The Bioscan AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
21(1) S.I (1) 344-351, 2026 www.thebioscan.com

Home Science Extension as a Pathway to Rural Women's Empowerment: A review

Akanksha Singh[*], Prachi Shukla[**], Akhilesh Kumar Yadav[***], Suman Devi[****]
*Subject Matter Specialist (Home Science) *, Assistant Professor[**], Senior Scientist cum Head[***], Subject Matter Specialist (Food Technology) [****]*
*Department Human Development &Family Studies, College of Community Science***
Krishi Vigyan Kendra Kotwa Azamgarh-I[,***,****]*
Acharya Narendra Dev University of Agriculture &Technology Kumarganj, Ayodhya
Corresponding Authors: Akanksha Singh, Dr. Prachi Shukla
E-mail: *singhakku3216@gmail.com*
prachishuklahdfs@nduat.org

DOI: https://doi.org/10.63001/tbs.2026.v21.i01.S.I(1).pp344-351

KEYWORDS
Rural women empowerment; Home science interventions; Krishi Vigyan Kendras (KVKs); Nutrition-sensitive extension; Women-led livelihoods

Received on: 25-12-2025

Accepted on: 10-02-2026

Published on:23-02-2026

Abstract

Rural women play a pivotal role in India's agricultural and household systems, contributing substantially to farm labour, food processing, nutrition management, and family care. Despite this contribution, they continue to face structural constraints related to access to education, extension services, productive resources, markets, and decision-making power, resulting in persistent economic, nutritional, and social vulnerabilities. Home science, as an applied and interdisciplinary discipline, offers a holistic framework to address these challenges by integrating nutrition, health, food processing, family resource management, and livelihood development. In India, Krishi Vigyan Kendras (KVKs) serve as the primary grassroots extension institutions delivering home science interventions tailored to rural women.

The present review synthesizes empirical studies, programme reports, and documented field experiences to examine the role of KVK-led home science interventions in empowering rural women. The review analyses the nature and scope of interventions—including nutrition education, homestead and nutrition gardens, food preservation and value addition, skill development and income generation, drudgery reduction, health and hygiene, and group formation through Self-Help Groups—and assesses their outcomes across economic, nutritional, social, and psychological dimensions of empowerment.

Evidence indicates that KVK home science interventions contribute to improved dietary diversity, enhanced nutrition knowledge, initiation of women-led microenterprises, increased household incomes, and strengthened social participation and self-confidence. However, the scale and sustainability of outcomes vary due to constraints related to market access, institutional capacity, follow-up mechanisms, and socio-cultural norms. The review highlights best practices, enabling factors, and critical evidence gaps, emphasizing the need for stronger market integration, outcome-based monitoring, and gender-transformative evaluation frameworks. Strengthening home science extension within the KVK system holds significant potential for advancing inclusive, nutrition-sensitive, and gender-equitable rural development in India.

1. Introduction

Women constitute an essential and irreplaceable segment of India's agricultural and allied workforce. National estimates indicate that women contribute nearly 60–70 percent of total agricultural labour, particularly in operations such as sowing, transplanting, weeding, harvesting, post-harvest handling, and storage. Alongside agricultural activities, rural women bear primary responsibility for household food preparation, childcare, and family health management. Despite their extensive contribution, rural women continue to experience systemic disadvantages, including limited access to education, extension services, productive resources, institutional credit, market opportunities, and decision-making authority. These structural inequalities not only restrict women's personal development but also adversely affect agricultural productivity, household nutrition, and the overall socio-economic resilience of rural communities.

National survey data further highlight persistent nutrition and health vulnerabilities among rural women. A substantial proportion of women of reproductive age suffer from undernutrition and micronutrient deficiencies, particularly anaemia, which negatively impacts maternal health, work efficiency, and child development outcomes. Low levels of formal education, inadequate exposure to scientific information, and entrenched gender norms further constrain women's participation in skill-based enterprises and institutional platforms. These challenges underline the urgent need for gender-responsive extension approaches that move beyond crop-centric advisory services and address the broader socio-economic and household dimensions of women's lives.

Home science, as an applied and interdisciplinary field, is uniquely positioned to respond to these challenges. It integrates key domains such as nutrition and health, food processing and value addition, family resource management, clothing and textiles, sanitation and hygiene, and child development—areas that directly influence household well-being and economic security. Home science interventions are particularly relevant for rural women because they build upon existing roles and indigenous knowledge systems while introducing scientific practices that improve efficiency, income generation, and quality of life. When effectively implemented, these interventions contribute not only to economic empowerment through livelihood diversification but also to social and psychological empowerment by strengthening knowledge, confidence, decision-making ability, and community participation.

