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Initiatives in Nutrition-Sensitive Agriculture

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Abstract

In recent years, nutrition-sensitive agriculture has emerged as a critical approach to tackling malnutrition while also enhancing global food security. Countries worldwide have underlined the significance of agricultural and food cooperation in enhancing food security and eradicating food shortages. In India, the government has implemented various measures to bolster food security in agriculture, including policies, plans, and interventions aimed at promoting nutrition-sensitive agriculture. These initiatives aim to mitigate food insecurity and enhance dietary diversity. Essential efforts involve boosting agricultural productivity, diversifying the food supply, ensuring access to nutritious foods, and integrating nutrition education into agricultural extension services. This paperinvestigates into the diverse influences and measures through which the government can promote the adoption of nutrition-sensitive agriculture, while highlighting its benefits and best practices. Furthermore, it examines the role of extension strategies in raising awareness, building capacities, fostering behavioral change through incentive policies, fostering collaboration among agencies, and monitoring progress in agricultural nutrition. Additionally, the rise of Information and Communication Technology (ICT) has revolutionized nutrition-sensitive agriculture, making information access easier, communication more effective, and decision-making more streamlined. ICT tools like mobile phones, websites, digital libraries, and remote sensing technologies play a significant role in facilitating nutrition-sensitive agriculture measures.

Keyword:Nutrition-sensitive, food security, ICT, interventions

Introduction

In recent years, nutrition-sensitive agriculture has emerged as a vital approach to addressing both global food shortages and enhancing food security. The significance of agriculture contributing to health and well-being has been acknowledged in discussions leading up to the United Nations 2030 Agenda for Sustainable Development[4]. Various avenues exist to link agriculture and food, categorized into general and specific effects[3]. General effects entail connecting nutrition and agriculture through employment and income, while specific interventions encompass food availability and access, personal usage of products, and household procurement and distribution of food. Nutrition-sensitive agriculture facilitates the cultivation of sustainable, affordable, culturally appropriate, and safe food varieties that meet people's nutritional needs adequately and qualitatively[9]. However, many impoverished individuals lack health knowledge and consume inadequate food, resulting in food shortages. Agriculture assumes a critical role in ensuring food security, as nutrition cannot be attained without agricultural food. Numerous studies predict that agricultural expansion significantly contributes to reducing malnutrition with increased food production stemming from the crucial link between agricultural development and improved nutrition. By intertwining agriculture and food, it seeks to elucidate the interplay between food production, food choices, and health, thereby promoting clean drinking water and enhancing health outcomes, particularly

for marginalized groups[12, 13]. Potential avenues to enhance food supply involve augmenting the quality and quantity of food by expanding agricultural diversity through ecosystem processes[4]. Many development organizations advocate ecological utilization as the primary foundation for nutrition-sensitive agriculture, emphasizing both food production and the sustainability of food procurement. Overall, nutrition-sensitive agriculture represents a comprehensive strategy aimed at harnessing agricultural potential to bolster food supply. It contributes to sustainable development goals such as food security, health, and poverty reduction by integrating nutritional objectives into agricultural policies, measures, and systems. Given the ongoing global challenges posed by climate change and food insecurity, nutrition-sensitive agriculture remains a crucial strategy for promoting health and well-being[1,2]. To foster effective synergy between agriculture and nutrition, authorities and stakeholders are increasingly embracing innovative approaches leveraging Information Communication Technology (ICT) platforms to enhance the nutritional quality of foods.

Efforts to promote food-sensitive agriculture: initiatives, policies and programs aimed at promoting healthy food

The relationship between agriculture and nutrition is widely recognized by governments and various development agencies. Strengthening this connection is crucial to increase the production and consumption of nutritious food. In India, the concept of nutrition-sensitive agriculture (NSA) plays a pivotal role in addressing the country's challenges, such as malnutrition and food security. Due to population diversity and varying agro-climatic conditions, India faces difficulties in solely focusing on food production; therefore, integrating nutrition aspects into agricultural practices becomes imperative[5,7].

The importance of large-scale, effective nutrition programs and interventions were indicated to improve the nutritional status of vulnerable populations[10]. These interventions should comprehensively address the various functions of food in an integrated and coordinated manner to tackle the root causes of malnutrition. An integrated approach with cross-sectoral nutrition targets is essential to develop sustainable solutions and enhance the overall health and well-being of populations.The recognition of the connection between agriculture and nutrition in India dates back to the period between 1965 and 1975, when it was acknowledged that food not only needs to be consumed but also should be healthy and nutritious. Subsequently, from 1975 to 1997, malnutrition began to be understood as a poverty-related issue with multiple underlying causes. Presently, agriculture is generally perceived as a source of income, employment, and economic growth, with the aim of improving the food supply for the population, although progress in this area is often slower than anticipated. Since 1997, there has been an increasing societal interest in nutrition, and malnutrition has been identified as a food and nutrition problem.

