignored. For the second category, assuming that 30% means 'pro-women' is a problem since about half of the population of India is female.

Real value of outcome budget lies in its utility as a policy tool to establish effective linkage with allocation and disbursement of public funds on the basis of measurable performance. From a gender budgeting perspective, the outcome budget provides a golden opportunity to examine the linkages between allocations and disbursements, the delivery of immediate benefits and services for women and girls, and gender equality outcomes.

### **Role of Gender Budgeting Cells**

The Department of Expenditure, Ministry of Finance issued a charter for Gender Budget Cells, on 8<sup>th</sup> March 2007, clearly articulating the composition and functions of the gender budget cells. These gender budget cells serve as a focal point for coordinating Gender Budgeting initiatives both intra and inter-ministerial. The roles envisaged for these cells include:

- Act as a nodal agency for all Gender Budgeting initiatives.
- Pilot action on gender sensitive review of public expenditure and policies (Expenditure/Revenue/ Policies/Legislation etc.)

- Guide and undertake collection of sex-disaggregated data for target group of beneficiaries covered under expenditure, revenue raising/ policy/ legislation
- Guide Gender Budgeting initiatives within departments as well as in field units responsible for implementing government programmes.
- Conduct gender based impact analysis, beneficiary need's assessment and beneficiary incidence analysis.
- Establish effectiveness of public expenditure
- Identify scope for re-prioritization of public expenditure
- Improve implementation etc.
- Collate and promote best practices on participative budgeting for implementation of schemes

### **Gender Budgeting Initiatives of various States in India**

Several States have initiated gender budgeting, besides its implementation by various Ministries and departments at the Centre.

#### **Chhattisgarh**

The State officially adopted Gender Budgeting in 2007-08 with Women and Child Development as the nodal Department. It Introduced Gender Budget Statement as part of State Budget in 2007-08. Finance Department undertakes monitoring of Gender Budget Statement. The State Planning Board and Women and Child Development Department are focusing on capacity building on Gender Budgeting.

#### **Karnataka**

Karnataka officially adopted Gender Budgeting in 2006-07. It constituted a Gender Budget Cell in the Fiscal Policy and Analysis Cell, Finance Department in 2007 and introduced Gender Budget Statement as part of State Budget in 2007-08. As a first step to Gender Budgeting, strength of male and female employees working in the State Government was captured. Detailed circular seeking information on Gender Budgeting is issued every year. The Department of Planning monitors the progress using Monthly Program Implementation Calendar. Gender Budgeting Cell in the Finance Department, Women & Child Department, Department of Economics and Statistics, ATI and SIRD Mysore are promoting capacity building on Gender Budgeting.

## **Kerala**

The State officially adopted Gender Budgeting in 2008. Gender Budgeting was made part of local government process in 1998. A Gender Budgeting exercise of State Budget was also conducted in 2008-09. It had set up a Gender Advisory Committee in 2008. The reconstituted committee is headed by Minister of Social Welfare. It also introduced two Flagship programs for Gender with various Departments on board in 2008, undertook Gender audit of the two schemes and thereby increased fund allocation. The total budget outlay for women had thus increased from 5.5% of the State Budget in 2008-09 to 8.5% in 2010-11.

## **Maharashtra**

Maharashtra had officially adopted Gender Budgeting in 2011-12. A Gender Budgeting Cell has also been formed under the Planning Department.

## **Nagaland**

Nagaland officially adopted Gender Budgeting in 2009. It had set up a Task Force for "Engendering State and District Plans" headed by Additional Chief Secretary in 2009 with members from Departments of Health & Family Welfare, Finance, Rural Development, Development Commissioner, SIRD, ATI, Nagaland University and Additional Director, Women Development as member secretary. It also constituted a Gender Budgeting Cell under Planning and Coordination Department. Gender Budgeting is a subject of training calendar of ATI (Administrative Training Institute) and SIRD (State Institute of Rural Development). The Task force also developed a Gender Budgeting manual customized to local requirement in collaboration with UNDP.

## **Rajasthan**

The State officially adopted Gender Budgeting in 2005-06. It had set up a High level Committee under the Chairmanship of Chief Secretary in 2009-10. Principal Secretary of Finance, Planning and Women and Child Development are members; and Commissioner of Women's Empowerment as the Secretary. It also constituted a Gender Cell under the Directorate of Women Empowerment to function as Secretariat to High Level Committee and also to undertake capacity building exercises. Gender Desks have been set up in 42 Departments to act as a focal point on gender issues. The State introduced Gender Budget Statement as part of the State Budget in 2012-13. It conducted gender analysis of budgets of 12 Departments.

