p-ISSN 2815-648X
p-ISSN 1859-4611
e-ISSN 3030-4717

ĐẠI HỌC TÂY NGUYÊN
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KHOA HỌC TÂY NGUYÊN
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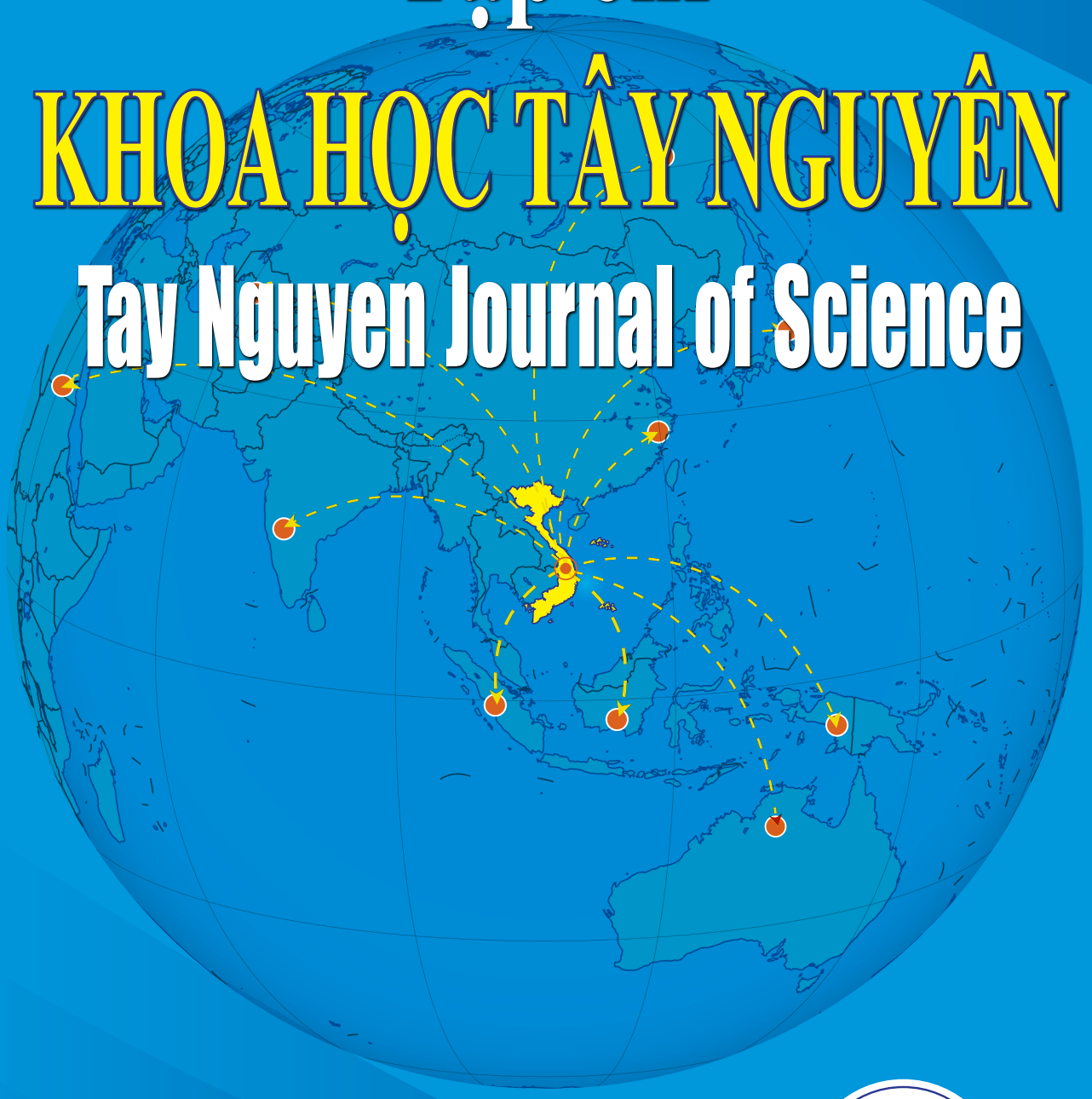

SÁNG TẠO - CHẤT LƯỢNG - HỘI NHẬP

Tập 20
Số 3
Tháng 06-2026

Vol 20 • No 3, June of 2026

TẠP CHÍ KHOA HỌC TÂY NGUYÊN Tập 20 - Số 3, tháng 06/2026 TRƯỜNG ĐẠI HỌC TÂY NGUYÊN

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p-ISSN 1859-4611 & 2815-648X/ e-ISSN 3030-4717

Giấy phép hoạt động báo chí in số 197/GP-BTTTT,
do Bộ trưởng Bộ Thông tin và Truyền thông cấp ngày 06/6/2023

In 50 quyển, khổ 20x29cm. In tại Công ty TNHH một thành viên In Đắk Lắk,
45 Nguyễn Tất Thành, phường Tân An, tỉnh Đắk Lắk.

