

Promoting adoption of
circular economy in
agriculture for sustainable
development in northern
mountainous region of
Vietnam

CBA2024-05MY-Ho Van

2026



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1. Summary

The project addressed the need to promote more sustainable, resource-efficient, and environmentally friendly agricultural production systems in the northern mountainous region of Vietnam. The project recognized that smaller farmers, local government officials, agricultural extension workers, young researchers, and university students play important roles in the transition toward circular agriculture, but their knowledge and practical capacity in applying circular economy (CE) principles remain limited. Thus, the project aimed to promote the adoption circular agriculture practices, strengthen stakeholder capacity and contribute to sustainable agricultural development in the region.

To achieve the objective, the project implemented a combination of capacity building, field demonstrations, field visit, scientific research, knowledge dissemination and university education. Training activities were organized for commune-level government officials, agricultural extension workers, farmers and university students to improve their understanding of the principles and practical applications of circular economy in agriculture. These activities helped connect theoretical knowledge with practical solutions appropriate to local agricultural conditions.

A major achievement of the project was the establishment of eight (8) demonstration models for field-based training and knowledge dissemination. The models covered several practical circular agriculture practices, including biological bedding in livestock production, organic composting, vermicomposting, vegetable production using organic compost, beekeeping. These demonstration sites provided opportunities for farmers and other stakeholders to directly observe, practice, and discuss circular agricultural approaches and their potential application in local production systems. The project also generated important scientific and knowledge outputs. These included two articles published in peer-reviewed international journals, three articles published in peer-reviewed domestic journals and one published reference book. These outputs contributed to disseminating knowledge and research findings on circular agriculture beyond the immediate project implementation sites. An important institutional achievement was the successful integration of circular economy content into one formal undergraduate course at Thai Nguyen University of Agriculture and Forestry (TUAF). This outcome provides a mechanism for maintaining and expanding knowledge on circular agriculture among university students and future agricultural professionals beyond the project period.

Overall, the project strengthened knowledge and practical capacity among farmers, local officials, extension workers, young researchers, and university students. The combination of training, demonstration models, research outputs, and curriculum integration established a foundation for the continued adoption and wider dissemination of circular agricultural practices. The project experience and outputs provide useful lessons for sustainable agricultural development in mountainous areas and can support future research, capacity building, stakeholder collaboration and scaling-up of circular economy approaches in other rural areas of Vietnam.

2. Objectives

This project aims to promote the adoption of circular agriculture practices in the northern mountainous region of Vietnam by improving capacity of involved stakeholders through circular economy initiatives and low carbon farming practices for multiple purposes of pollution control, reduced GHG emission, reuse of agriculture waste in crop production, improved human health, production efficiency and profit margins. The stakeholders include small farmers, extension workers, government officials, young researchers, and university students.

The overarching goal of this project was achieved by pursuing the following specific objectives:

1. To increase small farmer's awareness and knowledge of circular agriculture practices and promote the adoption at their agricultural production systems.
2. To increase the capacity for government officials and extension workers on the effective design and implementation of circular agriculture practices, ensuring alignment with local specific contexts.
3. To enhance the capacity of young researchers and university students on circular agriculture and eco-friendly production practices.

3. Outputs, Outcomes and Impacts

Outputs	Outcomes	Impacts
40 small farmers attended the training on CE principles and circular agriculture; 269 farmers joined in baseline survey on current situation and need assessment on CE; 45 farmers participated in a planning meeting to select key farmers and prepare for piloting activities; 70 farmers participated the capacity-building training on livestock and poultry health management, disease prevention and treatment; 10 key farmers were trained and supported demo plot models (manure treatment, composting, worm raising, vegetable production, and beekeeping).	Outcome 1: Small farmers increased their awareness and knowledge of circular agriculture and improved their adoption of circular practices in their production systems.	The project significantly contributed to strengthening the foundation for sustainable, resource-efficient, and circular agriculture in the northern mountainous region of Vietnam. The project contributed to this impact through three interconnected areas of intervention. First, smallholder farmers increased their awareness and knowledge of circular agriculture and gained practical experience in applying circular practices through demonstration models, including manure treatment, composting, vermicomposting, vegetable production and beekeeping. These activities provided practical evidence and locally relevant experiences for promoting the adoption of circular agriculture at the farm level. Second, the project strengthened the
- A plan meeting with local officials and extension workers was organized to discuss pilot and scale-up activities; - A field visit with participation of local officials and extension workers was conducted to share experience on applying CE principles; - A consultation workshop with participation of stakeholders was conducted to share project results and to discuss issues related to CE application in specific context;	Outcome 2: Local government officials and extension workers improved their capacity to design and implement circular agriculture practices in accordance with local contexts, supporting future dissemination and replication in other areas	

