



A Competitive Perspective of Sustainable Coffee Production Practices

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Abstract

Background: This study analyzes sustainable coffee production and its competitive perspectives. The present study explains the understanding of sustainable production practices with a triple bottom line approach examining the relationship between production practices and competitiveness. The adoption of a sustainable development strategy has become important for companies as they cannot only be environment friendly but also gain a competitive advantage. The recent studies even found that environmental sustainability has a direct and positive relationship with competitiveness.

Objective: The main objective of this study is to find out sustainable coffee production practices and competitive perspectives.

Method: The research is descriptive. It explains the data and their characteristics statistically without manipulation. A structured questionnaire was used to collect the data using a survey method.

Result: The most significant observation of the study is that the strenuous working condition of coffee production changes the living standard of the people in the community in the future. In this study, the majority of farmers responded that they were practicing sustainable coffee production. They were aware of the environmental aspect of coffee production practices and sustainable way of production leads to competitiveness in international markets.

Conclusion: The research concluded that the independent variables economic aspect, social aspect, and environmental aspect of sustainable production practices have a significant positive relationship with competitiveness.

Implication: The findings of the paper imply that the adoption of a sustainable development strategy has become more important for the companies as they cannot only be environment friendly but also gain a competitive advantage.

Keywords: Competitive perspective, Sustainability, Production practice, Coffee.

Paper Type: Research paper

JEL Classification: P47, Q56, L11

Introduction

Coffee production can be made more sustainable by incorporating practices through better crop management and water use practices, using pheromone boxes to ward away insects instead of pesticides, composting coffee bean waste for using as fertilizer, using coffee hulls as fuel instead of cutting down eucalyptus trees, shade-growing and reforestation. Economic and social sustainability go hand in hand with environmental sustainability. By using sustainable practices that minimize any negative impact growing and processing coffee could have on the environment. Sustainable farming practices might be critical in the efforts to support the environment positively. By combining practices such as root bending and selective pruning with natural shade canopies, farmers can grow stronger trees that produce an extra crop in subsequent year.

Coffee in comparison to many other agricultural activities is relatively benevolent (Giovannucci and Koekoek, 2003). Coffee is also the second most heavily traded commodity after petroleum and an important cash crop from the Rubiaceae family. There are 500 root types and around 6000 other types in the Rubiaceae family. Among them only four types of coffee are consumable they are Arabica, canephora (Robusta), liberica, and excels (Coffee Development Center, 2017). Coffee, as one of the most important commodities in terms of value traded globally, plays a crucial role in the livelihoods of millions of rural households across the developing world (UN Conference on Trade and Development, 2003). Production of coffee takes place in smallholder farms in more than 50 developing countries with more than 20 million families depending on the crop (Alvarez et al. 2010). Coffee contributes significantly to foreign exchange earnings and plays a leading role in determining opportunities for employment and infrastructure development.

Akoyi and Maertens (2016) vied that coffee plays important role in international trade relationships with developing countries. However, Kattel et al. (2009) argued that coffee farmers have very little technical knowledge and low bargaining power. Looking at the history of coffee in Nepal, Hira Giri brought some seeds of coffee from Myanmar (now Burma) and planted them in Aapchaur of Gulmi district for the first time in Nepal. The cultivation has gradually spread to about 40 districts of the middle hills of Nepal. Gulmi, Palpa, Syangja, Kaski, Sindhupalchowk, Kavre, Lalitpur are some of the districts of Nepal known for coffee production.

Coffee is a high-value cash crop with environmental importance and is being popular among Nepalese for the last few decades. Nepali coffee is considered special for its distinct aromatic flavor and body as it is grown at higher altitudes, away from the main coffee growing the Capricorn and Cancer belt beyond 23-degree latitude. More than 20,000 smallholders have planted coffee in about 1800 hectares of land with a production of 466mt. dry parchment in 2016 (NTCD). The majority of Nepali coffee farmers are small and poor, and they usually do not use chemical fertilizer and insecticide/ pesticide and grow in a diversified agroforestry system creating the foundations for organic coffee cultivation. In Nepal, coffee is initially known as the drink of foreigners, tourists, and expatriates, but nowadays it has become popular among the Nepalese and, therefore, has received numbers of domestic consumers (Tiwari, 2010). Out of the total production, 65% is exported and the rest is consumed in the domestic market.

