



Integrating Agriculture for Nutrition in Pakistan: A Critical Review of Policy and Strategic Interventions

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Abstract

Malnutrition remains a critical public health challenge in Pakistan, particularly in Punjab the nation’s primary agricultural province where high levels of food insecurity coexist with significant agricultural output. This review paper critically examines strategic interventions that aim to bridge agriculture and nutrition through the Punjab Multi-Sectoral Nutrition Strategy. Emphasis is placed on mainstreaming nutrition in agricultural policy, enhancing productivity of nutrient-rich crops, promoting biofortification, and improving access to animal protein. Special attention is given to grassroots initiatives such as kitchen gardening and backyard poultry farming that increase household-level dietary diversity. Additionally, the review highlights cross-cutting themes such as gender mainstreaming, awareness campaigns, and youth involvement in nutrition-sensitive value chains. Despite promising frameworks, major challenges persist, including weak intersectoral coordination, lack of nutrition training among extension staff, and gender inequities in access to resources. The paper concludes that the strategic alignment of agriculture with nutrition goals, reinforced by behavior change and inclusive planning, is essential for improving nutritional outcomes and achieving Sustainable Development Goals in Punjab.

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INTRODUCTION

Nutritional security helps to achieve sustainable development by fostering health improvements and economic growth. The Punjab facing serious issues in terms of population growth and climatic vulnerabilities and national food and nutritional security (Haq *et al.*, 2021). Producing the breadbasket of countries facing issues with sectoral issues between agriculture and industrial sectors.

Pakistan is facing the south Asian paradox of undernutrition despite high rates of economic growth due to disparities and equity issues. The nutrition is mostly linked with health sector, and it is part of health issues especially in Pakistan. However, agriculture sector is one of the most prime sectors that has direct and validated implication to cater the multisectoral issue of nutrition in developing world (Balagamwala and Gazdar, 2013). It is important to understand the casual pathway of malnutrition to identify its linkages with different sectors. Malnutrition is lined with household food insecurity and this way Agriculture sector can play an important role. Despite being Pakistan's agricultural province Punjab shows high levels of food insecurity and malnutrition, especially among women and children (Burki, 2025). The strategy identifies that agriculture must not only focus on production, but also on enhancing access to diverse and nutritious foods to address malnutrition.

The government of Punjab formulated multi-sector nutrition strategy for addressing malnutrition in Punjab. That is a comprehensive draft to establish the road map for action plans and strategies to combat the malnutrition in Punjab. Poor nutrition has far-reaching consequences that undermine a nation's overall development, impeding progress across multiple dimensions of well-being. Given its foundational role in health, education, productivity, and equity, nutrition is intrinsically connected to nearly 12 of the 17 Sustainable Development Goals (SDGs), making it a critical cross-cutting issue for sustainable development. The integration of the agricultural sector with nutrition improves the consumption of food at household level, increases farm income that could be spend on food, shifts the food preferences with greater diversity and choices. It is an effective strategic intervention with a strong link with communities and mainstreaming of gander and youth in nutrition activities rural areas.

AGRICULTURE SECTOR INTERVENTIONS

Mainstreaming nutrition in agriculture is an important strategic intervention that can positively affect the large number of populations in the developing world.