• 30 lecturers and young researchers of TUAF attended a training workshop on assessment framework and indicators on CE; • 20 young researchers, lecturers and students were trained on statistical tools, econometric models, and data analysis skills in STATA; • Two (2) teams of young researchers and students conducted two small grants and co-research works on CE; 01 papers published in an internal conference, and 01 paper submitted to peer-reviewed journal for review; • A seminar with participation of young researchers and students was conducted to share findings from co-research works and small grants; • A detailed circular economy syllabus was developed and approved for teaching at undergraduate level at the Faculty of Economics and Rural Development of TUAF; • Young researchers and students participated in other activities of the project for improving their research and technical skills.	Outcome 3: Young researchers and university students increased their capacity in circular agriculture, research, and technical skills, contributing to the development of education and research on circular agriculture at TUAF	capacity and engagement of local government official and extension workers through planning meetings, field visits, and stakeholder consultations. This helped create enabling conditions for the dissemination, adaptation, and potential replication of circular agriculture practices in accordance with local contexts. Third, the project strengthened the capacity of lecturer, young researchers, and students at TUAF through training, co-research, small grants, seminars, and development of a circular economy syllabus. These activities contributed to building a longer-term foundation for research, education, and human resource development related to circular agriculture.
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4. Key facts/figures

- 55 farmers participated in a kick-off workshop of the project;
- 40 farmers were trained on CE principles and circular agriculture initiatives;
- 45 farmers participated in a planning meeting to select key farmers and prepare for piloting activities;
- 13 key farmers were trained and were financially supported by demo plot models (manure treatment, composting, worm raising, vegetable production, and beekeeping);
- 70 farmers were trained the capacity-building training on livestock and poultry health management, disease prevention and treatment;
- 20 local authorities were introduced about CE principles and circular agriculture initiatives;
- 01 field visit was organized to share experience, lessons in applying CE in agriculture;
- 01 consultation workshop with local authorities was organized;
- 01 workshop to scale up circular agriculture;
- 05 research papers were published;
- 01 proceeding at the national conference of Vietnam;
- 01 reference book was published;
- 01 student seminar;
- 02 student theses were generated from the project;
- 01 syllabus on Circular economy was developed and approved for teaching at undergraduate level from 2026

5. Publications

1. Hien, V.T., **Bac, H.V.** & Xinh, H.L. (2026). Factors influencing the adoption of circular economy models in agriculture: A systematic review. *Journal of Industry and Trade*, 15: 70-75; <https://tapchicongthuong.vn/cac-yeu-to-tac-dong-toi-viec-ap-dung-mo-hinh-kinh-te-tuan-hoan-trong-nong-nghiep--mot-danh-gia-he-thong-tong-quan-559548.htm>
2. **Bac, H.V.**, Hien, V.T. & Xinh, H.L. (2026). Determinants of home composting behaviour in supporting sustainable agriculture among smallholder farmers: A case study in Thai Nguyen province of Vietnam. *Journal of Environmental Science and Sustainable Development*, 9(1): 247-262; <https://scholarhub.ui.ac.id/jessd/vol9/iss1/12/>
3. **Bac, H.V.**, Xinh, H.L. & Hien, V.T. (2026). Determinants of Readiness to Adopt Circular Economy Model in Agriculture: Empirical Evidence from Thai Nguyen province, Vietnam. *Research on World Agricultural Economy* (**Accepted** for publication in 2026).
4. **Bac, H.V.** (2026). Effectiveness of the circular economy training program: Evidence from Thai Nguyen and Tuyen Quang province. *Journal of Economics and Business Administration*, 38: 1-5. <https://tapchi.tueba.edu.vn/wp-content/uploads/2026/09/Ho-Van-Bac-3.pdf>
5. Xinh, H.L., **Bac, H.V.**, Nhung, N.T.H., Thuong, N.T.H. & Trang, T.M. (2026). Perceptions of the green economy model in rural tourism development: A case study in Tan Cuong commune of Thai Nguyen province. *Asia-Pacific Journal*, 2: 1-5;

<https://tapchiktcatbd.vn/magazines/so-2-thang-9-tieng-viet-tieng-anh/show>

6. Xinh, H.L., Nhi, L.T.N., & Bac, H.V. (2026). Raising awareness of the circular economy: A solution to promote rural tourism associated with the tea-growing region in Tan Cuong commune, Thai Nguyen province. *Proceedings of the National Scientific Conference: Restructuring Vietnam's Agriculture and Rural Development Toward Sustainability: Opportunities, Challenges, and Solutions*, Hanoi, May 30, 2026.