International Coffee Organization (ICO) has directed its members to give due consideration to the sustainable management of coffee and processing, bearing in mind the principles and objectives on sustainable development contained in Agenda 21 adopted by the UN conference on environment and development held in Rio de Janeiro in 1992 and those adopted at the world summit on Sustainable Development held in Johannesburg in 2002 (ICO, 2007). There are 78 official members of ICO which contain 44 exporting countries and 34 importing countries including all EU members. Brazil is the top exporter of coffee whereas the EU, Japan, and the USA are the top importers of coffee (ICO, 2017). Nepal is also a member of ICO but it produces and exports a negligible quantity of coffee.

Coffee is one of the important and emerging cash crops of Nepal having the potential to generate

employment and income for Nepalese farmers. Coffee is well adapted to climatic conditions of the mid-hills of Nepal. The majority of farmers are mostly have attracted to the cultivation of coffee because of its excess demands in national and international markets. The health of the planet relies on the sustainable behavior of big businesses and, at the same time, small business leaders should understand that a healthy planet is essential for the success of a company. Addressing the ecological issues, environmental protection, sustainable technology, and clean product development are in practice in business both in the western and some eastern countries. This study significantly contributes to creating a new horizon for Nepali coffee producers and so that Nepali coffee farmers drive the existing production practices to quality and sustainable coffee production in the future.

Sustainability has become a big issue today. Even big brands in the world like Honda, GE, P&G, Coca-Cola, Unilever, Starbucks, etc. have faced the issues of sustainability. The issues on sustainable production and consumption of those companies have been pushing themselves in the path of sustainability. Though the Nepal coffee producers association emphasizes promoting and practicing organic farming for environmental sustainability, it is not guaranteed. In this context, this study seeks to answer: Is there a relationship between sustainable coffee production practices and their competitiveness? To analyze the relationship between sustainable coffee production practices and their competitiveness, a triple bottom line approach has been applied. This paper fills the existing gap in sustainable coffee production processes and practice in the literature.

The main limitations of the study are: It has not covered processing, roasting, packaging, logistics, and marketing part; the study only covers some major issues under the triple bottom line approach but there are lots of issues rising in the world like Carbon footprint, contribution to national GDP, social violence and crimes, etc. which the study will not cover.

The paper is organized as Section II reviews the relevant literature; Section III covers the methodology; Section IV presents the results and discusses them; and finally, Section V concludes the study.

Review of Literature

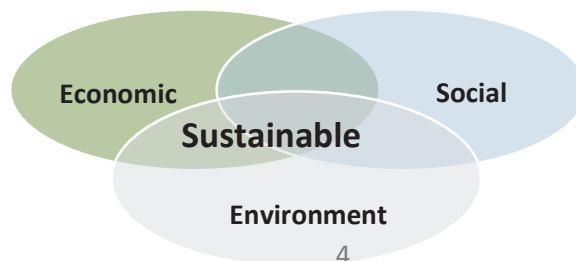
There is a potential for growth in the flourishing market for sustainable coffees in Europe and Japan, but there are some challenges that the coffee industry faces in the mainstream appearances (Giovannucci & Koekoek, 2003). This report refers to the importance of addressing issues related to the coffee industry and developing a sector-wide approach to sustainability. This study also reveals that a common front to sustainability is important not just for ensuring the concept of sustainability but also for setting the stage for extensive buying capacity among consumers, industry, and policymakers.

Karki et al. (2018) examined the coffee production in Kavre and Lalitpur where they found coffee cultivation has an important role in the livelihood of farmers. The majority of the coffee plantations were between 6 to 10 years, however, started before 40 years. The area of cultivation is increasing in the study area. Hung et al. (2019) show that the trend of market-oriented sustainable coffee production provides opportunities for smallholder farmers to integrate a high-value market. The study reveals that most farmers realize the positive impacts of sustainable farming in terms of economic efficiency, environmental protection, and social welfare. Sustainability is necessary for the Vietnamese coffee industry in terms of economic, ecological, and social benefits. Sustainable coffee farming is more cost-effective and profitable than conventional farming.