In xong và nộp lưu chiểu tháng 06 năm 2026.

THỂ LỆ VIẾT BÀI

1. QUY ĐỊNH VỀ VIỆC GỬI BÀI

Bài viết gửi đến Tạp chí Khoa học Tây Nguyên phải đảm bảo chưa từng được công bố hoặc gửi xét duyệt tại bất kỳ tạp chí, hội thảo hay ấn phẩm thông tin nào khác. Tạp chí chấp nhận bài viết bằng hai ngôn ngữ: **tiếng Việt** và **tiếng Anh**, tùy thuộc vào đối tượng nghiên cứu và phạm vi tiếp cận của tác giả. Tác giả cần đảm bảo rằng nội dung bài viết tuân thủ đúng chuẩn mực đạo đức khoa học, không vi phạm các quy định về đạo văn hay sở hữu trí tuệ.

2. YÊU CẦU VỀ NỘI DUNG BÀI VIẾT

Nội dung bài viết cần đảm bảo tính cô đọng và súc tích, nêu bật được những kết quả nghiên cứu chính yếu. Tạp chí chỉ xét duyệt những bài viết có cấu trúc rõ ràng và phù hợp với tiêu chuẩn của từng loại hình bài báo. Tạp chí Khoa học Tây Nguyên đặc biệt hoan nghênh hai loại bài viết chính như sau:

a. Bài báo nghiên cứu (Research Article):

Là bài viết trình bày kết quả chi tiết của một nghiên cứu nguyên gốc, đóng góp vào lĩnh vực khoa học tương ứng. Cấu trúc chính gồm: **Tóm tắt (Abstract):** Giới thiệu ngắn gọn mục tiêu, phương pháp, kết quả và kết luận. **Giới thiệu (Introduction):** Trình bày bối cảnh, tầm quan trọng và mục tiêu nghiên cứu. **Vật liệu và Phương pháp (Materials and Methods):** Mô tả chi tiết vật liệu (dụng cụ, hóa chất, dữ liệu...) và phương pháp thực hiện để đảm bảo người đọc có thể tái hiện lại. **Kết quả và Thảo luận (Results and Discussion):** Trình bày kết quả qua số liệu, biểu đồ và đánh giá ý nghĩa, so sánh với các nghiên cứu trước. **Kết luận (Conclusion):** Tóm tắt kết quả chính và đề xuất hướng nghiên cứu hoặc ứng dụng tiếp theo. **Tài liệu tham khảo (References):** Danh sách tài liệu trích dẫn theo tiêu chuẩn của tạp chí. Bài báo phải minh bạch, đảm bảo tính khoa học và đóng góp giá trị cho cộng đồng học thuật.

b. Bài viết tổng quan (Review Article):

Bài viết tổng quan tập trung vào việc **tổng hợp và đánh giá** các nghiên cứu đã được công bố, đồng thời phản ánh xu hướng nghiên cứu hoặc các vấn đề đang được cộng đồng quan tâm. Tác giả cần trình bày một cách khách quan, có hệ thống và đảm bảo các quan điểm đưa ra được hỗ trợ bởi bằng chứng khoa học rõ ràng. Phần tổng quan nên cung cấp cái nhìn bao quát về chủ đề, chỉ ra những khoảng trống cần được khai thác trong tương lai.

3. YÊU CẦU VỀ ĐỊNH DẠNG BÀI VIẾT

Bài viết cần được trình bày theo đúng quy định về định dạng của tạp chí trên **khổ giấy A4**, tối đa **10 trang**, và tuân thủ các quy cách sau: **Font chữ:** Times New Roman, cỡ chữ 11, giãn dòng đơn. **Lề:** Trên 2 cm, dưới 2 cm, trái 3 cm, phải 2 cm. **Công thức toán học:** Sử dụng **MS Equation** hoặc **MathType** (đặc biệt cho bài thuộc lĩnh vực Toán học và Vật lý). **Hình ảnh và biểu đồ:** Khuyến khích dùng Word Picture để dễ dàng chỉnh sửa. Việc tuân thủ các yêu cầu này giúp đảm bảo sự thống nhất về hình thức và hỗ trợ quá trình biên tập, phản biện được thực hiện nhanh chóng và hiệu quả.