6. Media reports, videos and other digital content

- A project kick-off/ introduction
- A training session on CE principles and circular agriculture initiatives
- Baseline survey on waste management and treatment method
- Training session on different topics
- Establish demo-plots for training and sharing
- A session on sharing in application of circular agriculture and field visit



Project leader (Dr. Bac Ho Van) A project kick-off workshop



Project staff (Dr. Hien Vu Thi) provided a training session on CE principles (left)

Mr. Nong Van Toan, a leader of Trang Xa people committee, delivered his remarks (right)



Baseline survey_ Project leader/ and project staffs are interviewing farmers



Dr. Hien Vu Thi –Project staff in the baseline survey_ Field observation





Trainers provided a training session on 04 topics





A key farmer (Ms. Nguyen Thi Thu Phuong) is sharing her knowledge and experience from application of circular economy (CE) and field visit



Dr. Vu Thi Hien - Young researcher/representative of small research groups shared her study on CE!





Consultation meeting with local government officials on CE issues



Training session for farmers and extension staffs on animal health management (Dr. Nguyen Thi Bich Dao – A consultant from Thai Nguyen University of Agriculture and Forestry)

7. Pull quotes

"The project has practical significance to local residents. We hope the project will continue to be expanded to other villages in Minh Son commune, so that local farmers can learn and improve their livelihood."

Mr. Trieu Van Khang

Vice Chairman of the Minh Son People Committee

"Although my home garden is not large, through participating in the Circular agriculture model trial from the project, I have witnessed many positive changes. The chemical fertilizer amount used in my garden has significantly reduced manual. Especially, vegetable production using compost has enabled us to use it more safety."

Mr. Hoang Van Le

A farmer participating in the project

“The field-based training approach, using on-site demonstration models, was very useful. It enabled participating farmers to observe the practices directly and learn more easily compare with training conducted solely through classroom-based materials.”

Mr. Hoang Tien Dien

Extension worker of Trang Xa commue

8. Acknowledgements

We extend our heartfelt gratitude to the Asia-Pacific Network for Global Change Research (APN) for generously funding this project. We also wish to express our sincere appreciation to Mr. Duong Van Toan, Vice chairman of Vo Nhai district; Mr. Hoang Tien Dien, extension staff of Trang Xa commune, Vo Nhai distric; Mr. Ly Vinh Hai, Vice Chairman of Bac Me district; Mr. Nguyen Duc Thuy, Head of Department of Agriculture and Rural Development of Bac Me district; Mr. Trieu Van Khang, Vice Chairman of Minh Son Commune of Bac Me district; Dr. Nguyen Thi Bich Dao, lecturer from Faculty of Animal Science and Veterinary Medicine, TUAf. Special thanks are extended to the researchers, government officials, and leaders of departments who directly and indirectly contributed to this project by generously offering their time, expertise, experiences, and datasets. Their active participation in workshops has been invaluable to the success of this endeavor.

9. Appendices

- APPENDIX 1. TRAININGS & WORKSHOPS
- APPENDIX 2: JOURNAL ARTICLES
- APPENDIX 3: THESIS ABSTRACTS

APPENDIX 1. TRAININGS AND WORKSHOPS

Kick-off project workshop and training course on principles of circular economy in agricultural production

I. Introduction

The Kick-off Project Workshop and Training Course on Principles of Circular Economy in Agricultural Production was organized as an initial activity of the project *“Promoting Adoption of Circular Economy in Agriculture for Sustainable Development in Northern Mountainous Region of Vietnam.”* The event aimed to introduce the project objectives, expected activities, and implementation approach, while providing participants with fundamental knowledge of circular economy principles and their application in agricultural production.

The training focused on the transition from conventional linear agricultural production, which often involves the intensive use of external inputs and generates considerable waste, toward more circular and resource-efficient farming systems. Participants were introduced to key concepts such as resource efficiency, waste reduction, reuse and recycling of agricultural by-products, nutrient cycling, and value creation from agricultural residues. Particular attention was given to the potential of circular approaches to reduce production costs, improve resource utilization, enhance environmental sustainability, and support farmers’ livelihoods.

The workshop also provided an opportunity for farmers, local officials, extension workers, researchers, and other stakeholders to exchange experiences and discuss challenges and opportunities for applying circular economy principles in local agricultural systems. Through presentations, discussions, and practical examples, participants were encouraged to identify feasible circular practices that could be adapted to their local farming conditions.