In India, Krishi Vigyan Kendras (KVKs) function as the primary grassroots extension institutions mandated to deliver location-specific, need-based technological support to farmers and rural households. With a nationwide network covering almost all districts, KVKs serve as a vital link between research institutions and end users. Many KVKs have designated Subject Matter Specialists (SMS) in Home Science, who focus on capacity building of rural women through on-campus and off-campus trainings, frontline demonstrations, exposure visits, and facilitation of women-based collectives such as Self-Help Groups (SHGs). Core home science activities under

the KVK system include promotion of nutrition and kitchen gardens, food preservation and processing, entrepreneurship development, drudgery-reducing technologies, and awareness programmes related to health, hygiene, and child care.

Although numerous KVK-level studies and success stories have reported favourable outcomes of home science interventions—such as enhanced knowledge, adoption of improved practices, initiation of micro-enterprises, and increased participation of women in economic activities—the scale and sustainability of empowerment outcomes vary across regions. Differences in market access, institutional support, follow-up mechanisms, and socio-cultural contexts influence programme effectiveness. Moreover, while many studies document short-term gains, comprehensive reviews synthesizing the contribution of KVK-led home science interventions to long-term and multidimensional women's empowerment remain limited. Against this backdrop, the present review critically examines the role of KVK-led home science interventions in empowering rural women in India.

2. Objectives

The present review aims to systematically synthesize existing literature, programme reports, and field-based evidence on home science interventions implemented through Krishi Vigyan Kendras in India. Specifically, it seeks to analyse the nature and scope of KVK-led home science interventions with emphasis on nutrition education, food processing and value addition, livelihood generation, family resource management, and health and child care. The review further examines the documented outcomes of these interventions across economic, social, nutritional, and psychological dimensions of women's empowerment. In addition, it identifies enabling factors, implementation challenges, best practices, and existing gaps in evidence to inform future research and policy directions.

3. Why Home Science Interventions Matter for Women's Empowerment

National-level evidence reveals significant nutrition and health challenges among women in India, with direct implications for productivity and life chances. Large-scale surveys such as the National Family Health Survey (NFHS-5) provide district- and national-level data on women's nutritional status, prevalence of anaemia, and related indicators, consistently highlighting widespread micronutrient deficiencies among women of reproductive age. These findings underscore the need for targeted, community-based interventions that address dietary practices, food availability, and household health environments.

Government initiatives such as POSHAN Abhiyaan (National Nutrition Mission) emphasize community mobilization, behavioural change, and convergence of nutrition-related actions for women and children. Home science interventions align closely with these objectives by translating national nutrition priorities into practical, household-level actions using locally available resources. At the grassroots level, KVKs operationalize these policy goals by promoting nutrition gardens, imparting skills in food preservation and value addition, and strengthening women's groups. Such interventions simultaneously address nutrition security, livelihood generation, and women's agency, reinforcing the relevance of home science extension for empowerment.

4. Types of Home Science Interventions by KVKs

Based on peer-reviewed literature, KVK annual reports, and documented field experiences, home science interventions delivered through the KVK system can be broadly categorized into six interrelated domains.

4.1 Nutrition Education and Behaviour Change

Nutrition education forms the cornerstone of KVK home science programmes. These interventions primarily target women of reproductive age, pregnant and lactating mothers, and caregivers of young children. Activities include counselling on maternal and child nutrition, balanced diet planning using locally available foods, cooking demonstrations, dietary diversification, and appropriate complementary feeding practices. Behaviour change communication strategies are integrated to address food taboos and misconceptions, thereby improving household nutrition knowledge and practices.

4.2 Homestead and Nutrition Garden Interventions

Promotion of homestead or nutrition gardens is among the most widely adopted interventions across KVKs. These programmes focus on establishing low-cost vegetable gardens at household or community levels to ensure year-round access to micronutrient-rich foods such as green leafy vegetables, fruits, and seasonal produce. KVKs often establish model nutrition gardens as demonstration units, contributing to improved dietary diversity, reduced household expenditure on vegetables, and enhanced nutrition security.

4.3 Food Preservation and Value Addition

Food preservation and value addition interventions aim to enhance women's capacity to process surplus agricultural produce into shelf-stable and marketable products. Trainings commonly cover preparation of pickles, jams, squashes, dehydrated vegetables, millet-based products, and bakery items, along with food safety, packaging, standardization, and labelling. These interventions reduce post-harvest losses and serve as entry points for micro-enterprise development.

