

Nutri Smart Village: A Holistic Approach Towards Nutrition-Sensitive Rural Development

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Introduction

Food and nutrition security is an issue of significant concern in the context of the high rate of urbanization and the global environmental problems of the present age particularly to the rural population of the developing countries such as India. Conventional farming methods, which are mostly geared towards high yield production of the staple foods largely ignore the key aspects of nutrition and health. Therefore, though self-sufficiency in production of food grains has been realized in many countries, deficiency in micronutrients has been a big factor of the hidden hunger. The concept of a Nutri Smart Village (NSV) emerges as an innovative, integrated approach that seeks to address these complex, interlinked issues by combining agricultural productivity with improved nutritional outcomes, sustainable livelihoods, environmental conservation, and community empowerment.

What is Nutri Smart Village?

A Nutri Smart Village signifies a multi-phase development design whereby, agriculture is not only seen as a method of developing food; however, it would be a shared system of developing nutrition, health, and socio-economic prosperity (Pingali *et al.*, 2019). It combines seemingly unrelated parts of the food system, such as production, processing, consumption, education, and entrepreneurship, and at the same time considers environmental sustainability and social equity a priority (Safdar & Heap, 2016). Simply put, a Nutri Smart Village will see that all households have easy access to a wide variety of safe and wholesome affordable food, and also create livelihoods out of value addition and enterprise creation (Choudhary, 2023).

According to the Indian Council of Agricultural Research (ICAR), a Nutri Smart Village aims to “bridge the gap between agriculture and nutrition by ensuring the production, availability, accessibility, and utilization of diverse, safe, and nutritious food at the household level.” (ICAR 2020). Not only does the model reduce or alleviate hunger, it also seeks to eliminate malnutrition and health issues associated with poor nutrition, including overall well-being and resilience of the communities it targets, which are in rural settings (Amadou & Lawali, 2022).

The Rationale Behind Nutri Smart Village

The Persistent Burden of Malnutrition

Despite impressive growth in food production, malnutrition continues to plague a significant portion of India’s population (Qadeer *et al.*, 2025). According to the National Family Health Survey (NFHS-5, 2019-21):

- The number of children below the age of 5, who are stunted, represents chronic undernutrition, and comprises 35.5%
- 32.1% of children under 5 are underweight
- 57% of women aged between 15-49 years is anaemic
- A significant proportion of the adult population faces obesity and non-communicable diseases (NCDs) linked to poor dietary habits.

Over resilience on Monoculture

Green Revolution model continues to apply Indian agriculture and depends mostly on monoculture especially rice and wheat (Eliazer Nelson *et al.*, 2019). This dominance of calorie-rich but nutrient-poor staples has led to reduced dietary diversity and contributed to widespread micronutrient deficiencies, also known as ‘hidden hunger’ (Agu & Lu, 2025).

Knowledge and Awareness Gaps

Most of the families in the rural areas have poor information regarding healthy diets, nutrition value on locally-available foods as well as the diversification of foods (Pradhan *et al.*, 2021; Bisht *et al.*, 2018). Nutrition related issues are also escalated by poor eating habits and cultural food likes and dislikes.

Rural Livelihood Challenges

The rural areas face economic vulnerabilities in terms of agricultural income instability, underemployment, failure to add value to the agricultural produce, limited access to the market and rural-urban migration (Ezeudu & Tukur, 2024). Implantation of the Nutri Smart Village involves several income generating activities that can supplement the agricultural production as processing, packaging and marketing of nutrient dense food products (Ilham *et al.*, 2022).

Core objectives of Nutri Smart Village

- Encourage diversified, nutrition sensitive systems of farming that ensures that, at all times, there is access to nutrient-rich foods.
- Improve value addition, processing and agri-entrepreneurship opportunities to increase rural incomes.
- Engage four communities to improve nutrition literacy, diets and health.
- Ensure that women, young people, and marginal groups can actively engage in nutrition-sensitive agriculture and other businesses of the type.
- Promote environmental sustainability and climate-resilient farming practices.
- Enhance local governance and multi-sectoral coordination to achieve a comprehensive development.

Components and Interventions of Nutri Smart Village

Nutrition-Sensitive Agriculture

In the very core of Nutri Smart Villages, one will find the nutrition-sensitive agriculture concept, where the production of nutrient-dense and diverse crops and livestock takes precedence over other commodities (Rukmani *et al.*, 2018). Some key elements include:

- **Crop Diversification:** Integrating pulses (e.g., chickpea, pigeon pea), millets (e.g., sorghum, pearl millet, finger millet), oilseeds (e.g., groundnut, sesame), fruits (papaya, guava, banana), and green leafy vegetables (amaranth, moringa) (Tiwari *et al.*, 2023).
- **Minor Livestock and Fisheries:** Backyard Poultry, rearing of goats, fish culture, and dairy act as significant protein and micro-nutrient sources (Rukmani *et al.*, 2018).
- **Kitchen Gardens and Nutri-Gardens:** The garden-level interventions at household level result in direct benefit of achieving a higher dietary and improved micronutrient intake.
- **Bio fortification:** Cultivation of bio fortified varieties of staple crops (e.g., zinc-rich rice, iron-rich pearl millet) enhances nutrient intake without altering traditional food habits (Gills & Sharma, 2021).

Value Addition and Food Processing

Village-level promotion of cheap and simple food processing technologies will have many purposes:

- Reduces post-harvest losses.

- Has the benefit of increasing nutritional and the shelf-life of agricultural products.
- Creates opportunities in entrepreneurship mainly among women and the youth.
- Provides affordable, nutritious, ready-to-cook and ready-to-eat products.