II. Time: 26-27/11/2024

III. Location: Trang Xa commune – Vo Nhai district – Thai Nguyen province

IV. Participants

- Project members and consultant/speaker from Thai Nguyen University of Agriculture and Forestry (TUAF)
- Representative of Department of Agriculture and Rural Development (DARD) of Vo Nhai district of Thai Nguyen province
- Representative of local authority: Nông Văn Toàn – Vice Chairman of Commune people committee

- Extension worker of commune: Mr. Tiến
- Local households: 51 farmers from Dong Hy district of Thai Nguyen and Bac Me district of Ha Giang provinces

V. Objectives

- Introduction to the project (background, objective, main activities, project policies of financial support)
- Introduction to principles of circular economy and sharing circular agriculture practices from other local areas of Vietnam
- Application of circular economy principles in agricultural sectors, especially in the context of local agriculture

VI. Agenda

Day	Time	Content	Person in charge
26 Nov 2024	8:00 – 8:30	Registration	Project member
	8:30 – 8:40	Opening speech	Representative of local authority
	8:40 – 10:30	Introduction to the project	Dr. Ho Van Bac -Project leader
	10:30 – 11:30	Discussion & Question	Dr. Ho Van Bac – Project leader
	13:30 – 15:30	Visit some households and agricultural systems in the area	All participants
27 Nov 2024	8:30 – 11:00 14:00 – 17:00	Training on topic: Principles of circular economy and its application in agriculture	Dr. Vu Thi Hien 7 Dr. Ho Van Bac - Key member of project

A planning meeting with local authorities, key farmers, and extension workers to discuss piloting activities

I. Introduction

The planning meeting was organized to bring together local authorities, key farmers, and agricultural extension workers to discuss and prepare for the implementation of the project's pilot activities. The meeting provided an opportunity to introduce the planned pilot models, clarify the roles and responsibilities of participating stakeholders, and discuss the technical and logistical requirements for implementation.

Particular attention was given to selecting appropriate pilot sites and participating farmers, identifying locally available resources, and ensuring that the proposed circular agricultural practices were suitable for local farming conditions. Participants also discussed potential challenges, implementation arrangements, technical support, and mechanisms for monitoring the progress and results of the pilot activities.

Through open discussions and experience sharing, the meeting helped strengthen coordination among local stakeholders and build a common understanding of the project's objectives and implementation approach. The active participation of local authorities, key farmers, and extension workers was expected to facilitate the effective implementation of the pilot models and support the subsequent dissemination and replication of successful circular agricultural practices in the local community.

II. Objective

To design a detailed plan and scale up activities of circular economy models

III. Time

11th Dec 2024

IV. Venue

Trang Xa commune, Võ Nhai district, Thai Nguyen province

V. Participation

- Local officials of both Trang Xa & Minh Son communes
- Local extension workers of both communes
- Representative of Department of Agriculture and Rural Development of Vo Nhai district, Thai Nguyen province

- Key farmers of both communes who will join in project activities and introduce it to other farmers through village meetings

VI. Agenda

Day	Time	Content	Person in charge
11 th Dec 2024	8:00 – 8:30	Registration	Project member
	8:30 – 8:40	Opening speech	Representative of local authority
	8:40 – 11:00	Orientation speech and facilitating the meeting	Dr. Ho Van Bac -Project leader
	11:00 – 11:30	Discussion & Question	Dr. Ho Van Bac – Project leader Dr. Vu Thi Hien – Project member
	11:30 – 11:35	Closing the meeting	All participants

TRAINING FOR FARMERS
**ON SPECIFIC TOPICS IN CIRCULAR AGRICULTURE (BIOLOGICAL BEDDING, MANURE
TREATMENT, VERMICOMPOST, VEGETABLE PRODUCTION)**

I. Introduction

Agriculture in the northern mountainous region of Vietnam plays an important role in supporting rural livelihoods and local economic development. However, smallholder farmers in the region face various challenges, including limited access to agricultural inputs, increasing production costs, improper management of livestock and crop residues, and environmental pollution. These challenges highlight the need for more sustainable and resource-efficient agricultural production systems. Circular agriculture provides a practical approach by promoting the reuse and recycling of agricultural resources, reducing waste, improving resource efficiency, and creating additional value from agricultural by-products.

Within the framework of the project *“Promoting Adoption of Circular Economy in Agriculture for Sustainable Development in Northern Mountainous Region of Vietnam,”* a series of practical training sessions was organized to introduce farmers and other local stakeholders to appropriate circular agricultural practices. The training focused on four closely related topics: (1) the use of biological bedding in livestock production, (2) organic composting, (3) red worm (earthworm) production, and (4) vegetable production using composted organic fertilizer.

The training was designed to combine basic knowledge with practical, field-based learning. Participants were introduced to the principles, materials, procedures, technical requirements, and potential benefits of each practice. Particular emphasis was placed on the reuse of livestock manure and agricultural residues as valuable resources rather than waste. Through demonstrations and hands-on activities, participants had opportunities to observe production processes and discuss how these practices could be adapted to their own farming conditions.