4. THÔNG TIN LIÊN HỆ

Ở cuối bài viết, tác giả hoặc nhóm tác giả cần cung cấp đầy đủ thông tin liên hệ bao gồm: **họ và tên, địa chỉ công tác hoặc nơi làm việc, số điện thoại và email**. Thông tin này giúp tòa soạn và ban biên tập dễ dàng trao đổi, liên hệ trong quá trình phản biện và chỉnh sửa bài viết nếu cần thiết.

5. THÔNG TIN BỔ SUNG VÀ KINH PHÍ PHẢN BIỆN

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TẠP CHÍ KHOA HỌC TÂY NGUYÊN p-ISSN 1859-4611 & 2815-648X/ e-ISSN 3030-4717

p-ISSN 1859-4611 & 2815-648X/ e-ISSN 3030-4717
TẠP CHÍ KHOA HỌC TÂY NGUYÊN

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p-ISSN 1859-4611 & 2815-648X/ e-ISSN 3030-4717
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KHOA HỌC TÂY NGUYÊN

Tay Nguyen Journal of Science

p-ISSN 1859-4611 & 2815-648X/ e-ISSN 2815-6471

Tập 20 - Số 3, tháng 06 năm 2026
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DOES SUSTAINABILITY CERTIFICATION IMPROVE PRODUCTIVITY OR EXPAND PRODUCTION SCALE? EVIDENCE FROM CERTIFIED COFFEE SYSTEMS IN VIETNAM'S CENTRAL HIGHLANDS

Phan Thi Thuy[1], Le Thi Hoang Oanh[2]

Received Date: 06/04/2026; Revised Date: 14/05/2026; Accepted for Publication: 01/06/2026

ABSTRACT

Sustainability certification has become an important feature of coffee production systems in Vietnam's Central Highlands. However, its role in shaping production outcomes remains unclear. This study examines whether certification is associated with improvements in productivity or primarily supports expansion in scale. Using unit-level panel data from 10 certified production units over the period 2021 to 2025, the analysis combines descriptive statistics with fixed-effects regression models to assess differences in yield between Rainforest Alliance (RA) and Common Code for the Coffee Community (4C) certification systems, as well as the relationship between production and certified area. The results indicate no statistically significant difference in yield across certification schemes. At the same time, certified coffee production expanded substantially over the study period, closely accompanied by increases in certified area. Regression estimates further show that production is strongly associated with certified area, suggesting that growth is largely associated with scale expansion rather than productivity gains. These findings suggest that certification plays a stronger role in organizing and scaling production systems than in improving productivity at the observed production-system level. The results highlight the need for complementary interventions that directly target productivity if certification is to contribute more effectively to sustainable intensification in coffee production systems.

Keywords: *coffee certification, productivity outcomes, Central Highlands, Vietnam.*

1. INTRODUCTION

Coffee is one of the most important agricultural commodities globally, supporting the livelihoods of millions of smallholder farmers. Vietnam has become the world's second-largest coffee producer and the leading exporter of Robusta coffee, with the Central Highlands accounting for most of the national output (FAO, 2021; General Statistics Office of Vietnam, 2023; ICO, 2023). The rapid expansion of coffee production has contributed significantly to rural incomes and export earnings. At the same time, it has raised concerns about environmental sustainability, resource use, and the long-term performance of production systems (Ho et al., 2020; Lambin et al., 2018; Nguyen et al., 2019).

In response to these challenges, sustainability certification schemes such as Rainforest Alliance (RA) and Common Code for the Coffee Community (4C) have been widely adopted in the Vietnamese coffee sector (Dang et al., 2025; MARD, 2022; WASI, 2021). These schemes aim to promote improved farming practices, strengthen traceability, and facilitate access to international markets, particularly under increasingly stringent regulatory frameworks such as the EU Deforestation Regulation (European Commission, 2023). As a result, certification has become an important mechanism shaping how coffee production is organized and linked to global markets (Dietz et al., 2018; Grabs, 2020; Meemken, 2020).