Driving Change: Key initiatives in 21st Century

The National Food Security Mission (NFSM), initiated in 2007, aims to enhance the production of rice, wheat, and pulses through measures such as area expansion and production enhancement. The interventions proposed under NFSM offer opportunities to raise awareness of new and improved agricultural practices among farmers and to devise strategies for expanding crop areas. Additionally, the Rashtriya Krishi Vikas Yojana (RKVY), launched in 2007 as a national agricultural development program, encourages states to develop agricultural projects in specially planned agro-climatic zones and natural resource-oriented areas. These flexible strategies have been optimized for agriculture, poultry, and fish farming [6].Through the National Food Security Act (2013), the government extends financial and nutritional support to pregnant and lactating mothers (benefitting over 8.75 billion beneficiaries) and implements the mid-day meal (MDM) program under the Integrated Child Development Scheme (ICDS) for children aged between 6 months to 14 years. Addressing malnutrition, the scheme includes various programs such as Anganwadi Services, Youth Services, and Pradhan Mantri Matru Vandana Yojna (PMMVY) under the ICDS program.

Policy discussions now recognize the importance of nutrition in agriculture (Barnett and Srivastava, 2016), with initiatives like the National Horticulture Mission (2005-06) and the National Rural Livelihoods Mission (2011) acknowledging the link between agriculture and nutrition. The National Horticultural Mission aims to promote horticultural crops to increase yields and enhance food diversity. It supports interventions like creating vegetable gardens, promoting high-value crops, and improving food product quality. Similarly, NRLM aims to reduce rural poverty by promoting various livelihoods, including agriculture-related activities. It supports interventions that enhance household food security and health by improving resource access and economic connections.

Several policy initiatives, projects, and programs focused on pulses were approved in 2017 to increase pulse production. Additionally, biofortified varieties are being introduced under the NFSM, aiming to produce nutrition-rich cereals. India's involvement in the Harvest Plus: Bio-fortification challenge program is noteworthy, aiming to produce biofortified crops rich in essential nutrients. The government also plans to ensure complete crop protection across all states and union territories by 2024 through various welfare schemes. Organic farming has gained importance in India due to rising prices, climate change-induced losses, and consumer preference for pesticide-free products. The National Organic Production Program (NPOP), established in 2000, certifies organic agriculture and livestock products. The government further promotes organic farming under the Paramparagath Krishi Vikas Yojana (PKKVY) to improve soil health, reduce chemical inputs, and produce quality crops.

Despite these efforts, India still grapples with high rates of stunted and underweight children. The government has intensified efforts to improve nutritional status, notably through initiatives like the National Nutrition Mission (renamed POSHAN-Abhiyaan). Additionally, to promote nutrition-sensitive agriculture, the Government of India designated 2023 as the International Year of Millets (IYM) to

highlight the nutritional value of millets. These government schemes and programs encompass a range of interventions aimed at promoting sustainable agriculture, increasing productivity, diversifying crops, improving dietary diversity, and addressing malnutrition and food shortages.

The urgent need to integrate agriculture with nutrition goals is evident, yet major weaknesses in existing national nutrition programs, including a lack of monitoring and targeting, and a narrow focus on staple consumption, hinder the overall development and well-being of rural communities. Agricultural programs and policies should prioritize improving dietary diversity and access to micronutrient-rich foods to enhance nutritional outcomes. However, challenges persist, as nearly 3 billion people worldwide, particularly the poor, struggle to afford healthy food due to high food prices and income inequality (FAO and GFRAS, 2021). Moreover, malnutrition, lack of nutrition knowledge, and limited access to diverse agricultural products further exacerbate this problem.

As nutrition increasingly contributes to poverty reduction strategies and countries develop nutrition programs, innovative delivery methods and tools will be essential. Extension and Advisory Services (EAS) emerge as a potential solution due to their ability to disseminate knowledge, provide information, and promote improved practices to rural households. EAS can act as crucial service providers across various domains such as crop, livestock, and forestry aspects of production, consumption, and food security. Recognized by many development agencies, EAS ensures that research, development of farmer organizations, improved inputs, and other rural development elements align with farmers' needs and demands.

Agricultural extension and advisory workers play a pivotal role in disseminating messages on the nutritional aspect of agriculture to rural communities. Four key reasons were focused why agricultural EAS delivery systems are effective tools. Firstly, extension workers have well-established structures and reach numerous farming communities in rural areas. Secondly, they maintain strong relationships with the farming community, facilitating discussions on sensitive issues such as family nutrition and diet. Thirdly, being members of the community themselves, extension workers possess a deep understanding of local social norms, cultures, and beliefs. Finally, their empathy with rural communities enables them to comprehend daily challenges and constraints faced by farmers. Linking agricultural Extension and advisory services with participatory learning and action on health and nutrition can enhance the impact and sustainability of food and agricultural programs on nutrition and household food security.