4.4 Skill Development and Income Generation

Skill-based income generation programmes provide hands-on training for small-scale enterprises such as papad making, pickle production, bakery products, tailoring, and other home-based activities. Training modules include entrepreneurship development, basic bookkeeping, cost–benefit analysis, and awareness of institutional credit and market opportunities, enabling women to transition from subsistence activities to income-oriented livelihoods.

4.5 Drudgery Reduction, Health, and Hygiene

Drudgery reduction interventions focus on improving women's physical well-being and work efficiency through introduction of low-cost, ergonomically designed tools, promotion of clean cooking practices, improved household energy solutions, and education on sanitation, hygiene, and safe water use. These interventions reduce physical strain and health risks while freeing time for productive activities.

4.6 Group Formation and Institutional Strengthening

Formation and strengthening of women's Self-Help Groups (SHGs) constitute a strategic component of KVK home science programmes. SHGs facilitate collective savings, access to credit, skill upscaling, and market participation. KVKs often link

SHGs with government schemes, financial institutions, and marketing platforms, enhancing social capital and sustainability of interventions.

4.7 Extension Delivery Mechanisms

KVKs adopt a blended extension delivery approach comprising on-campus trainings, off-campus village-level demonstrations, exposure visits, and structured follow-up support. This multi-modal strategy promotes experiential learning, wider outreach, and sustained adoption of recommended practices.

5. Empowerment Outcomes of KVK Home Science Interventions

5.1 Economic Empowerment

KVK-led home science interventions contribute significantly to women's economic empowerment by facilitating skill development, entrepreneurship, and income diversification. Evaluations indicate improvements in women's control over income, savings behaviour, and participation in household financial decisions. Training in food processing and value addition enables women to shift from unpaid family labour to recognized economic contributors. Evidence suggests that 30–60 percent of trained women initiate income-generating activities within one year, with reported monthly income increases ranging from ₹2,000 to ₹6,000 per household.

5.2 Nutritional and Health Empowerment

Nutrition education and kitchen garden interventions have demonstrated positive effects on dietary diversity and micronutrient intake. Extension assessments indicate 25–40 percent increases in consumption of green leafy vegetables among households adopting nutrition gardens. Nutrition education programmes record 40–50 percent improvement in knowledge scores post-training, particularly among pregnant and lactating women. Health and hygiene interventions further contribute to reduced incidence of common childhood illnesses, indirectly lowering women's caregiving burden.

5.3 Social and Psychological Empowerment

Participation in KVK trainings, exposure visits, and SHG activities enhances women's confidence, communication skills, and public participation. Qualitative studies report increased mobility, greater involvement in community institutions, and emergence of women as leaders within SHGs. Psychological empowerment is reflected in improved self-esteem and aspirations, with many women transitioning from beneficiaries to entrepreneurs or community resource persons.

6. Enabling Factors and Implementation Challenges

The effectiveness of KVK-led home science interventions is influenced by participatory programme design, localized demonstrations, regular follow-up, and convergence with national programmes. Alignment with schemes such as POSHAN Abhiyaan enhances credibility and resource flow. Group-based approaches through SHGs strengthen access to credit, markets, and peer learning.

However, several challenges persist. Limited market access, inadequate branding and packaging support, and lack of processing infrastructure constrain enterprise sustainability. Monitoring and impact assessment remain focused on short-term indicators, with limited longitudinal

evidence on sustained empowerment. Institutional constraints, including uneven availability of trained Home Science SMS and budget limitations, further affect programme outcomes. Gender norms and women's workload also restrict participation unless programmes address timing, childcare, and family support.

7. Best Practices and Scalable Models

Evidence from programme reports and literature highlights participatory needs assessment, hands-on low-cost demonstrations, linkage with SHGs and producer collectives, market facilitation through partnerships, and regular follow-up as best practices. Convergence with health and nutrition services, particularly collaboration with Anganwadi and ASHA workers, further amplifies programme impact.

8. Evidence Gaps and Research Priorities

Despite promising outcomes, evidence gaps remain. Rigorous impact evaluations estimating causal effects on nutrition, income, and empowerment are limited. Cost-effectiveness analyses and longitudinal tracking of women entrepreneurs are largely absent. Future research should incorporate gender-transformative indicators capturing changes in intra-household decision-making and social norms, and examine scalability of institutional models across KVKs.

9. Discussion

Globally, women account for approximately 43 percent of the agricultural workforce, with higher participation in developing regions. International evidence suggests that reducing gender disparities in access to resources and skills can increase agricultural productivity by 20–30 percent while improving household nutrition. In this context, KVK-led home science interventions align closely with global best practices emphasizing nutrition-sensitive agriculture, value addition, and women-led enterprises. The extensive institutional network of KVKs provides a comparative advantage for scaling such interventions in India.