Despite this rapid expansion, the effects on production outcomes remain unclear. Existing studies have primarily focused on income and sustainability impacts, often reporting mixed results (Blackman and Rivera, 2011; Bray and Neilson, 2017; Ibanez and Blackman, 2016; Jena et al., 2012; Meemken, 2020). Limited attention has been given to whether certification improves productivity at the farm level or mainly supports scale expansion. This distinction is well established in agricultural development theory (Hayami and Ruttan, 1985), but remains underexplored in the certification literature. Previous empirical studies also suggest that certification effects on farm productivity are often weak or statistically insignificant, with benefits more commonly observed in market access, price stability, or institutional support rather than yield improvements (Raynolds et al., 2007; van Rijsbergen et al., 2016).

This study contributes to the literature in three ways. First, it uses unit–scheme–year pan-

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el data from certified coffee production systems in Vietnam's Central Highlands over the period 2021–2025, providing system-level evidence from one of the world's major Robusta-producing regions. Second, it explicitly distinguishes productivity (yield) from production scale, allowing a clearer interpretation of how certification is associated with production outcomes. Third, it provides a comparative analysis of two widely adopted certification systems, Rainforest Alliance (RA) and 4C, within the context of Vietnam's coffee sector.

Against this background, two questions are particularly relevant. First, is certification associated with differences in productivity between RA and 4C certified coffee systems? Second, is the growth of certified coffee production more closely associated with productivity improvement or with scale expansion? Addressing these questions helps clarify whether sustainability certification primarily contributes to productivity enhancement or to the expansion of certified production systems in Vietnam.

2. MATERIALS AND METHODS

2.1. Literature Review

Sustainability certification refers to voluntary standards and assurance systems that establish environmental, social, and economic requirements for agricultural production and trade (Giovannucci and Ponte, 2005; Loconto and Dankers, 2014; Ponte, 2002). Within agricultural value chains, these systems define the criteria against which production processes are assessed and verified (Dietz et al., 2018; Grabs, 2020; Meemken, 2020; Raynolds et al., 2007).

In the coffee sector, certification standards typically specify requirements related to environmental protection, labor conditions, resource management, and traceability. These requirements are organized into principles and criteria that guide compliance at both farm and supply-chain levels (Dragusanu et al., 2014; Loconto and Dankers, 2014; Meemken, 2020; Raynolds et al., 2007). Existing studies suggest that certification is often associated with changes in production practices and market access conditions, while evidence on productivity effects remains mixed (Blackman and Rivera, 2011; Ibanez and Blackman, 2016).

Among the various systems currently in use, Rainforest Alliance (RA) and the Common Code for the Coffee Community (4C) are among the most widely adopted in Vietnam as well as globally (ICO, 2023; MARD, 2022; Panhuysen and Pierrot, 2020).

Rainforest Alliance certification, following its merger with UTZ, is implemented through the Rainforest Alliance Sustainable Agriculture Standard (2020). This standard sets requirements across environmental, social, and economic dimensions, including ecosystem conservation, biodiversity protection, agrochemical management, labor conditions, and traceability (Grabs, 2020; Rainforest Alliance, 2020, 2025). It adopts a risk-based approach to compliance and increasingly emphasizes data transparency and shared responsibility among supply-chain actors (Meemken, 2020; Rainforest Alliance, 2020, 2025).

The 4C system similarly establishes a set of principles and criteria for responsible coffee production and sourcing, focusing on environmental, social, and economic requirements. It is implemented at the level of producer organizations and supply-chain actors, with particular emphasis on resource management, labor conditions, and traceability (4C Services, 2020, 2024; Panhuysen and Pierrot, 2020).

Recent developments in both RA and 4C have placed greater emphasis on traceability, risk-based assessment, and supply-chain transparency, particularly in response to evolving regulatory requirements related to deforestation and due diligence in global coffee trade (ICO, 2023; Rainforest Alliance, 2025; 4C Services, 2024).

The distinction between these two standards provides the basis for examining differences in production outcomes in this study.

2.2. Methods

2.2.1. Data collection

This study uses a panel dataset covering ten certified coffee production units in the Central Highlands of Vietnam over the period 2021–2025. These units include companies and producer organizations that manage groups of smallholder farmers under RA and 4C certification schemes. The dataset includes 99 observations. This is because one production unit did not participate in a certification scheme in a given year, resulting in a slightly unbalanced panel.

The dataset is compiled from certification records and internal monitoring systems and is verified through third-party audits. To ensure confidentiality, all production units and certification bodies are anonymized.

The unit of analysis is defined at the unit–scheme–year level. This is because production units may participate in multiple certification schemes within the same year. All variables are

therefore aggregated at the scheme level within each unit. The number of farmers refers to the total number of participating farmers under each certification scheme. Certified area (hectares) and production volume (tons) are measured at the same level.

