SOLUTIONS TO PROMOTE FARMERS' ACCESS TO INFORMATION IN THE BUSINESS PROCESS IN THE NORTHERN MIDLAND AND MOUNTAINOU AREAS, VIETNAM

Nguyen Ngoc Quynh[1*], Nguyen Thi Hong[2]
[1]*TNU - International Cooperation Center*
[2]*Phenikaa School of Economics and Business - Phenikaa University*

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ABSTRACT

This study examines the state of information access in post-production (business) period among farmers in the Northern midland and mountainous region of Vietnam, identifies key barriers, and proposes solutions to improve the effective use of agricultural information. Using descriptive statistical methods, the findings show that farmers primarily access practical information such as prices, markets, and production techniques, while more advanced topics such as e-commerce, risk management, and international standards remain limited. Information access still relies heavily on traditional channels, while modern platforms are not effectively utilized due to limited skills and infrastructure. Based on these findings, the study proposes four solution groups: enhancing information literacy, improving technological infrastructure, establishing intermediary support networks, and developing user-friendly agricultural information systems. These efforts aim to modernize the agricultural information environment and support sustainable development in the Northern midland and mountainous region.

GIẢI PHÁP THÚC ĐẨY NÔNG DÂN TIẾP CẬN THÔNG TIN TRONG QUÁ TRÌNH KINH DOANH TẠI VÙNG TRUNG DU VÀ MIỀN NÚI PHÍA BẮC, VIỆT NAM

Nguyễn Ngọc Quỳnh[1*], Nguyễn Thị Hồng[2]
[1]*Trung tâm Hợp tác Quốc tế - ĐH Thái Nguyên*
[2]*Trường Kinh tế - ĐH Phenikaa*

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TÓM TẮT

Nghiên cứu này nhằm đánh giá thực trạng tiếp cận thông tin sau sản xuất (kinh doanh) của nông dân vùng trung du và miền núi phía Bắc Việt Nam, xác định các rào cản và đề xuất giải pháp cải thiện hiệu quả sử dụng thông tin trong hoạt động kinh doanh nông sản. Áp dụng phương pháp thống kê mô tả, kết quả cho thấy nông dân chủ yếu tiếp cận các thông tin thực tiễn như giá cả, thị trường và kỹ thuật, trong khi các nội dung chuyên sâu như thương mại điện tử, rủi ro và tiêu chuẩn quốc tế còn hạn chế. Việc tiếp cận thông tin hiện vẫn phụ thuộc vào các kênh truyền thống, trong khi các nền tảng hiện đại chưa được khai thác hiệu quả do thiếu kỹ năng và hạ tầng. Từ đó, nghiên cứu đề xuất bốn nhóm giải pháp: nâng cao kỹ năng thông tin, cải thiện hạ tầng công nghệ, xây dựng mạng lưới trung gian hỗ trợ và phát triển hệ thống thông tin nông nghiệp thân thiện, dễ sử dụng. Các giải pháp này sẽ góp phần hiện đại hóa hệ sinh thái thông tin và thúc đẩy phát triển nông nghiệp bền vững tại vùng trung du và miền núi phía Bắc.

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[*] Corresponding author. *Email: quynh20011997@gmail.com*

1. Introduction

In the context of deep economic integration and the accelerating digital transformation of agriculture, the agricultural value chain no longer ends at the production stage. It now extends to post-production activities such as preservation, processing, storage, distribution, marketing, and consumption. For farmers, access to information related to these business activities is vital for enhancing product value, optimizing profits, and expanding market opportunities [1].

However, in reality, farmers in the Northern midland and mountainous region of Vietnam continue to face significant challenges in accessing information that supports post-production and business operations [2]. Numerous studies have confirmed that the lack of post-production information, including preservation techniques, market standards, storage and transportation methods, risk management, and especially e-commerce, can have a direct impact on business efficiency, competitiveness, and the capacity to engage in modern supply chains [3]-[5]. Furthermore, in the face of climate change and increasingly stringent market requirements, access to such information not only helps reduce post-harvest losses but also strengthens the ability to meet international standards and promote sustainable agricultural development [6].

In modern agricultural value chains, post-production information plays a central role in enhancing the quality, value, and marketability of agricultural products. In practice, to meet increasingly stringent market demands and improve income, farmers must be equipped with a comprehensive information system related to post-production business activities.