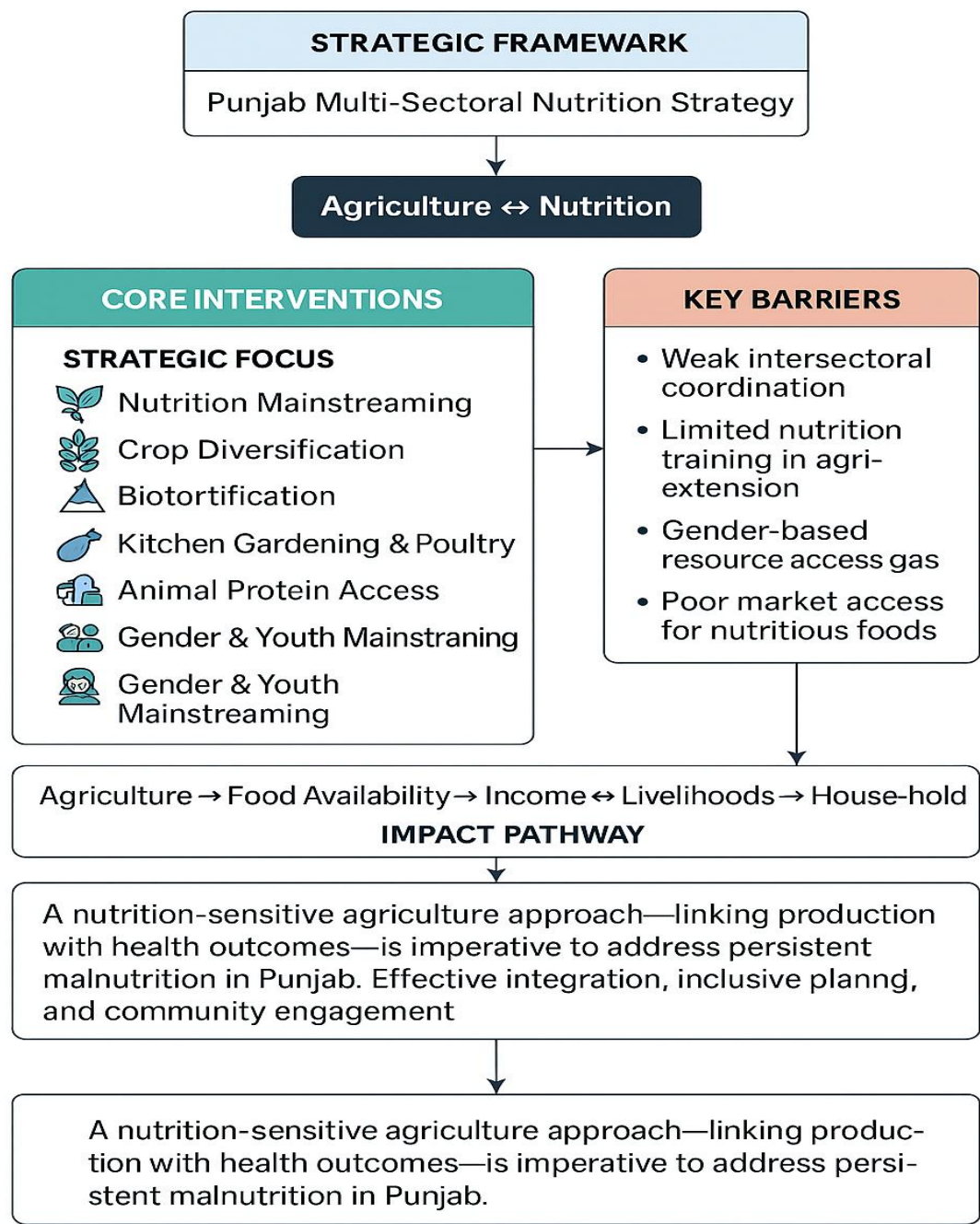


FIGURE: PATHWAYS TO NUTRITION-SENSITIVE AGRICULTURE IN PUNJAB: A STRATEGIC FRAMEWORK INTEGRATING AGRICULTURAL INTERVENTIONS WITH NUTRITION GOALS TO IMPROVE FOOD SECURITY, HEALTH OUTCOMES, AND SDG PROGRESS

INTEGRATE NUTRITIONAL OUTCOMES INTO AGRICULTURAL POLICIES AND PRACTICES

The nutrition aspects must be considered while devising agricultural policies and practices to drive the sustainable production practices at national and provincial levels. The subsidies and priorities must be given to those sectors that are important for the food and nutritional needs of the country. The crop and income diversification could be fostered with the government preference in terms of resource allocation at national policy

implementation synergies. Food security and agriculture development are already prioritized area in policy domain in Pakistan, that must add the nutritional aspects and food diversity and improvement mechanism for the country.