Yield, used as a proxy for productivity, is not directly observed but is calculated as the ratio of total production to certified area (tons per hectare). This definition allows a clear analytical distinction between productivity (yield) and production scale (area), which is central to the analysis. While yield is used as a proxy for productivity in this study, it does not capture important production inputs such as labor, fertilizer use, irrigation, and management practices. It should therefore be interpreted as a partial indicator of productivity rather than a complete measure of production efficiency.

While the number of units is relatively small, each unit represents a large population of smallholder farmers. The dataset therefore captures production systems at an aggregated level rather than individual farm behavior. Accordingly, the analysis focuses on identifying system-level patterns rather than making farm-level or causal claims.

2.2.2. Data analysis

Descriptive statistics are used to summarize the main characteristics of certified production systems, including the number of farmers, certified area, production volume, and yield over the period 2021–2025. This provides an overview of how certified coffee production has evolved over time.

To examine how certification is associated with production outcomes, this study uses two complementary empirical models.

Model 1: Certification and productivity (yield)

The first model examines whether yield differs between certification schemes, specifically between RA and 4C, while controlling for unit and year fixed effects. The analysis includes unit and year effects to account for unobserved differences across production units and common time-related factors. The model is specified as follows:

$$Y_{ist} = \beta_0 + \beta_1 Scheme4C_{ist} + \alpha_i + \gamma_t + \varepsilon_{ist}$$

Where denotes unit, denotes certification scheme, and denotes year. In this study, certification scheme refers to the type of certification system, namely RA and 4C. The variable *Scheme4C* is a binary indicator that takes the value 1 for 4C and 0 for RA. RA therefore serves as the reference category. The term represents unit fixed effects and captures year effects. Under this specification, the coefficient captures the average within-unit difference in yield between 4C and RA over time after accounting for time-invariant differences across units and common year-specific shocks.

The use of a binary indicator allows a direct comparison between 4C and the reference category, RA. The model is used to assess association rather than causal effects, as certification assignment is not exogenous. In particular, production units participating in different certification schemes may differ systematically in terms of management capacity, scale of operation, agro-ecological conditions, and market access. These factors may influence both certification participation and production outcomes. Therefore, the comparison between RA and 4C should not be interpreted as reflecting the causal impact of certification schemes, but rather as descriptive evidence of differences observed within the sample.

Model 2: Production and scale dynamics

Model 2 examines how variation in certified coffee production is associated with changes in certified area over time within each unit–scheme pair. Given the panel structure of the data, a fixed-effects estimator at the unit–scheme level is employed to control for unobserved, time-invariant characteristics specific to each production system. The selection of explanatory variables is guided by both the agricultural production literature and the specific characteristics of Vietnam's coffee sector. In standard agricultural production settings, land is a core input associated with output variation (Hayami and Ruttan, 1985; Pingali, 2007). In this study, certified area is used as the primary observable proxy for production scale.

It should be noted that the relationship between production and certified area partly reflects an accounting identity, as yield is defined as the ratio of production to area. Therefore, this model is not intended to estimate a structural production function or to identify causal effects. Instead, it provides descriptive evidence on how changes in production are associated with changes in certified area over time.

The estimated coefficient close to one is consistent with relatively stable yield levels, implying that production changes largely track variations in certified area.

The model is specified as follows:

$$ln(Production_{ist}) = \beta_0 + \beta_1 ln(Area_{ist}) + \gamma_t + \mu_{is} + \varepsilon_{ist}$$

Where represents unit–scheme fixed effects and captures common time effects. Standard errors are clustered at the unit–scheme level.

Given the accounting relationship between production, area, and yield, this specification is not interpreted as a structural production function but rather as descriptive evidence of scale dynamics.

Given data limitations, other potential determinants of production, such as labor input, input intensity, and farm management practices are not directly observed. These factors are partially absorbed by unit-scheme fixed effects and year fixed effects, although this approach does not fully eliminate potential omitted variable bias. The results should therefore be interpreted as associational rather than causal.

To compare fixed-effects and random-effects specifications, a Hausman test was conducted for Model 2. The test results indicate that the null hypothesis cannot be rejected ($p = 0.0847$), suggesting that the random-effects specification could also be appropriate. However, given the likelihood that unobserved, time-invariant characteristics of production units are correlated with the explanatory variable, the fixed-effects specification is retained for consistency and robustness.

A log-log specification is employed to allow coefficients to be interpreted as elasticities. In Model 2, the estimated coefficient reflects the percentage change in production associated with a one-percent change in certified area.