Triple Bottom Line of Sustainability

This accounting framework called the triple bottom line (TBL) went beyond the traditional measure of profits, return on investment, and shareholder value to include environmental and social dimensions. Many business and non-profit organizations have adopted the TBL sustainability framework to evaluate their performance. TBL incorporates three dimensions of performance: social, environmental, and economic. These dimensions are also commonly called 3Ps: People, Planet, and Profit (Slaper & Hall, 2011).

Figure 1: Triple Bottom Line of Sustainability



Environmental Sustainability

Environmental sustainability means that we are living within the means of our natural resources. To live in true environmental sustainability we need to ensure that we are consuming our natural resources such as minerals, energy fuels, land, water, etc. at a sustainable rate.

Economic Sustainability

Economic sustainability means using the resources efficiently and responsibly so that it can operate sustainably to produce an operational profit consistently. Without operational profit, a business cannot sustain its activities. Without acting responsibly and using its resources efficiently no one will be able to sustain its activities in a long term.

Social Sustainability

Social sustainability is the ability of a society or any social system to persistently achieve good social well-being. Achieving social sustainability ensures that the social well-being of a country, organization, or community can be maintained in a long term.

Research Hypothesis

To meet the purposes, the following research hypotheses have been tested.

H₁: There is a significant relationship between the economic aspect of sustainable production practices and the competitiveness;

H₂: There is a significant relationship between the social aspect of sustainable production practices and competitiveness; and

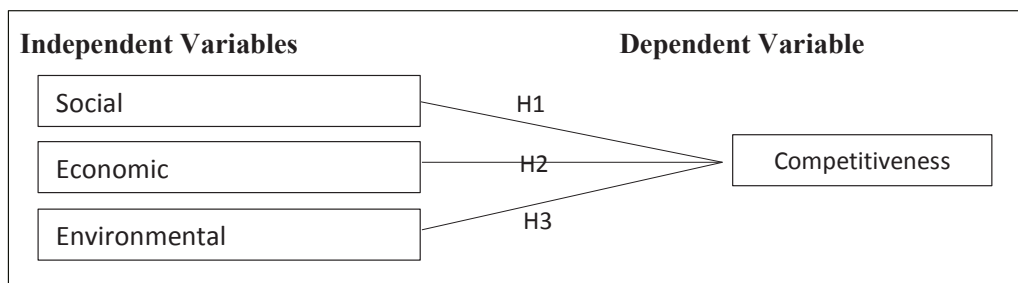
H₃: There is a significant relationship between the environmental aspect of sustainable production practices and competitiveness.

Research Method

The research is descriptive as it explains data and characteristics about the population being studied, solely based on statistics, without manipulation. The research is also explanatory because it is conducted to identify the extent and nature of cause-and-effect relationships among the dependent and independent variables.

Conceptual Framework

This research study is guided by the following theoretical framework in the context of sustainable coffee production practices from a competitive perspective. The main purpose of the research is to examine the relationship between sustainable production practices which includes social, economic, and environmental measures, and competitiveness of the product.

Figure 2: Conceptual Framework

Sustainable production practices include three aspects: social aspect, economic aspect, and environmental aspect. All the variables included under sustainable production practices are independent whereas competitiveness is a dependent variable in this study.

Data and Methods

A structured questionnaire was used to collect data in the survey. The categorized questionnaire consists of 20 questions. The questionnaire includes variables related to sustainable coffee production practices such as social, environmental, and economic aspects. The respondents were asked to answer the questions provided. Approximately 1,500 farmers were, directly and indirectly, involved in coffee production in the district of Gulmi. Most of them were pulping and processing with the involvement of coffee co-operatives. A convenience sampling technique was used and the sample size for the research was 110 farmers.

A four-point Likert scale was used to perform the questionnaire activities in which respondents chose only one answer from among four alternative answers. Mean and standard deviation are used to study the dependent variable called competitiveness and independent variables called sustainable production practices: social, economic, and environmental aspects. To test the relationship between the independent variables like social aspects, economic aspects, and environmental aspects of production practices for sustainability and dependent variable competitiveness, Pearson's correlation analysis is used. Coefficient (r) is used to measure the co-variation between numerous variables. The magnitude of the linear relationship between variables and the direction of the relationship is indicated with a coefficient (r). The analysis of data was performed with the help of SPSS and MS-Excel.