The training therefore aimed not only to improve participants’ knowledge and technical skills but also to encourage the adoption of integrated circular practices that can contribute to reducing production waste, improving soil and farm environmental quality, and supporting more sustainable livelihoods in the northern mountainous region of Vietnam.

II. Objectives

- Sharing about circular agriculture models
- Guidance on technical measures in agricultural production to adapt to local context

- Support technical knowledge for all specific topics

III. Participants

Total number of participants: 20 people are households in Minh Son and Trang Xa communes

IV. Time and venue

Time and location:

- 14-16/5/2025: Minh Son commune, Bac Me district, Ha Giang province

Time	Topics	Indicator
8:00 – 11:00	Manure treatment	Dr. Nguyen Thi Bich Dao
14:00 – 17:00	Biological bedding in animal raising	Dr. Nguyen Thi Bich Dao
8:00 – 11:00	Compost and vermicompost production	Dr. Nguyen Thi Bich Dao
14:00 – 17.00	Vegetable production using compost	MSc. Nguyen Manh Thang

Time and location:

- 5-7/5/2025: Trang Xa commune, Vo Nhai district, Thai Nguyen province

Time	Topics	Indicator
8:00 – 11:00	Manure treatment	Dr. Nguyen Thi Bich Dao
14:00 – 17:00	Biological bedding in animal raising	Dr. Nguyen Thi Bich Dao
8:00 – 11:00	Compost and vermicompost production	Dr. Nguyen Thi Bich Dao
14:00 – 17.00	Vegetable production using compost	MSc. Nguyen Manh Thang

TRAINING FOR STUDENTS AND YOUNG RESEARCHERS IN USING STATISTICAL TOOLS AND ECONOMETRIC MODELS

I. Introduction

The *“Training for Students and Young Researchers in Using Statistical Tools and Econometrics in Research”* was organized to strengthen the capacity of students and young researchers in applying quantitative methods to academic and research activities. The training focused on providing participants with practical knowledge and skills in data management, statistical analysis, and the application of econometric models using statistical software.

The course introduced key concepts and techniques commonly used in empirical research, including data preparation, descriptive statistics, hypothesis testing, regression analysis, interpretation of econometric results, and the use of statistical software such as STATA. Particular emphasis was placed on hands-on exercises using real or research-related datasets, enabling participants to connect theoretical knowledge with practical research applications. Through the training, participants were expected to improve their ability to independently analyze quantitative data, apply appropriate econometric methods, and interpret research findings. These skills will contribute to strengthening the research capacity of young researchers and students and support evidence-based research on circular agriculture and sustainable agricultural development.

II. Objectives

- Sharing knowledge and skills in using statistical tools and applying econometric models in research
- Students and young researchers have the opportunity to practice skills related to small grants and their theses

III. Participants

Total number of participants: About 20 people are young research staff and students at Thai Nguyen University of Agriculture and Forestry

IV. Time and venue

1. Time: January 20, 2026;

2. Location : At Faculty’s Hall, Thai Nguyen University of Agriculture and Forestry

V. Agenda

Time	Content	Indicator
8.30-8.45	Introduction	
8.45 – 9.30	About quantitative and qualitative analysis tools	Dr. Ho Van Bac
9.30-10.00	About STATA software	Dr. Ho Van Bac
10.00-10.15	Breaks	
10.15-10.30	About Structural Equation Modeling (SEM)	Dr. Vu Thi Hien
10.30-12.00	Practice/Questions and Answers	Dr. Ho Van Bac & Dr. Vu Thi Hien

STUDENT SEMINAR

"Student Research Seminar on Circular Agriculture: Econometric Applications and Research Findings"

I. Introduction

The seminar was organized to provide students with an opportunity to learn from the project's research findings and strengthen their practical research skills. The seminar introduced selected research results related to circular agriculture and demonstrated how econometric models and statistical tools can be applied to analyze real-world agricultural and socio-economic issues. Through presentations and discussions, students were encouraged to connect theoretical knowledge with empirical research, interpret econometric results, and apply quantitative research skills to their own research topics. The seminar also promoted interaction and knowledge exchange between students, young researchers, and project members.

II. Objectives

The seminar aimed to share research findings, demonstrate the practical application of econometric methods, and enhance students' research skills through real-world research examples.