Firstly, information on preservation and processing techniques helps extend product shelf life, minimize post-harvest losses, and improve overall quality, thereby laying the groundwork for accessing high-standard markets [1]. Secondly, information on market requirements and quality standards enables farmers to understand and comply with protocols such as VietGAP and GlobalGAP, which helps enhance competitiveness and expand export opportunities [7].

In addition, information on storage and transportation plays a key role in optimizing logistics, maintaining product freshness, and reducing distribution costs [8]. Information on value addition, such as packaging, labeling, and branding, supports product differentiation, increases economic value, and facilitates access to premium market segments [9].

Equally important is information on post-production risk management, which enables farmers to cope with losses and respond to unfavorable market fluctuations, thereby safeguarding both yield and profitability [4]. Information regarding conformity and quality certification helps ensure legal compliance and builds consumer trust in both domestic and international markets. Environmental information related to processing activities also promotes sustainable production practices aligned with modern consumption and export trends [10].

Furthermore, information on pricing and market trends allows producers to adjust their production plans, align with market demands, and optimize profitability [11]. Access to distribution network information helps identify appropriate sales channels, improve market accessibility, and reduce transportation burdens [12].

Marketing and promotional strategy information contributes to enhancing product visibility, strengthening farmers' negotiation capacity, and attracting customers [9]. In the context of globalization, information on international markets and export procedures is essential for farmers to access high-value markets and increase competitiveness [13]. Similarly, information on production linkages fosters collaboration between farmers, cooperatives, and enterprises, leading to improved operational efficiency and risk reduction [3]. Finally, information on consumer trends and e-commerce allows farmers to adapt to changing preferences and take advantage of digital platforms for more efficient and broader customer engagement [5].

In light of these challenges and demands, this study was conducted with the objectives as follows:

- To analyze the current situation of farmers' access information in post-production (business) period in the Northern midland and mountainous region of Vietnam.

- To identify the limitations and barriers in accessing such information.
- To propose specific and practical solutions for improving the effectiveness of information access for farmers.

2. Methodology

This study was conducted in two provinces including Thai Nguyen (covering Thai Nguyen and Bac Kan according to the planning prior to July 01, 2025) and Cao Bang, which represent the Northern midland and mountainous region of Vietnam. Due to the unavailability of a complete sampling frame for the farming population in these areas, the study employed a non-probability sampling method, specifically purposive sampling.

Data were collected from May to July 2024 through direct, face-to-face interviews using structured questionnaires. In geographically remote areas, questionnaires were distributed with the assistance of local agricultural extension officers. All enumerators received prior training to ensure consistent data collection. In addition to structured questions, a small number of open-ended items were included to capture qualitative insights. A total of 526 farmers were surveyed across the two provinces.

We measure choosing information or channel through binary question. Additionally, the study examined various information channels, categorized into: (i) official channels (such as governmental agencies and scientific organizations), (ii) unofficial channels (such as traders and acquaintances), (iii) traditional media (such as newspapers, radio, and television), and (iv) modern platforms (such as the Internet, social media, and digital applications). These questionnaire are measured through five-point Likert scale (from 1 – strongly disagree to 5 – strongly agree).

All data were processed using SPSS software. The study applied basic descriptive statistical techniques, including frequency counts, percentages, and cross-tabulations.

3. Results and Discussion

3.1. Farmers access information

The status of farmers' access information to post-production period is presented in Table 1. The results indicate that farmers tend to prioritize practical types of information that directly support value enhancement and market adaptation. Information on pricing and market trends ranks first at 100%, underscoring the critical role of price in shaping production and marketing decisions. Access to this type of information enables farmers to proactively adjust their business activities and reduce price-related risks.

Table 1. *The status of farmers' demand for access to post-production information*

Type of information	The number of people	%
Preservation and processing techniques	229	43.54
Market standards and requirements	385	73.19
Information on product storage and transportation	325	61.79
Information on value addition	470	89.35
Post-harvest risk management information	80	15.21
Information on standardization and quality certification	226	42.97
Information on environmental protection in processing and storage	17	3.23
Price and market trend information	526	100.00
Distribution network information	383	72.81
Information on marketing and promotion strategies	206	39.16
Information on international markets and export	53	10.08
Information on cooperation and production linkages	111	21.10
Consumer trend information	256	48.67
Information on e-commerce channels	279	53.04

(Source: Data from interview)

Next is information on value addition, accounting for 89.35%, which reflects a shift in farmers' business mindset from raw production toward processing, packaging, and branding. Market standards and requirements also receive significant attention, with 73.19%, suggesting a trend toward greater professionalism and integration into export markets. Distribution networks (72.8%) and storage and transportation (61.79%) are also prioritized, indicating concern with supply chain efficiency and market access. Interest in e-commerce (53.04%) and consumer trends (48.67%) is growing, showing that digital transformation in agriculture is taking place.