## **Tripura**

Tripura officially adopted Gender Budgeting in 2005-06. Social Welfare and Social Education Department is the nodal Department. Gender Budget Cells have been formed in the State in 17 Departments. It had introduced Gender Budget Statement as part of the State Budget in 2005-06. The budget allocation in Gender Budget Statement has increased from Rs. 149.82 crores in 2005-06 to Rs. 337.45 crores in 2012-13.

## **Uttarakhand**

The State officially adopted Gender Budgeting in 2007-08. Women and Child Development is the nodal Department. It introduced Gender Budget Statement as part of the State Budget in 2007-08. The no. of Departments reporting the statement increased from 18 to 29 between 2007-08 and 2012-13. There was corresponding increase in fund allocation from Rs. 330 crores to Rs. 2228 crores respectively. Department of Women and Child Development is the nodal agency for capacity building on Gender Budgeting.

## **Uttar Pradesh**

Uttar Pradesh officially adopted Gender Budgeting in 2005-06. A working group was formed under the directions of Secretary Finance, Planning and Women & Child Development for promoting Gender Budgeting. In the first phase 24 Departments were identified for Gender Budgeting. Women and Child Development Department is the nodal agency.

### **Plan initiatives**

#### **The Tenth Five Year Plan (2002-2007)**

The tenth Plan highlighted the need for gender budgeting, to establish gender differential impact of resource allocations and to translate gender commitments into budgetary commitments.

#### **The Eleventh Five Year Plan (2007- 2012)**

- The Eleventh Plan further reiterated the commitment to gender budgeting and clearly stated that, gender equity requires adequate provisions to be made in policies and schemes across Ministries and Departments. It also entailed strict adherence to gender budgeting across the board.
- The Eleventh Plan also envisaged incorporation of Gender Budgeting beyond traditional areas like health, education etc. to so called “gender neutral” sectors like Transport, Power, Telecommunications, Defence, etc. In addition, the plan document emphasized on engendering important national macro-economic policies and striving for inter-sectoral convergence.
- Accounting of resource utilization for a particular purpose.
- Evaluation of effectiveness of resources utilized in delivering the intended results

#### **The Twelfth Five Year Plan (2012- 2017)**

The vision for the XII Five Year Plan was to ensure improving the position and condition of women by addressing structural and institutional barriers as well as strengthening gender mainstreaming.

The Twelfth Plan regarded “Mainstreaming gender through Gender Budgeting” as a key element to address Gender Equity. The process of GB was further strengthened in the Twelfth Plan and its reach extended to all Ministries, Departments and State Governments.

### **Goals for the XII Five Year Plan**

- Creating greater ‘freedom’ and ‘choice’ for women by generating awareness and creating institutional mechanisms to help women question prevalent “patriarchal” beliefs that are detrimental to their empowerment.
- Improving health and education indicators for women like maternal mortality, infant mortality, nutrition levels, enrolment and retention in primary, secondary and higher education.
- Reducing the incidence of violence against women and providing quality care services to the victims.
- Improving employability of women, work participation rates especially in the organized sector and increased ownership of assets and control over resources.
- Increasing women’s access to public services and programmes through establishing and strengthening convergence mechanisms at multiple levels, creation of physical infrastructure for women and improving the capacity of women’s organizations and collectives.
- Ensuring that the specific concerns of single and disadvantaged women are addressed.

| <b>GENDER BUDGET TREND OVER THE YEARS</b> |             |                                |
|-------------------------------------------|-------------|--------------------------------|
| <b>S No.</b>                              | <b>YEAR</b> | <b>Total Gender Budget (%)</b> |
| 1                                         | 2007-08     | 3.3                            |
| 2                                         | 2008-09     | 5.5                            |
| 3                                         | 2009-10     | 5.5                            |
| 4                                         | 2010-11     | 5.5                            |
| 5                                         | 2011-12     | 5.8                            |
| 6                                         | 2012-13     | 5.5                            |
| 7                                         | 2013-14     | 5.4                            |
| 8                                         | 2014-15     | 4.9                            |
| 9                                         | 2015-16     | 4.5                            |

Source: Ministry of Finance (2015a), EPW\*<sup>2</sup>

## **Conclusion**

Gender analysis frameworks are the working tools that enable researchers, scholars and extension functionaries to find out the gender gaps and address gender equity towards holistic development of the nation. No single tool; can highlight true gender scenario. Hence a combination of these tools should be used to generate accurate fact and data. Data generated through such tools serve as a benchmark for policy makers to evaluate the effectiveness of various gender related programs and schemes.

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