The agriculture sector continues to play a pivotal role in economic resilience and rural livelihood, contributing 23.5 percent to GDP and employing over 37 percent of the labor force (GOP, 2025). Employment and livelihood in the agriculture sector also allows the policy maker to improve the livelihood and food indicators to communities and marginalized groups. To incorporate nutrition goals with agricultural policy it must also be integrated with agricultural extension services. Furthermore, coordinate with health, education, and food sectors to align outputs with nutrition needs. The growth in the agriculture sector also directly transforms into food and nutritional security if guided with objectivity. The crop, livestock and fisheries sectors along with special attention to horticulture the intervention directly supports the nutritional security of the country.

INCREASING PRODUCTIVITY OF NUTRITIOUS FOOD

The public policy must focus on grains and pulses by promoting high-yielding and nutrition-rich crop varieties. Focusing on livestock value added products and organic agricultural produce at farms and fields. Policy directives must consider and prioritize the areas like forestry, horticulture and oilseed crops. Crop diversification is also fostering the income induced nutritional outcome in country. Encourage diversification beyond wheat and rice to include legumes, fruits, and vegetables. Pakistan's agriculture sector has historically been dominated by wheat and rice; cereals occupy most of the cropped area in Punjab. This monoculture has resulted in low dietary diversity, contributing to widespread micronutrient deficiencies. Crop diversification and integrated farming systems not only improve agro-ecological resilience but also foster income induced nutritional gains. Public policy should align agricultural subsidies, extension services, and research priorities with nutrition sensitive goals.

The nutrition depends on availability and accessibility if various nutritious foods and the food balance sheet provides insights that have been added in table. The calculations are based on detailed analysis of data on production, imports and exports. A review of key food items over the past three fiscal years highlights significant shifts in their availability.

TABLE: FOOD AVAILABILITY PER CAPITA PER ANNUM IN PAKISTAN

Food Items	2022-23	2023-24	2024-25
Calories/day	2588.83	2658.84	2719.69
Cereals	151.94	163.11	170.47
Edible Oil/ Ghee	13.97	12.96	13.05
Eggs (dozen)	8.22	8.48	8.76
Fish	2.55	2.55	2.36
Fruit & Vegetables	60.3	65.32	59.81
Meat	22.79	23.12	24.17
Milk (liter)	163.79	164.73	165.8
Pulses	6.87	5.88	6.12
Sugar	27.65	27.91	27.77

Source: GOP, 2025

BIO-FORTIFICATION INITIATIVES TO IMPROVE NUTRITION

Bio-fortification is a cost-effective, sustainable agricultural strategy to reduce micronutrient deficiencies by increasing the nutritional value of staple food crops through plant breeding and agronomic practices (Azeem *et al.*, 2025). In Pakistan, where diets are heavily cereal-based and micronutrient deficiencies are widespread, bio-fortification presents a powerful tool to improve population health. The development of zinc-rich wheat and other micronutrient-fortified crops will help to combat the dietary needs of escalating population (Gauliya *et al.*, 2025). The bio-fortification initiative will align with global best practices in combating hidden hunger (micronutrient deficiencies) (Babu and Srivastava, 2024). Bio-fortification is recognized in the Punjab Multi-sectoral Nutrition Strategy and the Pakistan Multi-Sectoral Nutrition Strategy (PMNS) 2018–2025.

The challenges for Bio-fortification are limited seed availability, weak linkages of agricultural departments with nutrition programs. The acceptance of bio-fortification is also limited and increasing over time due to traditional food patterns and limited knowledge and awareness. Need for incentives and public procurement (e.g., schools, BISP food baskets) to create demand (Rashid *et al.*, 2025).

