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Agricultural Information Needs of Smallholder Farmers in Aathrai

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Abstract

Access to timely and reliable agricultural information is essential for improving the productivity and livelihoods of smallholder vegetable farmers in Aathrai Rural Municipality. Many farmers rely on informal sources like neighbors, agro-vet shops, and radio for quick advice, but this information is often outdated or not specific to their needs. Formal extension services, while more accurate, are limited by irregular visits and a lack of localized guidance. To overcome these challenges, local governments and NGOs must work together to expand and strengthen agricultural extension services in every ward. Community radio and mobile alerts in local dialects can be used to provide farmers with real-time updates on weather patterns, pest outbreaks, and market prices. Hands-on digital training can also help farmers' access online resources independently. Establishing demonstration plots in each community and encouraging peer mentorship will promote practical, experience-based learning. Additionally, farmer cooperatives and regular community forums should be activated as spaces for collaboration, dialogue, and shared problem-solving. These integrated strategies will not only bridge the current information gap but also empower farmers to make better decisions, adopt sustainable farming practices, and increase their yields. In the long run, such efforts can lead to stronger rural communities and more resilient agricultural systems in Nepal's mid-hill regions.

Keywords: smallholder farming, agricultural extension, information access, knowledge systems, vegetable farmers, rural Nepal

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Introduction

Agriculture in Nepal is much more than just an economic activity; it forms the very backbone of rural life, identity, and development. Despite rapid progress in other sectors, the country's agricultural economy still largely depends on smallholder farmers, who make up more than (65%) of the agricultural workforce (Ministry of Agriculture and Livestock Development [MoALD], 2023). These farmers usually cultivate small, fragmented plots of land, often in difficult terrain and varying climatic conditions, especially in the mid-hill areas like Terhathum. Among the farming options available, vegetable cultivation on small plots has shown great promise because it can generate relatively higher income while requiring less land. However, many farmers have yet to unlock the full potential of vegetable farming, mainly due to limited access to timely, reliable, and location-specific agricultural information.

Aathrai Rural Municipality, situated within Terhathum District, offers a clear example of both the opportunities and difficulties faced by smallholder vegetable farmers. Located in Nepal's eastern hills, the area is characterized by diverse agro-ecological zones and a long-standing tradition of subsistence farming, which is now gradually shifting toward semi-commercial vegetable production. For many farmers here, though, farming remains a risky venture. Critical decisions related to what crops to plant, how to manage pests, when and what inputs to use, and how to access markets are often made without sufficient information or expert guidance.

This study focuses on understanding the specific agricultural information needs of smallholder vegetable farmers in Aathrai Rural Municipality. It seeks to identify not only the types of information farmers most urgently require but also how they currently obtain this information, what challenges prevent them from accessing it effectively, and how local institutions, including agricultural extension services, are meeting or failing to meet these needs.

In recent years, Nepal has implemented important policy reforms aimed at decentralizing agricultural services through its federal governance system. This reform assigns local governments greater responsibility for agricultural planning, extension services, and resource distribution. Although this shift has the potential to make agricultural support more locally tailored and responsive, evidence from places like Aathrai shows that the capacity of local institutions to deliver relevant agricultural information remains limited (Ghimire et al., 2023). Many farmers in hill areas are still disconnected from formal extension networks due to poor road infrastructure, limited access to digital technology, and social or cultural barriers.

Taking a grounded, farmer-centered perspective, this study explores the agricultural information ecosystem in Aathrai by prioritizing the voices and lived experiences of the farmers themselves. It recognizes the diverse forms of knowledge that farmers hold,

their preferences for receiving information, and the constraints they face in their daily agricultural work. By combining data from surveys with in-depth interviews and direct field observations, the research paints a detailed and nuanced picture of how agricultural information flows — or fails to flow — within this unique rural community.

Ultimately, this study highlights the urgent need to strengthen local agricultural information systems to support smallholder vegetable farmers in Aathrai. Addressing these gaps is essential not only to improve farm productivity and incomes but also to contribute to the sustainable development and resilience of rural communities across Nepal's mid-hills.

Methodology

The study was conducted in Aathrai Rural Municipality of Terhathum District, Koshi Province, Nepal In this study, I used a descriptive survey design to better understand the challenges and information needs of smallholder vegetable farmers in selected wards of Aathrai Rural Municipality. Using simple random sampling, I fairly selected 60 households—20 each from wards 4, 5, and 6—to ensure a balanced and unbiased sample. Data was collected through a structured questionnaire focusing on key areas like pest control, input use, market access, and sustainable practices. Before the main survey, we pre-tested the questionnaire with a few farmers to make sure the questions were clear, relevant, and easy to understand. Their feedback helped us refine the tool. This approach allowed me to collect dependable and meaningful data that truly reflects the realities and needs of the local farming communities.