Some other areas such as quality certification (42.97%) and marketing and promotion (39.16%), while important, are not yet given adequate priority. This may reflect limited awareness or access to support services. Notably, the demand for post-harvest risk management (15.21%) and production linkages (21.10%) remains low, indicating that cooperation and risk mitigation are not yet key concerns for most farmers. In particular, information related to international markets (10.08%) and environmental protection in processing and storage (3.23%) receives very limited attention. This highlights existing barriers to global market integration and a lack of awareness regarding sustainable development.

According to the survey results presented in Appendix 1, farmers access post-production information through a variety of channels, including official, unofficial, traditional, and modern sources. Among these, agricultural extension officers are the most commonly used official channel, particularly for technical information such as preservation and processing (435 people) and market standards (364 people). However, for value additional information, the level of support from extension officers remains limited (156 people), indicating a narrow scope of assistance.

Agricultural cooperatives serve as organized information hubs, especially for value addition (360 people) and market standards (302 people), but are less frequently used for specialized topics such as preservation techniques (124 people) or risk management (22 people). Informal channels such as farmer groups, friends, and relatives play an influential role due to their familiarity and accessibility. In particular, farmer groups are widely accessed for value addition (408 people) and preservation techniques (164 people). Nevertheless, these channels tend to lack reliability and technical accuracy.

Traditional media such as radio (36 people) and television (10 people) are still present, but their effectiveness is limited as they mainly provide general information with little depth or interactivity. Modern channels such as the Internet and social media show potential for delivering rapid and diverse information. The Internet accounts for 171 people for value addition, while social media registers 219 people for preservation techniques. However, usage remains low due to digital skill limitations and infrastructure barriers.

Conversely, specialized channels such as research institutes, universities, and scientists are rarely accessed by farmers, reflecting a weak connection between academic research and practical production. Lastly, oral communication and community meetings remain prevalent in rural areas (with hundreds of people), offering high community engagement but limited accuracy and systematization.

Data from Figure 1 indicates that farmers highly value information from agricultural extension officers, particularly during the pre-production phase (4.6 points) and the production phase (4.4 points). However, the score decreases slightly in the post-production phase (4.2 points), reflecting limitations in supporting market information, product distribution, and brand development. Successful farmers are also trusted due to their practical experience, receiving high ratings across all three phases with 4.7, 4.5, and 4.4 points respectively. Similarly, agricultural business personnel serve as useful sources of information on inputs and techniques, with strong evaluations in pre-production (4.5 points) and production (4.6 points).

Specialized channels such as research institutes and scientists were rated highly for technical expertise, especially in the early stages. Meanwhile, informal channels like agricultural markets and buyers received the highest ratings in the post-production phase due to their practical

relevance and easy access. Social media and the Internet are being used more frequently, especially in the pre-production and post-production phases. However, their moderate scores between 3.8 and 4.2 reveal existing barriers in digital skills and infrastructure. Mobile applications and SMS received the lowest score at 1.9, clearly reflecting challenges in technological access. Traditional media such as television, radio, and community meetings continue to play an important role due to their popularity and ease of use, with scores ranging from 3.9 to 4.6.