KITCHEN GARDENING PROMOTION

Kitchen gardening is an important endeavor to revamp the agricultural production system for organic produce that is healthier option especially in context of increasing chemical use and unsustainable practices and farm. Along with health and other benefits it also ensures the household-level food security (Bhatti, 2025). The proposed intervention to foster the kitchen gardening and backyard poultry there are a lot of initiatives from public sector that include the motivation of employment creation and livelihood improvements. The suggested action plans are distribution of seed kits, promotion of backyard farming of vegetables/fruits. The initiative will have wider short term and long-term impacts by increasing the direct access to micronutrient-rich foods, especially for rural women and children (Mohsin *et al.*, 2017).

ENHANCING ACCESS TO ANIMAL PROTEIN

Support programs to increase availability of high protein diet poultry, eggs, dairy, and fish at the household level. Encourage women's engagement in livestock and poultry for dual impact that increase the nutrition level of household and increase the income. The Livestock contributes 60 percent of agriculture GDP in Pakistan (GOP, 2023). Promoting backyard poultry farming, especially among women, to improve household access to eggs and meat. Public support in terms of subsidies and technical support for chicken feed, vaccinations, and breeds can increase the productivity at large. Government programs such as "Save the Calf", dairy development projects, and poultry schemes have improved productivity but need to be scaled up with nutrition goals in mind. Investments in fish nurseries and mobilization in community fish farms and aquaculture, particularly in Sindh and southern Punjab will support the fisheries sector. Improvement and efficient management to cold chain infrastructure to reduce spoilage and enhance fish availability in remote areas.

AWARENESS AND BEHAVIOR CHANGE

Food diversity campaigns to encourage balanced diets in rural areas are important. The awareness and training for farmers and growers regarding nutrition aspects can make them effective in the food system regarding access to nutritious food. Nutrition education for small farmers and rural households on dietary choices and food preparation will improve the national nutritional scenarios at large from farm to fork. Community Nutrition



Promoters play a significant role in integrating nutrition in food systems, training and deployment of local youth as nutrition promoters linked to agriculture extension offices. Media Campaigns on Balanced Diets are also important to sensitize the masses about nutrition and public health. Launch culturally tailored campaigns promoting diet diversity, appropriate child nutrition, food safety/quality assurance and cooking practices. Incorporate Nutrition in School Curricula and introduce modules on food, agriculture, and health in primary and secondary school education.

GENDER MAINSTREAMING AND YOUTH INVOLVEMENT IN AGRICULTURE VALUE CHAINS

Recognize and strengthen the role of women in agriculture through training in nutrition-sensitive farming, inclusion in decision-making for farm-level interventions. Access to Inputs for Women Farmers by developing women centric programs with gender sensitive extension officers. Women cooperatives for nutrition can perform the community mainstreaming by supporting women-led producer and nutrition cooperatives with links to local markets and institutions. Youth inclusion in agriculture and nutrition related endeavors by establishing Agri-nutrition incubation hubs that support youth in processing, packaging, and marketing of nutrient-dense foods.

CHALLENGES IN INTEGRATION OF NUTRITION AND AGRICULTURAL PRODUCTION SYSTEMS

The implementation has various challenges

- Weak intersectoral coordination between agriculture and health.
- Lack of nutrition training among agricultural extension staff.
- Market access and affordability issues for nutrient-rich foods.
- Gender inequities in access to inputs, credit, and decision-making.

CONCLUSION

The Punjab strategy reflects a comprehensive, multi-sectoral approach to connect agriculture with nutritional outcomes. It aligns with global nutrition sensitive agriculture models and emphasizes food diversity, local food systems, bio fortification, and women’s role in ensuring food and nutritional security. The review highlights that integrating agriculture with nutrition is not only feasible but imperative for addressing persistent malnutrition in Punjab. Strategic interventions such as crop diversification, biofortification, livestock development, and kitchen gardening offer viable pathways to enhance the availability and accessibility of nutrient-rich foods. However, effective implementation requires overcoming structural barriers, particularly weak coordination between agriculture and health sectors, limited market access, and entrenched gender disparities. Policies must prioritize nutrition-sensitive agriculture, supported by trained extension staff and inclusive community engagement. With continued commitment and multisectoral collaboration, Punjab can serve as a model for leveraging agriculture to achieve comprehensive food and nutrition security in Pakistan.