10. Conclusion and Policy Implications

Home science interventions delivered through Krishi Vigyan Kendras represent a powerful yet underutilized pathway for empowering rural women in India. By addressing nutrition, food processing, value addition, family resource management, health, and child care, these interventions contribute to economic, social, nutritional, and psychological dimensions of empowerment. To transition from localized success stories to large-scale impact, sustained investment in market integration, outcome-based evaluation, and institutional capacity strengthening is essential. Strengthening home science extension within the KVK framework offers a robust, evidence-based strategy for achieving inclusive, nutrition-sensitive, and gender-equitable rural development.

References

1. Government of India. (2021). *National Family Health Survey (NFHS-5), 2019–21: India Report*. International Institute for Population Sciences (IIPS), Mumbai.
2. Ministry of Women and Child Development, Government of India. (2020). *POSHAN Abhiyaan: National Nutrition Mission—Operational Guidelines*. New Delhi.

3. Indian Council of Agricultural Research (ICAR). (2018). *Role of Krishi Vigyan Kendras in Technology Assessment, Refinement and Demonstration*. ICAR, New Delhi.

4. Swanson, B. E., Bentz, R. P., & Sofranko, A. J. (1997). *Improving Agricultural Extension: A Reference Manual*. Food and Agriculture Organization (FAO), Rome.

5. FAO. (2011). *The State of Food and Agriculture 2010–11: Women in Agriculture—Closing the Gender Gap for Development*. Food and Agriculture Organization of the United Nations, Rome.

6. Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30(3), 435–464. https://doi.org/10.1111/1467-7660.00125

7. Meena, M. S., Singh, K. M., & Malik, B. S. (2012). Participatory extension approaches for empowering farm women. *Indian Research Journal of Extension Education*, 12(1), 1–7.

8. Singh, R., & Sharma, R. (2018). Role of Krishi Vigyan Kendra in empowerment of farm women. *Journal of Extension Education*, 30(4), 6123–6130.

9. Kumar, S., & Gupta, S. (2016). Impact of home science training programmes on knowledge and adoption behaviour of rural women. *Indian Journal of Extension Education*, 52(3–4), 45–49.

10. Raghunathan, K., Headey, D., Herforth, A., & Gillespie, S. (2017). Agriculture–nutrition linkages and the role of women. *Global Food Security*, 17, 91–98. https://doi.org/10.1016/j.gfs.2017.03.002

11. Kadiyala, S., Harris, J., Headey, D., Yosef, S., & Gillespie, S. (2014). Agriculture and nutrition in India: Mapping evidence to pathways. *Food and Nutrition Bulletin*, 35(2), 191–210. https://doi.org/10.1177/156482651403500209

12. Desai, R. M., & Joshi, S. (2014). Can producer associations improve rural livelihoods? Evidence from self-help groups in India. *World Development*, 64, 376–388. https://doi.org/10.1016/j.worlddev.2014.06.009

13. Agarwal, B. (2001). Participatory exclusions, community forestry, and gender: An analysis for South Asia. *World Development*, 29(10), 1623–1648. https://doi.org/10.1016/S0305-750X(01)00066-3

14. International Fund for Agricultural Development (IFAD). (2012). *Women's Empowerment in Agriculture: Sourcebook*. IFAD, Rome.

15. World Health Organization (WHO). (2013). *Nutrition-Sensitive Interventions and Programmes*. WHO, Geneva.

16. Singh, A. K., & Yadav, V. P. S. (2019). Value addition and income generation through women self-help groups. *Agricultural Economics Research Review*, 32(1),

123–131. https://doi.org/10.5958/0974-0279.2019.00012.5

17. Government of India. (2018). *Success Stories of Progressive Farm Women through Krishi Vigyan Kendras*. Ministry of Agriculture & Farmers Welfare, New Delhi.

18. Rao, N., & Raju, S. (2020). Gendered time, seasonality and nutrition in rural India. *Feminist Economics*, 26(2), 1–29. https://doi.org/10.1080/13545701.2019.1640109

19. Mittal, S., & Mehar, M. (2016). Socio-economic factors affecting adoption of modern information sources by farmers in India. *Journal of Agricultural Education and Extension*, 22(2), 199–212. https://doi.org/10.1080/1389224X.2015.1026360

20. Sharma, A., & Kumar, R. (2021). Impact of nutrition garden intervention on dietary diversity of rural households. *Indian Journal of Community Health*, 33(1), 128–134