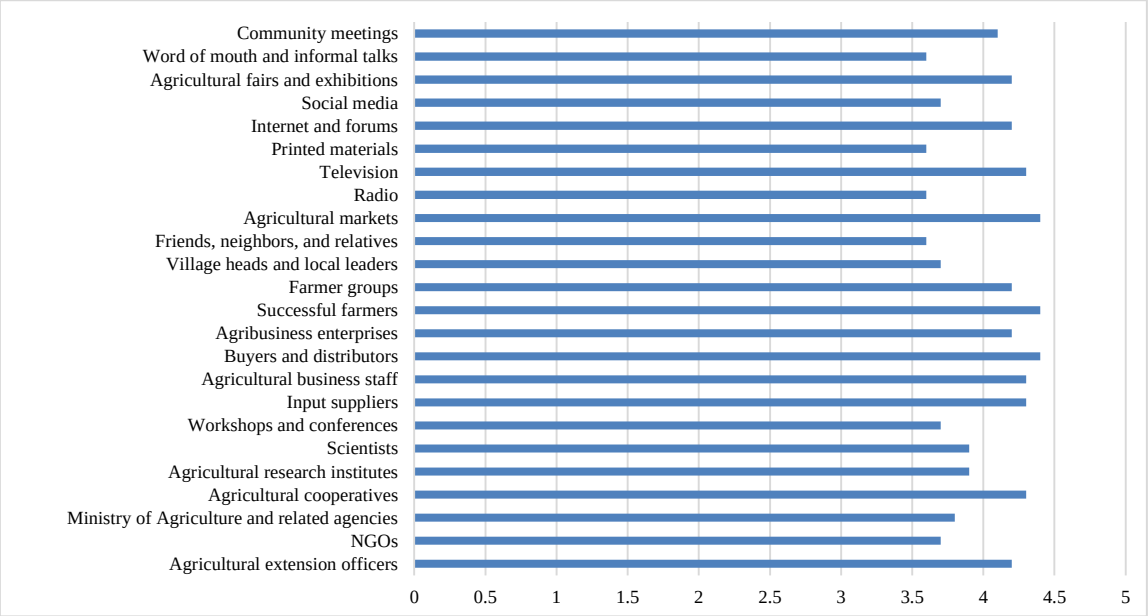

Figure 1. *Farmers' evaluation of the quality of information channels (1: very poor, 5: very good) (Source: Data from interview)*

The data shows that farmers currently prioritize access to information that is closely linked to practical production and business activities, especially information on prices, markets, farming techniques, and product distribution. In contrast, categories such as management, international markets, and environmental protection, while strategically important, have not yet received adequate attention. This indicates a limitation in long-term vision and the need for appropriate support policies to improve access to such information in the future.

Regarding information channels, farmers primarily rely on traditional sources such as extension officers, acquaintances, cooperatives, and social networks. Modern platforms like the Internet and mobile applications, as well as specialized sources such as research institutions and scientists, remain underutilized. This situation reflects an imbalance in the information ecosystem and highlights barriers related to technological capacity, infrastructure, and digital skills.

Nevertheless, there is an observable trend among farmers to combine formal, informal, and media-based channels in a flexible manner. This suggests that in order to enhance effectiveness, it is necessary to improve access to modern information channels and strengthen knowledge transfer from specialized sources. Such efforts would contribute significantly to modernizing the post-production agricultural information system.

3.2. Solutions to enhance farmers' access information in post-production period

Based on the identified challenges, the study recommends the following concise solutions to enhance farmers' access information in post-production period:

First, local authorities should organize short-term training sessions at the commune and village levels, particularly in remote areas and ethnic minority communities. These sessions aim to equip farmers with skills in using smartphones, searching for agricultural information,

evaluating source reliability, and applying digital tools. The training should combine theory with practice, using bilingual and simplified materials. In addition, local authorities should encourage the establishment of 'Farmer Information Clubs' led by extension officers and experienced farmers, enabling practical peer-to-peer learning within the community.

Second, infrastructure should be improved by expanding Internet coverage in rural and disadvantaged areas, installing signal towers and fiber-optic networks, and supporting low-income households in accessing affordable devices. Local governments should establish free information access points at community centers, equipped with internet-connected computers and technical staff. In addition, smart agricultural kiosks should be set up at commune centers to provide technical guidance, legal support, and market linkages.

Third, local authorities should develop an intermediary support network by training agricultural extension agents and local collaborators in both technical expertise and communication skills. They should also collaborate with enterprises, banks, and research institutions to establish local advisory hubs that provide information, credit, insurance, and digital services. In addition, they should identify and empower capable farmers to serve as peer communicators and practical knowledge sharers.

Finally, policymakers should enhance the agricultural information system by designing user-friendly, multilingual digital platforms with visual aids and relevant content such as pricing, techniques, support policies, and market data. These platforms should be regularly updated, content should be verified, and user feedback and experience surveys should be incorporated. Provinces should also issue evaluation criteria for agricultural applications to ensure usability, effectiveness, and scalability

4. Conclusion

In the context of agricultural digital transformation and global integration, access information in post-production period plays a pivotal role in enhancing product value and farmers' competitiveness. The study reveals that farmers in the Northern midland and mountainous region prioritize practical information such as pricing, markets, and production techniques. However, access remains limited for specialized topics such as e-commerce, risk management, and international standards. Information access still relies heavily on traditional channels, while modern and specialized platforms remain underutilized due to barriers in skills, infrastructure, and resources.