Data Analysis and Result

The descriptive central tendency and variation of the 6-subscale are calculated to find out sustainable coffee production practices and their competitiveness. A four-point Likert scale was used for each question ranging from 'Strongly Agree' to 'Strongly Disagree'; coded by 4 representing 'Strongly Agree', 3 representing 'Agree'; 2 representing 'Disagree', and 1 representing 'Strongly Disagree'. Thus, this section consists of descriptive analysis performed to analyze measurable questions as well as study variables.

Economic Aspect

The sustainable production practice involves certain economic aspect which must be fulfilled so economic aspect has been analyzed based on 6 different statements, including 110 questionnaires which are as follows:

Table1: Economic Aspect

Questionnaire	Queries	N	Mean	SD	Min	Max
E.1	Coffee production has provided a good return on my investment.	110	3.68	0.5056	2	4
E.2	Coffee production has provided good profit to me.	110	3.74	0.4629	2	4
E.3	Coffee production has been increasing than in previous years.	110	3.32	0.5234	2	4
E.4	The coffee that I have produced has got a good market price.	110	3.86	0.3704	2	4
E.5	The coffee that I have produced has been easily sold in the market.	110	3.95	0.2281	3	4
E.6	Coffee production has helped me to change my day-to-day living standard.	110	3.63	0.5043	2	4
Economic Aspect			3.70	0.4325		

Source: Field Survey, 2018

Table 1 depicts the mean value of the economic aspect of sustainability from 3.32 to 3.95 where the highest mean is shown by E.5 whereas the lowest mean is shown by E.3. Among them, the most significant observation on economic sustainability is ‘The coffee that I have produced has been easily sold in the market’. The least significant observation on role load is, ‘Coffee production has been increasing than previous years.’ The least significant observation is due to an attack of an insect called *seto gawaro* in the crop. The average mean for the workload is 3.70 which reveals that the economic aspect of sustainable coffee production practices is moderate and high. Farmers were not satisfied with the yearly increment in the production of coffee because the production of coffee is not increasing as it has to be due to the attack of *seto gawaro* on their coffee plants. Besides, the farmers moderately agree that coffee has helped them to grow their economy. The average standard deviation of the economic aspect is 0.4325.

Additionally, Table 1 shows that E.3 has the highest standard deviation of 0.5234 whereas E.5 has the lowest standard deviation of 0.2281. This means respondents have more deviation with the statement “Coffee production has been increasing than previous years.” i.e. the values in the data set are farther away from the mean, on average.

Social Aspect

The social aspect of sustainable coffee production has been analyzed based on 4 different statements, which are as follows:

Table 2 shows that the mean value of the social aspect of sustainable practices ranges from 3.75 to 3.95 where the highest mean is shown by S.1 whereas the lowest mean is shown by S.6. Among them, the least significant observation on social aspect is, ‘I take part in every training about coffee provided by the government and NGOs.’ The most significant observation on strenuous working conditions is, ‘Coffee production is going to change the living standard of the people in the community in future.’ The average mean for working conditions is 3.83, which reveals that the social aspect of sustainable coffee production is good and satisfactory. The average standard deviation of working conditions is 0.3711. Additionally, Table 2 shows that S.6 has the highest standard deviation of 0.4376 whereas S1 has the lowest standard deviation of 0.2093. This means respondents have more deviation with the statement, “I take part in every training about coffee provided by the government and NGOs”. i.e. the values in the data set are farther away from the mean, on average.

Table 2: Social Aspects

<i>Questionnaire</i>	<i>Statements</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
S.1	Coffee production is going to change the living standard of the people in the community in the future.	110	3.95	0.2093	3	4
S.2	My family members help me in planting, gardening, plucking berries.	110	3.84	0.3716	3	4
S.3	We husband and wife help each other in day-to-day household activities.	110	3.85	0.3631	3	4
S.4	I am aware of my health and apply safety measures while working in the garden.	110	3.77	0.4210	3	4
S.5	My children go to school or having their higher studies.	110	3.80	0.4241	2	4
S.6	I take part in every training about coffee provided by the government and NGOs.	110	3.75	0.4376	3	4
Social Aspect			3.83	0.3711		

Source: Field Survey, 2018

Environmental Aspect

The most important aspect of sustainable production is the environment.