III. Participants

Total number of participants: 80 students of Thai Nguyen University of Agriculture and Forestry

IV. Time and venue

1. Time: to be held on August 12th, 2026

2. Location: At Faculty's hall, Thai Nguyen University of Agriculture and Forestry.

V. Agenda

Time	Work	Present
14:00-14:15	Register	
14:15-14:30	Introduction to the project	Dr. Ho Van Bac – project leader
14:30-15:00	Main findings of small study (student 1)	Ms. Nguyen Thi Ngoc Thu – student of the Faculty of Economics and Rural Development, TUAF
15:00-15:20	Q&A	All participants
15:20-15:50	Main findings of small study (student 2)	Mr. Eng Van Tung - student of the Faculty of Economics and Rural Development, TUAF
15:50-16:10	Q&A	All participants
16:10-16:45	Main findings of young researcher's study	Ms. Vu Thi Hien – Lecturer of Faculty of Economics and Rural Development, TUAF
16:45-17:00	Q&A	All participants
17:00-17:05	Closing seminar	Dr. Ho Van Bac

APPENDIX 2: JOURNAL ARTICLES

Journal article 1 “Factors Influencing The Adoption of Circular Economy Models In Agriculture: A Systematic Review”

Abstract

This study provides a systematic overview of the factors influencing the adoption of the circular economy model in agriculture. The findings indicate that circular economy adoption in agriculture is shaped by five key factors: government policies, technology, production scale, awareness, and financial investment. Among these, policy, awareness, and financial investment are found to be closely interrelated and to exert a particularly strong influence on the capacity to implement circular economy practices in agricultural production. The study highlights the need to promote circular economy adoption in agriculture through financial support, technological investment, and training initiatives aimed at enhancing stakeholders’ awareness and practical application capacity.

Keywords: *Circular economy, influencing factors, agriculture, economic model*

Journal article 2 “Determinants of Home Compost Behavior in Support of Sustainable Agriculture for Smallholder Farmers: A Case Study in Thai Nguyen Province of Vietnam”

Abstract

Home composting represents a practical and sustainable approach that contributes to both organic waste management and enhancement of soil fertility. It is particularly relevant for smallholder farmers in Thai Nguyen province of Vietnam where agricultural livelihoods heavily depend on soil quality and the efficient use of available resources. This study will explore and analyze the determinants that influence participation in home composting among smallholder farmers. To achieve this objective, a mixed-methods approach was used. Data collection involved household surveys to obtain quantitative insights, complemented by focus group discussions that captured farmer’s perceptions, experiences, and challenges. In addition, a logit regression model was employed to identify and measure the factors affecting composting participation in systematic and statistically robust manner. The study revealed that several core elements significantly shape composting adoption. These include gardening practices, farmer’s attitudes toward composting, the role of social diffusion, and the level of composting

knowledge. Among these, composting knowledge and social diffusion stood out as the strongest predictors, highlighting the critical influence of both education and peer or community networks in shaping behavior. Interestingly, general pro-environmental attitudes were not found to have a significant impact, indicating that practical and context-specific motivations are more decisive. The results highlight the potential of targeted educational campaigns, community-led initiatives, and integrating composting into agricultural training programs to increase adoption rates. This research provides valuable insights for policymakers and practitioners aiming to promote sustainable agriculture and circular economy practices in rural areas. This study extends existing behavioral theories by showing that home composting among smallholder farmers is shaped by psychological factors, household resources, and unique rural contextual conditions. This study is among the few studies which have investigated determinants of smallfarmers' compost behavior in developing country contexts.

Keywords: *Home composting; Sustainable agriculture; Smallholder farmers; Logit regression; Vietnam*

Journal article 3 “**Determinants of Readiness for Applying the Circular Economy Model in Agricultural Production: An Empirical Study in Thai Nguyen Province**”

Abstract

Adopting the circular economy (CE) model within the agricultural sector has emerged as a strategic approach to promoting sustainable agricultural development and enhancing resilience to climate change in many countries, including Vietnam. This research seeks to identify the factors influencing readiness to adopt the circular economy model in agricultural production in Thai Nguyen province, by using partial least squares structural equation modeling (PLS-SEM). Data were gathered from face-to-face interviews of 300 farming households in the study area. The results indicated that households' habits, motivation, and support policies have a significant and positive effect on the readiness to adopt the CE model of households. Notably, motivation emerged as the strongest factor significant to the farmers' readiness to adopt the CE model. Among these determinants, motivation is the most influential factor, indicating that households are more willing to implement CE in agricultural practices when they perceive clear economic, environmental, and social benefits of the CE model. In contrast, although households' habits significantly facilitate CE adoption, their

impact is comparatively weaker than those of motivation and policy support. The findings from this study provide policymakers with a comprehensive overview of determinants affecting the adoption of CE in agriculture. To enhance its uptake, solutions should focus on financial support, technology transfer, and market stability, thereby creating stronger incentives for farmers to employ the CE model in agricultural production.