Primary data were gathered through in-depth, face-to-face interviews conducted in May 2025. These conversations provided rich insights into the perspectives and experiences of participants. The collected information was then analyzed using Microsoft Excel, with a focus on generating descriptive statistics such as frequencies, averages, and percentages. To further explore the data, a Likert scale was employed to assess the intensity of information needs across various agricultural domains. This approach allowed researchers to quantify and compare responses, providing a clearer understanding of where gaps or priorities exist in agricultural information. By breaking down the data into these measurable categories, the study aimed to shed light on the specific areas where stakeholders require more support or resources. This systematic process ensured that the findings were both comprehensive and actionable, offering valuable insights for future agricultural strategies.

Results

Table 1

Demographic Profile of Respondents

Category	Percentage/Value
Male Respondents	58%
Female Respondents	42%
Average Age	42 years
Households with 4–6 Members	Majority
Agriculture as Main Livelihood	67%

Sources: Field Survey report 2025

Out of the 60 farmers surveyed, a little more than half i.e. (58%) were men, while (42%) were women, showing balanced gender participation in vegetable farming. The average age of respondents was 42, reflecting the involvement of experienced, middle-aged individuals in agriculture. Most households had between 4 to 6 family members, which is typical in the region. Importantly, (67%) of the participants identified farming as their main source of income, highlighting how vital agriculture remains for rural livelihoods in Aathrai Rural Municipality. This profile paints a clear picture of the hardworking, family-based farming community at the heart of the study.

Major Crops and Landholding

The main vegetables grown included tomato, cauliflower, cabbage, and chili. The average landholding size was 9 Ropani, with (75%) of farmers practicing off-season vegetable production under plastic tunnels. Due to the hilly regions here farmer also involve in citrus fruits farming and cardamom cultivation.

Table 2

The primary sources of agricultural information for farmers

Source	Percentage of Farmers Using
Neighboring Farmers	86%
Local Agro-vet Shops	78%
FM Radio	65%
Government Extension Workers	42%
Mobile Phones	30%
Farmer Groups/Cooperatives	27%

Sources: Field Survey report 2025

The 2025 field survey shows that smallholder vegetable farmers in Aathrai Rural Municipality mostly depend on informal and easily reachable sources for agricultural information. Most farmers—around (86%)—turn to their neighboring farmers for advice, showing how important local knowledge-sharing is within the community. Local agro-vet shops also play a big role, with (78%) of farmers using them, likely because they are nearby and offer quick fixes for farming problems. FM radio remains a popular source as well, used by (65%) of farmers, thanks to its wide reach in rural areas. On the other hand, only (42%) of farmers said they receive help from government extension workers, pointing to gaps in regular outreach. While mobile phones are becoming more common, only (30%) of farmers use them for farm-related advice, possibly due to weak internet access or lack of digital skills. Lastly, just (27%) of farmers use farmer groups or cooperatives, showing these formal networks need to be made more active and accessible.

Table 3

The most demanded types of information

Type of Information Needed	Percentage of Respondents Indicating Need
Disease and Pest Management	92%
Improved Vegetable Varieties	88%
Fertilizer Application and Doses	84%
Market Prices and Linkages	81%
Irrigation and Soil Management	75%
Organic/Low-Chemical Farming Practices	63%

Sources: Field Survey report 2025

The survey findings highlight that smallholder vegetable farmers in Aathrai Rural Municipality have several pressing information needs. The most urgent among them is disease and pest management, with (92%) of respondents seeking better guidance in this area—reflecting their daily struggle to protect crops effectively. About (88%) of farmers expressed the need for information on improved vegetable varieties, showing a strong interest in boosting productivity and crop resilience. Similarly, (84%) wanted clearer advice on fertilizer use and proper dosing, indicating concerns about soil health and input efficiency. Market-related information is also a major need, with (81%) of farmers looking for updates on prices and market linkages to sell their produce more profitably. Irrigation techniques and soil management were important for (75%) of the respondents, while (63%) showed interest in organic or low-chemical farming practices—suggesting a growing awareness of sustainable methods. These responses underline the need for tailored, practical, and timely information to support farmers' evolving challenges.

Challenges in Accessing Information

The most significant problem is the inaccessibility of extension services in remote areas, affecting (65%) of farmers. Following this, (58%) report a lack of training opportunities, limiting their ability to improve farming methods. Literacy and language barriers affect (43%) of the farmers, making it difficult to fully benefit from available information. Poor mobile and internet connectivity is another hurdle for (39%) of respondents, restricting their access to timely agricultural updates and digital resources. These challenges emphasize the urgent need for better outreach, tailored training, and improved communication infrastructure to support these farmers effectively.

Discussion

The findings highlight a critical information gap in the smallholder vegetable farming landscape of Aathrai. While farmers express high interest in improving their practices, they are constrained by lack of targeted and timely information. Similar studies have found that the effectiveness of agricultural extension depends heavily on the mode and relevance of information delivery (Regmi et al., 2021; Sharma & Adhikari, 2018).