Table 3: Environmental Aspect

<i>Questionnaire</i>	<i>Statements</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
EN.1	I use less water to grow coffee and to process it into raw materials.	110	3.69	0.4642	3	4
EN.2	I don't use chemical fertilizers and pesticides to kill insects in coffee.	110	3.98	0.1342	3	4
EN.3	I recycle the pulped wastes for making bio-degradable and compost fertilizer.	110	3.74	0.4426	3	4
EN.4	I do not cut down other trees to plant coffee.	110	3.84	0.3716	3	4
EN.5	I have planted other plants and trees around the coffee plantation area.	110	3.9	0.3014	3	4
EN.6	The coffee I have produced is processed manually or in small electric machines instead of big petrol and diesel machines.	110	3.93	0.3509	1	4
Environmental Aspect			3.85	0.3442		

Source: Field Survey, 2018

Table 3 presents the mean value of peer relations ranges from 3.69 to 3.98 where the highest mean is shown by EN.2 whereas the lowest mean is shown by EN.1. Among them, the most significant observation on peer relations is "I don't use chemical fertilizers and pesticides to kill insects in coffee." The least significant observation on peer relations is, "I use less water to grow coffee and to process it into raw materials." The average mean for peer relations is 3.85, which reveals that the coffee produced in Gulmi is environmentally sustainable. Additionally, Table 3 shows that EN.1 has the highest standard

deviation of 0.4642 whereas EN.2 has the lowest standard deviation of 0.1342. This means respondents have more deviation with the statement, "I use less water to grow coffee and to process it into raw materials." i.e. the values in the data set are farther away from the mean on average.

Sustainable Production Practices

If the production practice has considered a triple bottom line approach which includes economic aspect, social aspect, and environmental aspect, then it is considered as sustainable production. This is an independent variable in this research. The practice of sustainable coffee production in the district of Gulmi has been analyzed based on the following three different statements.

Table 4: Sustainable Production Practices

S.No.	Particulars	Mean	SD	CV
SPP1	I am economically benefited by producing coffee beans.	3.70	0.25	0.062
SPP2	I am socially aware.	3.83	0.22	0.05
SPP3	I have been considering the environmental aspect while producing coffee beans.	3.85	0.17	0.03
Average		3.79	0.64	0.05

Source: Field Survey, 2018

Table 4 represents the mean value of sustainable coffee production practices in the district of Gulmi from 3.70 to 3.85 where the highest mean is shown by SPP3 i.e. environmental aspects whereas the lowest mean is shown by SPP1 i.e. economic aspects. Among the statements on "Sustainable coffee production practices in Gulmi district" the most agreed statement is, "I have been considering environmental aspect while producing coffee beans." with the coefficient of variance of 3%. The average mean of sustainable coffee production practices in the district of Gulmi is 3.79 which reveals that there is a good practice of sustainable coffee production] with an average coefficient of variance of 5%. The lower coefficient of the variable is admirable.

Competitiveness

The competitiveness of any product is high when the product has a high competitive advantage. The product is considered as having a high competitive advantage when the product has cost differentiation and product differentiation. Here the competitiveness of the sustainable coffee produced in the district of Gulmi has been measured with cost differentiation i.e. low cost and product differentiation i.e. high quality. The level of competitiveness has been analyzed based on two statements.

Table 5: Competitiveness

Questionnaire	Statements	N	Mean	SD	Min	Max
C.1	The cost of production of my coffee is very low in comparison to profit.	110	3.62	0.5198	2	4
C.2	The coffee that I produce has a unique quality and huge brands prefer it.	110	3.97	0.1342	3	4
	Competitiveness		3.80	0.3270		

Source: Field Survey, 2018

Table 5 shows that the mean value of competitiveness are 3.62 and 3.97 where the highest mean is shown by C2 whereas the lowest mean is shown by C1 among them most significant observation on competitiveness is 'The coffee that I produce has a unique quality and huge brands prefer it.' The least significant observation on competitiveness is, 'The cost of production of my coffee is very low in comparison to profit.' Competitiveness is a dependent variable in this study. The average mean for competitiveness is 3.80, which reveals that the coffee grown in Gulmi with sustainable production

practices has high competitiveness focused on high-quality coffee production. At the same time, the cost of production of the farmers in comparison to profit is also moderately high.