In response, the study proposes four groups of solutions: improving information access skills, upgrading digital infrastructure and devices, developing intermediary support networks, and enhancing the agricultural information system toward user-friendly and accessible platforms. The integrated implementation of these solutions will help bridge the digital divide, promote the use of information in agricultural production and business, and gradually modernize agriculture in the Northern midland and mountainous region toward sustainability and global integration.

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APPENDIX

Appendix 1. *The situation of farmers' selection of post-production information access channels*

Channels \ Types of information	Preservation and Processing Techniques	Market Standards and Requirements	Information on Product Storage and Transportation	Information on Value Addition	Post-Harvest Risk Management Information	Information on Standardization and Quality Certification	Information on Environmental Protection in Processing and Storage
Agricultural extension officers	435	364	185	156	76	215	15
NGOs	0	0	0	0	0	2	0
Ministry of Agriculture and related agencies	15	141	10	20	0	215	10
Agricultural cooperatives	124	302	171	360	22	215	15
Agricultural research institutes	21	1	16	0	0	28	1
Scientists	1	1	0	0	0	1	0
Universities and vocational schools	0	0	0	0	0	0	0
Workshops and conferences	165	93	0	0	0	15	0
Input suppliers	4	39	7	90	0	1	0
Agricultural business staff	3	14	5	75	0	1	0
Buyers and distributors	10	84	259	172	0	1	0
Agribusiness enterprises	5	14	93	19	0	172	0
Successful farmers	45	53	27	43	19	41	1
Farmer groups	164	303	279	408	69	119	1
Village heads and local leaders	52	141	32	30	10	171	2
Friends, neighbors, and relatives	215	163	171	393	76	116	7
Agricultural markets	10	126	141	304	36	8	0
Radio	36	5	13	25	1	42	1
Television	10	26	14	40	16	45	1
Printed materials	4	0	0	0	0	0	0
Mobile applications and SMS	0	0	0	0	0	0	0
Internet and forums	132	102	46	171	42	10	5
Social media	219	159	40	60	23	5	5
Agricultural fairs and exhibitions	1	12	1	2	0	0	0
Word of mouth and informal talks	167	148	136	347	5	94	3
Community meetings	218	91	47	305	24	129	13

Channels \ Type of information	Price and Market Trend Information	Distribution Network Information	Information on Marketing and Promotion Strategies	Information on International Markets and Export	Information on Cooperation and Production Linkages	Consumer Trend Information	Information on E-commerce Channels
Agricultural extension officers	277	393	40	10	123	136	180
NGOs	0	0	0	0	0	0	0
Ministry of Agriculture and related agencies	24	9	0	0	0	0	50
Agricultural cooperatives	405	393	96	5	123	104	84
Agricultural research institutes	0	0	0	0	0	0	0
Scientists	0	0	0	0	0	0	0
Universities and vocational schools	0	0	0	0	0	0	0
Workshops and conferences	4	0	0	36	9	0	184
Input suppliers	311	157	0	0	2	58	14
Agricultural business staff	136	102	37	1	7	39	93
Buyers and distributors	439	93	45	8	45	263	145
Agribusiness enterprises	108	279	50	24	26	96	40
Successful farmers	72	41	16	0	18	10	45
Farmer groups	367	136	52	2	123	236	227
Village heads and local leaders	45	38	5	3	41	40	17
Friends, neighbors, and relatives	368	223	171	32	115	209	272
Agricultural markets	526	294	96	0	32	263	173
Radio	42	21	5	0	0	11	15
Television	10	6	1	14	0	39	36
Printed materials	0	0	0	0	0	0	0
Mobile applications and SMS	0	0	0	0	0	0	0
Internet and forums	136	41	91	10	0	259	180
Social media	300	38	136	13	0	235	216
Agricultural fairs and exhibitions	5	3	7	1	0	2	3
Word of mouth and informal talks	408	136	146	0	88	187	250
Community meetings	93	223	83	0	71	171	263

(Source: Data from interview)