Keywords: *Circular economy, Agriculture, Factors, PLS-SEM; Thai Nguyen province, Vietnam*

Journal article 4 **“Effectiveness of the Circular Economy Training Program: Evidence from Thai Nguyen and Ha Giang Provinces”**

Abstract

In the context of the increasing urgency for sustainable agricultural development, the circular economy is considered an effective approach. This study evaluates the effectiveness of a training program on circular economy practices, focusing on four key topics: organic composting, earthworm farming, vegetable cultivation using organic compost, and biological bedding systems. The study employs a pre-post design with 59 farming households surveyed using semi-structured questionnaires. Data were analyzed using descriptive statistics, the McNemar test for binary variables, and the Wilcoxon signed-rank test for ordinal scales. The results indicate that the training program generated positive and statistically significant impacts on farmers’ knowledge, skills, attitudes, and overall capacity. Novelty of this study lies in its quantitative assessment of circular economy training impacts based on an integrated capacity framework in a mountainous context, thereby providing empirical evidence and policy-relevant insights for agricultural extension and the scaling up of circular economy practices in disadvantaged areas.

Key words: *Circular economy, training effectiveness, farmers, Vietnam*

Journal article 5 **“Perceptions of the Green Economy Model in Rural Tourism Development: A Case Study of Tan Cuong Commune, Thai Nguyen Province”**

Abstract

The green economy has emerged as an inevitable development trend in the context of climate change and the growing demand for sustainable growth. Green economy models in

rural tourism areas contribute to environmental protection, emission reduction, landscape conservation, and the creation of sustainable livelihoods for local residents engaged in tourism activities. Tan Cuong commune, Thai Nguyen province, located approximately 10 km southwest of the provincial center, has been designated by the Thai Nguyen Provincial's People Committee as a key tea-growing area linked to sustainable rural tourism development. This study was conducted through a survey of 200 households participating in rural tourism activities year 2026. The results indicate that local residents involved in tourism have a moderate level of understanding of the green economy model in rural tourism. The study also proposes four solutions to enhance awareness and facilitate the development of green economy models in rural tourism.

Keywords: *Green economy, rural tourism, Tan Cuong commune, Thai Nguyen province*

Journal article 6 **“Enhancing Awareness of the Circular Economy: A Solution for Promoting Rural Tourism Associated with Tea-growing Region in Tan Cuong Commune, Thai Nguyen Province”**

Abstract

This study was conducted using questionnaire survey with a five-point scale involving 200 tea-growing households engaged in rural tourism activities and 100 tourists who had visited the Tan Cuong tea-growing region. The results show that 78.5% of the surveyed households had a certain level of understanding of the circular economy in the development of rural tourism in the Thai Nguyen tea-growing region, while 73% of the tourists were very satisfied with visiting and experiencing tourism models that applied circular economy principles. Based on these findings, the study proposes three solutions to enhance awareness of the circular economy and promote rural tourism associated with the tea-growing region in Tan Cuong Commune, Thai Nguyen Province. These include: (1) strengthening communication, education, and training for local communities and tourists on the application of circular economy principles in rural tourism activities; (2) diversifying rural tourism products and services toward sustainability based on circular economy principles in the Tan Cuong tea-growing region; and (3) strengthening cooperation among stakeholders in developing rural tourism associated with the circular economy, with particular emphasis on the central role of the local community.

Keywords: *Circular economy, rural tourism, Tan Cuong tea-growing region, Thai Nguyen province*

Journal article 7 **“Analysis of Factors Influencing Green Food Consumption Behaviour among Residents in Thai Nguyen City of Vietnam”**

Abstract

This study examines the determinants of green food consumption intention and behavior of residents of Phan Dinh Phung Ward, Thai Nguyen Province, Vietnam, drawing on an extended Theory of Planned Behavior (TPB) framework. Data were collected using a five-point Likert-scale questionnaire. After screening, 228 valid responses were analyzed using Cronbach’s alpha, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) in IBM SPSS AMOS. The measurement and structural models demonstrated acceptable fit. All four antecedents had positive and statistically significant effects on green food purchase intention. Attitude exerted the strongest effect ($\beta = 0.464$, $p < 0.001$), followed by green food knowledge ($\beta = 0.408$, $p < 0.001$), health consciousness ($\beta = 0.307$, $p < 0.001$), and environmental consciousness ($\beta = 0.165$, $p = 0.003$). Purchase intention, in turn, strongly predicted consumption behavior ($\beta = 0.915$, $p < 0.001$), underscoring intention as the proximal mechanism through which consumer cognition and evaluation are translated into behavior. The findings suggest that policies aimed at promoting green food consumption should combine attitude formation, verifiable consumer knowledge, health- and environment-oriented communication, and stronger transparency and credibility of product information.