5.2.1. Examples of value-added products include:

- Rice-based instant idli, dosa, khichdi premixes.
- Millet-based snacks, extrudates, and fortified flours.
- Fermented foods like probiotic drinks, curd, and pickles.
- Flavoured rice milk and plant-based dairy alternatives.
- Traditional food innovations like Handia (fermented rice beverage) with improved packaging for extended shelf-life.

Nutrition Education and Behavioural Change Communication (BCC)

It is important to create awareness on nutrition, health and hygiene so as to have a long-term impact. Interventions include:

- Periodic education on nutrition literacy among the females, teenagers and school children.
- Sharing of information using folk media, posters, videos and interactive learning modules.
- Conducting cooking demonstrations to showcase nutrient-rich recipes.
- Promoting consumption of underutilized, indigenous, and traditional foods.

Entrepreneurship Development and Livelihood Generation

The Nutri Smart Village framework stimulates the agriculture and food processing entrepreneurial activities:

- Establishment of Farmer Producer Organizations (FPOs) for collective processing and marketing.
- Development programs in packaging, branding, e-commerce and quality control.
- Facilitation of linkages with agri-business incubators, such as ICAR-Agri Business Incubator (ABI) platforms.
- Encouraging rural entrepreneurs and matching young people with financial solutions under

governmental programs such as PMFME, MUDRA, and StartUp India.

Community Participation and Governance

Active community participation ensures the sustainability of interventions:

- Involvement of Panchayati Raj Institutions (PRIs), Self-Help Groups (SHGs), Non-Governmental Organizations (NGOs), and cooperatives.
- Setting up village-based nutrition committees to oversee the progress and coordinate actions.
- Ensuring participatory monitoring and evaluation so as to monitor nutrition indicators and livelihood outcomes.

Water, Sanitation, and Healthcare Integration

Nutrition problems cannot be solved without providing access to basic health services and access to clean water.

- Safe drinking water distribution by purifying the water at the community levels.
- The sanitation and hygiene improvement to avoid the spread of diseases.
- Improvement of primary healthcare, such as growth monitoring, immunization and provision of micronutrient supplements.

Expected Outcomes and Impacts:

- There was a considerable decrease in the incidence of stunting, wasting and anaemia.
- Increased household dietary diversity index (DDI).
- Enhanced rural incomes through value-added food processing enterprises.
- Gender emancipation of women as major entrepreneurs and nutritionists.
- Better food security and food self-sufficiency and over-reliance on food aid.
- Enhanced climate resilience via differentiated and sustainable farming systems.
- Enhanced community-level resilience against pandemics and health emergencies.

Challenges and Limitations: Although the idea of the Nutri Smart Village can provide an effective solution, there are some obstacles, which should be overcome to realize it:

- Early investment in value-added processing equipment, food storage and infrastructure.

- Poor access to credit and accessible finance to small scale businessmen.
- Barriers in market linkage of processed products especially in the isolated regions.
- Constant capacities building, training and handholding required.
- Interdepartmental coordination issues that turn complex in various sectors of agriculture, health, education and rural development.

Government Policies and Programmes Supporting Nutri Smart Villages

A number of the current government programs create a facilitating environment to develop Nutri Smart Villages on a wide scale:

- **POSHAN Abhiyan (National Nutrition Mission)**- Focus on nutrition outcomes through multi-sectoral coordination.
- **National Food Security Act (NFSA)**- Provides legal entitlements to subsidized food grains.
- **Pradhan Mantri Mantru Vandana Yojana (PMMVY)**- Maternity benefit programs to ensure nutritional security for mothers and infants.
- **PM POSHAN (formerly Midday Meal Scheme)**- School meal programs to promote child nutrition.
- **ICAR's Nutri-sensitive Agricultural Resources and Innovations (NARI) Program**- Framework for integrating agriculture and nutrition.
- **Paramparagat Krishi Vikas Yojana (PKVY)**- Supports organic and sustainable farming.
- **PM Formalization of Micro Food Processing Enterprises (PMFME)**- Supports micro-entrepreneurs in the food sector.

The Way Forward

To fully realize the potential of Nutri Smart Villages:

- **Policy Convergence:** There is need to have increased integration of policies to do with agriculture, health, education and rural development.
- **Community Ownership:** Sustainability is guaranteed by large involvement and ownership of a community.
- **Public-Private Partnerships (PPP):** Collaboration with private sector for technical support, market access, and investment.

- **Technology Integration:** Taking advantage of digital resources to access the market, distant training, monitoring, and extended services.
- **Research and Innovation:** Further research studies on nutrient rich crops of the area, crop processing, and tastes of consumers.
- **Monitoring and Evaluation:** Setting up of nutrition surveillance mechanisms to monitor progress and provide guidance to policy changes.

Conclusion

The Nutri Smart Village strategy is a paradigm shift in the conventional, production-driven, agricultural paradigm to a people-driven, integrated nutrition, livelihoods and sustainable development paradigm. It aligns with multiple national and global goals, including the Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger), SDG 3 (good Health and Well-Being), SDG 5 (Gender Equality), and SDG 13 (Climate Action).

As Mahatma Gandhi famously said, “The soul of India lives in its villages.” The reinforcement of these villages by the Nutri Smart Village solution guarantees the presence of food on the table, nutrition a lifetime, health of communities, prosperity to rural households, and sustainability to future. A case of the concerted efforts, these exist prospects of Nutri Smart Villages being potential to be used as models to change the country and world landscape of rural areas.

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