Reliance on informal sources, such as peers and agro-vets, while helpful, may not always lead to accurate or science-based advice. Strengthening government extension networks, promoting mobile-based advisory services, and empowering local farmer groups can be effective solutions. Moreover, participatory approaches involving farmer field schools, community radio programming, and ICT innovations have shown promise in bridging the information gap in similar hilly and rural contexts (Paudel & Thapa, 2020; Upreti, 2019).

Access to agricultural information is essential for effective decision-making in farming. Information on soil fertility, improved seed varieties, integrated pest management, climate risks, and post-harvest technologies plays a critical role in enabling farmers to enhance productivity and profitability. Moreover, in contexts affected by climate variability and shifting market dynamics, such information becomes a cornerstone of resilience. However, the effectiveness of information dissemination depends not only on availability but also on the relevance, credibility, accessibility, and trustworthiness of the sources through which it is delivered (Regmi & Paudel, 2023).

Aathrai Rural Municipality, situated in the eastern hills of Nepal, represents both the potential and the precarity of smallholder vegetable farming. Farmers here typically manage landholdings smaller than 9.5 ropani, grow diverse crops across steep terrains, and navigate challenges such as erratic weather, soil degradation, pest outbreaks, and market volatility. In these contexts, timely and accurate information is a powerful asset—enabling informed decisions on input use, crop choice, irrigation scheduling, and market participation (Ghimire & Thapa, 2022).

While the Government of Nepal has initiated efforts to decentralize agricultural service delivery through federal governance, institutional capacity remains uneven across local bodies. Rural municipalities often struggle with insufficient staff, limited training, and weak coordination with provincial agricultural research centers (Paudel et al., 2023). Moreover, many farmers in hilly areas remain excluded from digital extension platforms due to low digital literacy and poor connectivity (Shrestha & Bista, 2022).

Our study reveals a pronounced gap between smallholder vegetable farmers' high demand for tailored agronomic information and the inadequacy of existing delivery mechanisms in Aathrai Rural Municipality. Farmers overwhelmingly depend on informal networks—neighbors (86%) and agrovet shops (78%)—for pest management and input advice, yet such sources often circulate partial or outdated guidance. Formal extension services, accessed by only (42%) of respondents, suffer from irregular outreach, limited staffing, and standardized protocols that fail to accommodate Aathrai's diverse microclimates and cropping systems. Language barriers and low digital literacy further undermine the uptake of mobile and radio advisories.

Farmers identified pest and disease control (92%), improved varieties (88%), and market price updates (81%) as top priorities, yet these critical needs remain unmet due to poor connectivity (39%) and logistical constraints. Our findings align with Regmi et al. (2021) and Sharma & Adhikari (2018), who emphasize that relevance and timing of information are as vital as content accuracy. Strengthening local capacity through communityled demonstration plots, farmer field schools, and peermentor networks can foster trust and contextual learning. Integrating mobilebased alerts in local dialects, coupled with periodic, handson training by government and NGO agents, could bridge the informalformal divide. Ultimately, a decentralized, participatory extension model—leveraging ICT tools and local institutions—offers the most promising pathway to enhance productivity, resilience, and livelihoods among Nepal's midhill vegetable growers.

Conclusion

Smallholder vegetable farmers in Aathrai Rural Municipality face significant challenges due to limited access to accurate, timely, and locally relevant agricultural information. Informal sources such as neighbors, agro-vets, and radio broadcasts are widely used because they are accessible and immediate. However, the information they provide is often outdated, generalized, or incomplete. On the other hand, formal agricultural extension services—which are more credible and research-based—are underutilized due to sporadic visits, resource limitations, and a lack of location-specific guidance. This information gap directly impacts farmers' ability to make well-informed decisions related to crop selection, pest and disease management, soil health, and market strategies, thereby affecting productivity and income.

Bridging this gap requires an integrated approach that combines the strengths of both formal and informal information channels. Community demonstration plots, peer mentorship, and digital tools such as mobile alerts in local dialects can effectively bring practical, real-time knowledge to farmers. Strengthening local extension networks, providing digital literacy training, and activating farmer cooperatives as platforms for continuous knowledge exchange will further support this initiative. Collaborative efforts from local governments, NGOs, cooperatives, and tech providers are crucial. By addressing these challenges, smallholder farmers in Aathrai can improve their agricultural outcomes and contribute to sustainable rural development in Nepal's mid-hill regions.

To improve access to reliable agricultural information, local governments and NGOs should strengthen and expand extension services across all wards. Community radio, mobile alerts in local dialects, and hands-on training in digital tools can help disseminate timely updates. Demonstration plots and peer mentorship should be promoted to encourage practical, farmer-to-farmer learning. Furthermore, farmer cooperatives and regular community forums should be activated as hubs for collaboration and continuous knowledge exchange. These integrated efforts will empower farmers, boost productivity, and promote sustainable agriculture in the mid-hills.

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