2.2.3. Robustness check

To assess the robustness of the results, an alternative specification using the logarithm of yield is estimated. The results remain consistent, with no statistically significant difference in yield between certification schemes. This suggests that the findings are not sensitive to model specification.

3. RESULTS AND DISCUSSION

3.1. Evolution of certified coffee production (2021–2025)

Figure 1 presents trends in production and yield under RA and 4C certification systems from 2021 to 2025. Production increased under both systems over time, but the patterns differed across the two schemes. RA-certified production rose from 36,470 tons in 2021 to over 61,000 tons in 2023, then remained relatively stable in 2024 before declining in 2025. In contrast, 4C-certified production expanded more steadily, increasing from 60,233 tons in 2021 to over 114,000 tons in both years (2024 and 2025). Yield remained relatively stable throughout the period for both systems, with only minor fluctuations and no clear upward trend. This pattern suggests that production growth occurred without substantial changes in productivity.

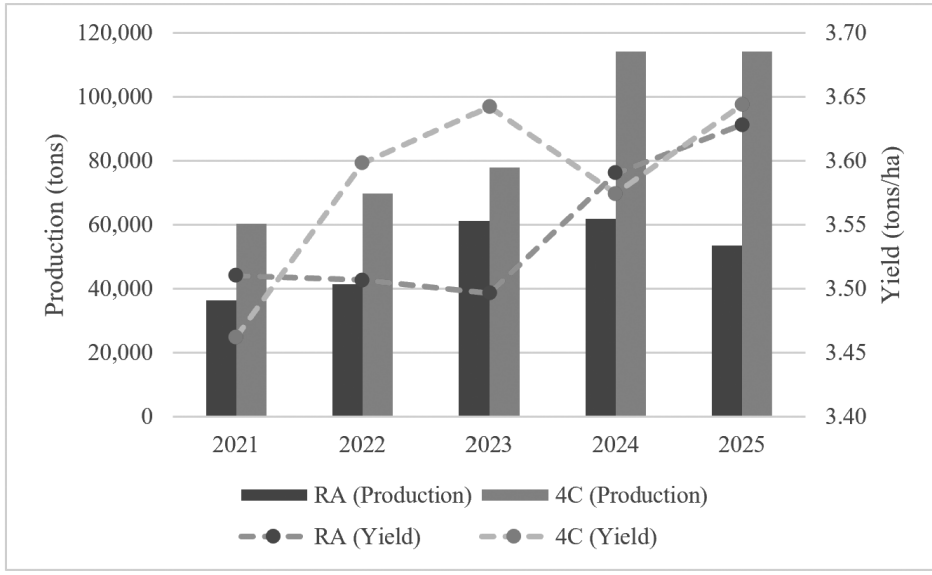

Figure 1. Trends in production volume (tons) and yield (tons/ha) under RA and 4C certification systems in the Central Highlands of Vietnam, 2021–2025.

Source: Author's calculations based on certification data (2021–2025).

Table 1 shows the evolution of the number of certified farmers and certified area under RA and 4C systems from 2021 to 2025. Both indicators increased over time under both certification schemes. However, 4C consistently involved a larger number of farmers and a substantially greater certified area compared to RA.

The number of farmers under 4C increased from 9,134 in 2021 to 18,883 in 2025. In contrast, RA showed more moderate growth and a slight de-

cline toward the end of the period. A similar pattern appears in certified area. By 2025, 4C covered over 28,000 hectares, compared to approximately 14,700 hectares under RA.

These differences may reflect variation in the accessibility and adoption of certification schemes in Vietnam. The 4C standard is often positioned as an entry-level initiative that allows broader participation among smallholder farmers. In contrast, Rainforest Alliance typically involves more demanding requirements, which may limit the speed and scale of adoption. As a result, 4C tends to achieve wider coverage in terms of both certified area and farmer participation (4C Services, 2020, 2024; ICO, 2023; Panhuysen and Pierrot, 2020). Differences in institutional presence and certification infrastructure across schemes may also contribute to these patterns.

Table 1. Evolution of certified farmers and area (2021–2025)

Year	RA		4C	
	Farmers	Area (ha)	Farmers	Area (ha)
2021	6,233	10,305.23	9,134	15,240.85
2022	7,183	11,846.23	10,921	17,854.40
2023	10,513	16,991.06	12,252	19,791.33
2024	10,686	16,836.35	19,028	28,488.88
2025	9,551	14,745.52	18,883	28,036.05

Source: Author's calculations based on certification data (2021–2025).