Keywords: *Green food, consumer behaviour, purchase intention, SEM, Thai Nguyen province*

APPENDIX 3: THESIS ABSTRACTS

Title of thesis 1 **“Factors Affecting Green Food Consumption Behavior of Residents in Phan Dinh Phung Ward, Thai Nguyen Province”**

Student name: **Nguyen Thi Ngoc Thu**

Abstract

The thesis was conducted to examine the factors influencing consumers’ green food consumption behavior and, on this basis, to propose appropriate solutions for promoting green food consumption in the study area. Specifically, the study pursued three main objectives: (1) to systematize the theoretical and practical foundations of green consumption behavior and green food consumption; (2) to analyze the factors affecting green food consumption behavior of residents in Phan Dinh Phung Ward, Thai Nguyen Province; and (3) to propose solutions to promote green food consumption behavior in the study area.

The study focused on reviewing and systematizing relevant theoretical and empirical foundations; describing the characteristics of the study area and survey respondents; identifying and measuring the effects of different factors on consumers’ green food purchase intention and consumption behavior; and proposing relevant solutions based on the empirical findings. The research model was developed based on the Theory of Planned Behavior (TPB) and incorporated four determinants-environmental awareness, health awareness, green food knowledge, and purchasing attitude-as predictors of green food consumption intention, which in turn was hypothesized to influence actual green food consumption behavior. The empirical analysis was based on 228 valid questionnaires, using a five-point Likert scale. The reliability of the measurement scales was assessed using Cronbach’s Alpha, while the data were further analyzed using SPSS and AMOS within the Structural Equation Modeling (SEM) framework.

The findings indicate that the measurement scales satisfied the required reliability and validity criteria, and the measurement model demonstrated an acceptable fit with the survey data. The SEM results revealed that all four determinants had positive effects on consumers’ intention to consume green food. Among these factors, purchasing attitude exerted the strongest effect (standardized coefficient $\beta = 0.464$), followed by green food knowledge ($\beta = 0.408$), health awareness ($\beta = 0.307$), and environmental awareness ($\beta = 0.165$); all relationships were statistically significant. Notably, green food consumption intention had a

strong and positive effect on actual consumption behavior, with a standardized coefficient of $\beta = 0.915$. These findings highlight the important roles of consumers' attitudes and knowledge in shaping their consumption intentions and demonstrate that behavioral intention is a key direct determinant of actual green food consumption behavior.

Based on the empirical findings, the thesis proposes several groups of solutions, including enhancing consumers' awareness and knowledge of green food; fostering positive attitudes toward green food consumption; improving the transparency of information regarding product origin, production processes, and quality standards; expanding reliable distribution channels and green food retail outlets; strengthening communication and awareness-raising activities; and creating favorable conditions for translating consumers' purchase intentions into actual purchasing behavior. The coordinated implementation of these solutions, with the participation of local authorities, businesses, retailers, and consumers, is expected to contribute to the expansion of the green food market, the protection of public health, and the promotion of sustainable consumption practices in the study area.

Title of thesis 2 “A Study on the Green Economy Model Integrated with Rural Tourism at the Thai Hai Ecological Ethnic Stilt House Village Conservation Area, Thai Nguyen Province”

Student name: Eng Van Tung

ABSTRACT

The study focuses on analyzing the current status, assessing the effectiveness, and proposing solutions for the sustainable development of the model. The study was conducted in response to the growing need to harmonize economic growth, environmental protection, cultural preservation, and livelihood improvement for local communities in the context of the increasing importance of green economy and rural tourism development.

The study employed a combination of secondary data review, field surveys, interviews, observation, analytical synthesis, and comparative assessment. The survey covered 30 households living in the Thai Hai Conservation Area and 100 tourists, with the aim of assessing the application of green economy principles, community participation, and tourists' perceptions. The findings indicate that the Thai Hai model has established a relatively strong linkage among ecological conservation, preservation of Tay ethnic cultural identity, and

livelihood development. Specifically, 93.3% of surveyed households rated the model as effective or highly effective, while 96% of tourists considered the tourism environment friendly or very friendly. The green attributes most highly appreciated by tourists included the natural ecological landscape, traditional stilt houses, clean agricultural products, and efforts to reduce plastic waste. Overall tourist satisfaction was also high, with 97% reporting that they were satisfied or very satisfied and 95% expressing an intention or willingness to revisit the destination.

Despite these positive outcomes, the model still faces several limitations, including inadequate infrastructure, relatively small operating scale, limited human resource capacity, insufficient promotional activities, and a lack of diversified tourism products. Accordingly, the thesis proposes several major solution groups, including strengthening environmental protection and efficient resource use; diversifying tourism products; enhancing community capacity; improving management mechanisms and stakeholder linkages; and promoting digital technology applications. Overall, the study concludes that integrating the green economy with rural tourism at Thai Hai represents an appropriate development pathway; however, further improvements are required to ensure a long-term balance among economic efficiency, cultural preservation, and environmental protection.