TABLE: BRIDGING AGRICULTURE AND NUTRITION IN PUNJAB: PATHWAYS FOR FOOD SECURITY AND PUBLIC HEALTH

Strategic Focus	Description
Nutrition Mainstreaming	Embedding nutrition goals in agricultural policy, extension and value chains



Crop Diversification	Moving beyond cereals (wheat/rice) to pulses, vegetables, fruits for dietary diversity
Biofortification	Zinc-rich wheat and micronutrient-dense crops to tackle hidden hunger
Kitchen Gardening & Poultry	Backyard food systems improving household nutrition and women’s empowerment
Animal Protein Access	Supporting livestock, dairy, and fish for high-protein diets
Awareness & Behavior Change	Promoting food diversity through education and outreach
Gender & Youth Mainstreaming	Inclusion in nutrition-sensitive farming and decision-making

POLICY RECOMMENDATIONS

The review emphasizes the need to integrate agriculture and nutrition to address persistent malnutrition in Punjab. Mainstream nutrition into agriculture policy and extension services by embedding dietary goals in planning, subsidies, and training while aligning agriculture, health, and education sectors under a coordinated framework. The policy recommendations to improve the integrating health and agriculture are following.

- Mandate that all provincial and district-level agricultural policies explicitly include nutritional objectives and indicators. Establish intersectoral coordination mechanisms and establish a Punjab Food and Nutrition Council that includes representatives from agriculture, health, education, livestock, and planning departments to ensure aligned priorities and joint planning. Embed nutrition in extension Services and update the agricultural extension curriculum to include nutrition-sensitive modules and food-based dietary guidelines.
- Reorient Agricultural Subsidies by Shifting subsidies from staple cereal crops to pulses, vegetables, fruits, and biofortified varieties to encourage diverse production. Promote climate-smart nutrition crops by investing in resilient, nutrient-dense crops such as lentils, millets, and oilseeds that align with both agro-ecological and dietary needs. Expand horticulture zones by developing region specific horticulture development plans with an emphasis on local fruits and vegetables to reduce transport losses and improve freshness.
- Make it mandatory for public institutions (schools, hospitals, BISP food baskets) to procure biofortified staples like zinc wheat and iron-rich maize.
- Strengthen seed supply chains and incentivize public-private partnerships to scale up seed production and distribution of biofortified crop varieties.
- Community awareness programs by education campaigns that explain the benefits and safety of biofortified foods to address cultural resistance and increase uptake. Subsidized seed kits for kitchen gardens and scale up the distribution of seasonal seed kits with training sessions targeting women, youth, and schoolchildren. Promote integrated backyard systems and provide starter kits that combine kitchen gardening, poultry, and small livestock for improved protein and micronutrient access. Urban Agriculture Incentives must be provided by implementation of policies encouraging rooftops and peri-urban agriculture to boost food access in cities.

- Targeted livestock support for women in poultry and dairy schemes with built-in nutrition and income training components for female-headed households. Fishery development by improvement in aquaculture infrastructure, especially in Southern Punjab and Sindh, with emphasis on community-based pond systems and cold chain logistics.
- Establish Agri-Nutrition Indicators: Develop and integrate food diversity, dietary intake, and Agri-nutrition outcome indicators into provincial MIS systems. strengthen data use in policy and use disaggregated household food consumption and nutrition data to tailor region-specific interventions. Promote operational research and provide funding to researchers and universities to evaluate Agri-nutrition innovations such as biofortification and integrated homestead food systems. Nutrition-Linked Livestock Subsidies: Link livestock support (feed, vaccine, breeding stock) to measurable improvements in household dietary diversity.

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