Taken together, these descriptive findings suggest that the expansion of certified coffee production is closely associated with increases in certified area and farmer participation, rather than improvements in productivity.

3.2. Certification and productivity (Model 1)

To assess whether certification type is associated with productivity, Model (1) estimates the relationship between certification scheme and yield using a fixed-effects (FE) estimator. Table 2 reports the regression results.

Table 2. Regression results: certification and production models

Variables	(1) Yield	(2) Ln(Production)
Scheme4C	0.046	
	(0.064)	
Ln(Area)	–	0.976***
		(0.026)
Unit FE	Yes	–
Unit–scheme FE	–	Yes
Year FE	Yes	Yes
Observations	99	99
R-squared (within)	0.700	0.973

*Robust standard errors clustered at the unit–scheme level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All models include fixed effects as indicated.*

Note: Dependent variables are indicated in the column headings.

Source: Author's calculations based on certification data (2021–2025).

The coefficient of the certification variable (4C) is not statistically significant, indicating that there is no systematic within-unit difference in yield between RA and 4C over time after controlling for unit-specific and time-specific effects. This suggests that certification schemes do not play a decisive role in shaping productivity outcomes at the production-system level. Year fixed effects are also not statistically significant, suggesting that there is no clear temporal trend in yield over the study period.

The results from the logarithmic specification of yield (Table 3) are consistent with the baseline model, with the certification variable remaining statistically insignificant.

Overall, the regression results show no statistically significant association between certification type and yield in this sample.

Table 3. Robustness check: Logarithmic specification of yield

Variables	Ln(Yield)
Scheme4C	0.012
	(0.019)
Year FE	Yes
Unit FE	Yes
Observations	99
R-squared	0.700

**** p<0.01, ** p<0.05, * p<0.1.*

Note: Robust standard errors are reported in parentheses. The dependent variable is the natural logarithm of yield (tons/ha). Unit and year fixed effects are included in all specifications.

Source: Author's calculations based on certification data (2021–2025).

3.3. Production and scale dynamics (Model 2)

Model (2) is used to examine whether changes in certified coffee production are primarily associated with expansion in production scale. The model estimates the relationship between production and certified area using a log-linear specification with unit–scheme fixed effects. The regression results are reported in Table 2 (column 2).

The estimated coefficient on certified area is positive, statistically significant, and close to one (0.976), indicating that production increases almost proportionally with certified area over time within unit–scheme pairs. This suggests that production growth is more closely associated with scale expansion than with productivity improvements.

Given the accounting relationship between production, area, and yield, this model is not interpreted as a structural production function, but rather as descriptive evidence of scale dynamics. This finding is consistent with the research objective of examining whether certified production growth is more closely associated with expansion in production scale than with productivity improvements.

3.4. Discussion

The findings from Models (1) and (2) do not provide evidence of a statistically significant difference in yield between certification schemes, while production growth is more closely associated with changes in certified area. These results highlight an important distinction between productivity effects and scale effects in certified coffee production systems in the Central Highlands of Vietnam. The results consistently show that certification is not systematically associated with improvements in yield. Instead, certified coffee production expands primarily through increases in certified area, indicating that production growth is closely linked to scale expansion rather than efficiency gains (Blackman and Rivera, 2011; Bray and Neilson, 2017; Jena et al., 2012; Meemken, 2020).

This pattern suggests that certification schemes such as RA and 4C do not primarily function as mechanisms for improving technical efficiency at the farm level. Rather, certification appears to operate more strongly through organizational and market-based channels (Dietz et al., 2018; Giovannucci and Ponte, 2005; Grabs, 2020; Ponte, 2002; Raynolds et al., 2007). This may reflect the fact that certification standards emphasize compliance, traceability, and market access. These factors can facilitate participation in global value chains, but they do not necessarily translate into yield-enhancing agronomic outcomes (Grabs, 2020; Ponte, 2002). As a result, productivity effects are likely to be indirect, heterogeneous, and not immediately observable in farm-level yield data (Estrella et al., 2022; Gather and Wollni, 2022; Meemken, 2020).

From a broader agricultural development perspective, these findings align with the classic distinction between intensification and extensification (Hayami and Ruttan, 1985). The evidence indicates that, in this context, growth in certified coffee production is more closely associated with extensification through expansion of cultivated area, rather than intensification through productivity improvements. This highlights an important structural dimension of certification that has received limited attention in previous studies.