Extension Strategies to link Agriculture with nutrition:

- Integrating nutrition into the curricula of agricultural institutions: Incorporating nutrition education into the curriculum of agricultural institutions strengthens human capacity to promote nutrition-sensitive agriculture.
- The farmer field school and farm school: Farmer associations provide opportunities for extension and rural advisory services to effectively deliver nutrition-sensitive agriculture without transport and training challenges faced by extension agents.

- Integrating gender and nutrition with agricultural extension and rural advisory services: Integrating Gender and Nutrition within Agricultural Extension System empowers rural families, reduces gender gaps in agriculture, and improves nutrition outcomes.
- Convergence: Promoting multi-stakeholder cooperation from agriculture, health, nutrition, education, and other allied sectors at the grassroots level enhances food security, dietary diversity, and nutrition outcomes for vulnerable populations.
- Expanding participatory methodologies through participation: Involving individuals and communities in decision-making processes ensures that solutions are relevant and sustainable, ultimately improving agriculture, food diversity, and nutrition benefits.

Utilization of Information and Communication Technologies (ICTs)

Information and Communication Technologies (ICTs) encompass a wide range of communication devices and applications, including radio, television, cellular phones, computers, network hardware & software, satellite systems, and associated services like distance learning and videoconferencing[8]. ICTs play a pivotal role in promoting nutrition-sensitive agriculture by facilitating access to information, knowledge sharing, decision-making, and market linkages. They offer small-scale farmers and farming communities various benefits such as accessing relevant nutrition and agricultural information, financial services, insurance, tools for risk management, and new business opportunities in rural areas. ICTs have the potential to bring transformative change by addressing societal needs for continuous health and nutrition care through effective state policies and scientific interventions.

Smallholder farmers, especially women engaged in agriculture, stand to gain significantly from the integration of appropriate ICTs into the agriculture value chain. Recognizing the importance of ICT in agriculture, it was identified as a key action line during the World Summit on the Information Society held in 2003 and 2005. In response, organizations like FAO established the e-Agriculture community to facilitate knowledge sharing and learning, thus improving decision-making regarding the crucial role of ICTs in empowering rural communities, enhancing rural livelihoods, and promoting sustainable agriculture and food security.

Over the years, ICT tools have played a vital role in various aspects of nutrition-sensitive agriculture. Mobile apps, websites, and digital libraries provide farmers with valuable information on crop management practices and nutrient-rich food production. Mobile phones, in particular, are widely used by farmers for social interactions, marketing produce, and accessing agricultural advisories in real-time[11]. NGOs are increasingly utilizing mobile platforms to deliver extension messages through SMS, apps, and voice messages. For instance, NOKIA LIFE's app and Digital Green are examples of organizations leveraging ICTs to deliver specialized information to farmers and agricultural stakeholders.

Agricultural Value Added Services (Agri-VAS) delivered through mobile technology are gaining traction in countries like India, Bangladesh, and China. FAO has been instrumental in using ICT to improve communication and interaction among agricultural

stakeholders, notably through the Virtual Extension, Research, and Communication Network (VERCON). Kisan Sarathi, an ICT-based platform, facilitates two-way communication between farmers and agricultural experts, providing agricultural technology/information and advisory through text, images, audio, and videos. Additionally, precision farming, GIS, and remote sensing emerge as promising ICT interventions for agriculture, helping farmers optimize resource use and manage fields efficiently. By harnessing these ICT tools, stakeholders in agriculture and nutrition can enhance productivity, food security, and sustainability while tackling challenges such as climate change, market volatility, and resource constraints.

Conclusion

Nutrition-sensitive agriculture (NSA) should integrate the principles of permaculture and nutrient-rich crop production to enhance population nutrition while aligning with production and business objectives. NSA programs prioritize supporting agriculture to boost the nutritional value of crops. However, effectively delivering quality agricultural services to rural households poses challenges, requiring a comprehensive understanding of the "what" and "how" of implementation. Traditional agricultural projects often overlook nutrition indicators in planning, leading to limited evaluative data and hindering advocates of nutrition-sensitive agriculture, exacerbated by the incentives dilemma. In India, the Government has initiated several measures for rural nutritional security. However, agricultural nutrition programs undergo lengthy processes, consuming significant time and effort. Mere enhancement of access and availability does not guarantee improved dietary intake, underscoring the importance of context-specific solutions within the agricultural sector.

Addressing these challenges necessitates a multi-stakeholder approach involving governments, NGOs, private sector entities, and local communities to develop tailored solutions that surmount barriers to scheme implementation and integrate ICT solutions for nutrition-sensitive agriculture. A concerted effort is crucial to tackle issues with NSA deployment and adopt innovative solutions to enhance the health and well-being of global populations.

Extension advisory services emerge as pivotal in promoting nutrition-sensitive agriculture, employing strategies to raise awareness, build capacity, induce behavioral change, and advocate policy support for improving food quality in agricultural practices. Moving forward, investments in extension and communication strategies should continue to enhance their efficacy in promoting nutrition in agriculture and alleviating global food shortages.

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