The results are also consistent with a growing body of literature documenting mixed or limited impacts of certification on productivity. Previous studies emphasize benefits such as improved market access, income stability, and environmental practices (Blackman and Rivera, 2011; Ibanez and Blackman, 2016; Meemken, 2020). However, they also suggest that yield effects are often weak or statistically insignificant (Dragusanu et al., 2014; Ruben and Fort, 2012). In the Vietnamese context, existing research has largely focused on income and participation outcomes, with less attention to production mechanisms. By explicitly separating productivity from scale effects, this study contributes to the literature by showing that certification is more closely associated with structural changes in production systems than with farm-level efficiency improvements.

These findings have several implications. First,

certification alone may be insufficient to generate substantial productivity gains and should therefore be complemented by interventions that directly target agronomic performance, such as technical training and improved input management. Second, certification should be understood as a mechanism for organizing and scaling production rather than as a standalone tool for yield improvement. Third, the observed expansion of certified production through increased land use raises sustainability concerns, particularly where extensification may exert pressure on natural resources (Ho et al., 2018, 2022; Lambin et al., 2018). This underscores the need to better align certification schemes with strategies for sustainable intensification. Finally, future research should explicitly distinguish between productivity and scale effects when evaluating agricultural interventions, to provide a more accurate assessment of their impacts.

4. CONCLUSION

This study examines the relationship between sustainability certification and production outcomes in coffee systems in the Central Highlands of Vietnam, with a particular focus on distinguishing between productivity and production scale effects. Using unit-level panel data from 2021 to 2025, the analysis shows no statistically significant difference in yield between RA and 4C certification systems. At the same time, certified coffee production expanded substantially over the study period and this growth was closely associated with increases in certified area. These findings indicate that growth in certified coffee production is more closely associated with scale expansion than with productivity improvement.

In this context, certification appears to be more closely associated with the organization and expansion of production systems than with yield enhancement at the production-system level. From a policy perspective, the results suggest that certification alone may be insufficient to generate substantial productivity gains. To improve the effectiveness of certified coffee systems, certification should be complemented by interventions that directly target agronomic performance, such as technical training, improved input management, and farm-level innovation. Although the analysis is based on aggregated unit-level data, it provides useful evidence on the structural dynamics of certified coffee production and offers a basis for future research on sustainable coffee development in Vietnam.

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CHỨNG NHẬN BỀN VỮNG GIÚP CẢI THIỆN NĂNG SUẤT HAY MỞ RỘNG QUY MÔ SẢN XUẤT? BẰNG CHỨNG TỪ CÁC HỆ THỐNG CÀ PHÊ CHỨNG NHẬN TẠI TÂY NGUYÊN, VIỆT NAM

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Ngày nhận bài: 06/04/2026; Ngày phản biện thông qua: 14/05/2026; Ngày duyệt đăng: 01/06/2026

TÓM TẮT

Chứng nhận bền vững ngày càng giữ vai trò quan trọng trong hệ thống sản xuất cà phê ở Tây Nguyên, Việt Nam. Tuy nhiên, tác động của chứng nhận đối với kết quả sản xuất vẫn chưa được làm rõ, đặc biệt khi xem xét sự khác biệt giữa cải thiện năng suất và mở rộng quy mô sản xuất. Nghiên cứu này phân tích mối quan hệ giữa chứng nhận và kết quả sản xuất cà phê dựa trên dữ liệu bảng cấp đơn vị sản xuất theo các chương trình chứng nhận trong giai đoạn 2021–2025. Nghiên cứu kết hợp thống kê mô tả và mô hình hồi quy để đánh giá sự khác biệt về năng suất giữa hai hệ thống chứng nhận Rainforest Alliance (RA) và 4C, đồng thời xem xét mối liên hệ giữa sản lượng và diện tích chứng nhận. Kết quả cho thấy không có sự khác biệt có ý nghĩa thống kê về năng suất giữa các hệ thống chứng nhận. Trong khi đó, sản lượng cà phê chứng nhận tăng đáng kể qua các năm và đi cùng với sự gia tăng diện tích chứng nhận. Điều này cho thấy tăng trưởng sản xuất chủ yếu gắn liền với mở rộng quy mô hơn là cải thiện năng suất. Nghiên cứu hàm ý rằng chứng nhận có vai trò quan trọng trong việc tổ chức và mở rộng hệ thống sản xuất, nhưng chưa phải là công cụ đủ mạnh để cải thiện năng suất trong hệ thống sản xuất cà phê. Vì vậy, cần kết hợp chứng nhận với các giải pháp tác động trực tiếp đến năng suất nhằm hướng tới phát triển cà phê bền vững.

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