Additionally, Table 5 shows that C.1 has the highest standard deviation of 0.5198 whereas C.2 has the lowest standard deviation of 0.1342. This means respondents have more deviation with the statement, “The cost of production of my coffee is very low in comparison to profit.” in comparison to the other i.e., the values in the data set are farther away from the mean on average.

Correlation Analysis

Pearson’s correlation analysis was carried out for variables having simple multi-option answers. A positive correlation reveals that the direction of the relationship is positive with one increasing in reaction to the other’s increase. Meanwhile, a negative correlation reveals an inverse of the above; an increase in one when the other decreases. Correlation between competitiveness and other variables has been calculated to find out their mutual relationship. Correlation between (1) economic aspect, (2) social aspect, and (3) environmental aspect has been calculated so that the effect of one variable on another variable can be determined. The correlation between these independent variables is shown below:

Table 6: Correlation Analysis

Variables		Competitiveness
Economic Aspect	Pearson Correlation	0.391**
	Sig. (2-tailed)	0.01
	N	110
Social Aspect	Pearson Correlation	0.346**
	Sig. (2-tailed)	0.01
	N	110
Environmental Aspect	Pearson Correlation	0.127
	Sig. (2-tailed)	0.186
	N	110
**. Correlation is significant at the 0.01 level (2-tailed).		

Source: SPSS

Table 6 shows that the Pearson correlation coefficient between the economic aspect of sustainable coffee production practices in Gulmi and its competitiveness is 0.391, which implies that the two variables are positively correlated. The positive coefficient of correlation is 0.391 at a 1% significant level.

The social aspect of sustainable coffee production practices and its competitiveness is 0.346, which implies that the two variables are positively correlated and at a 1% significant level. The environmental aspect of sustainable coffee production practices and its competitiveness is 0.127, which implies that the two variables are positively correlated at 0.265 significant levels. The positive correlation associated competitiveness of the sustainable coffee production practice in the district of Gulmi is affected by the economic aspect, social aspect, and environmental aspects of sustainability.

Hypothesis Testing

Each hypothesis is tested based on Pearson’s correlation coefficient presented in Table-7. Test on each of these hypotheses is discussed below:

H_1 : There is a significant relationship between the economic aspect of sustainable production practices and competitiveness. The correlation analysis shows that there is a positive correlation between the economic aspect of sustainable production practices and competitiveness. The correlation is significant

at 1% where the p-value is less than alpha i.e. $0.001 < 0.01$. Hence, the alternative hypothesis (H1) is accepted.

H₂: There is a significant relationship between the social aspect of sustainable production practices and competitiveness. The correlation analysis shows that there is a positive correlation between the social aspect of sustainable production practices and competitiveness. The correlation is significant at 1% where the p-value is less than alpha i.e. $0.001 < 0.01$. Hence the alternative hypothesis (H2) is accepted.

H₃: There is a significant relationship between the environmental aspect of sustainable production practices and competitiveness. The correlation analysis shows that there is a positive correlation between the environmental aspect of sustainable production practices and competitiveness. The correlation is significant at 1% where the p-value is less than alpha i.e. $0.186 < 0.01$. Hence the alternative hypothesis (H3) is rejected.

Table 7: Summary of Correlation and Hypothesis Testing

Hypothesized Relationship	Estimate		Conclusion
	R	p	
H1: C → EA	0.391	0.01	Accepted
H2: C → SA	0.346	0.01	Accepted
H3: C → ENA	0.127	0.186	Rejected

From the above analyses, it is concluded that the independent variables economic aspect, social aspect, and environmental aspect of sustainable production practices have a significant positive relationship with competitiveness. However, the economic aspect of sustainable production practice has the highest correlation coefficient i.e. 0.391. So, it is concluded that this dimension of recognition has a good impact on competitiveness.

Conclusion

As Nepalese coffee has the potential of export commodity, it should practice sustainable coffee production practices. Though Nepalese coffee is mostly exported to the foreign market, sustainable coffee production practices become a necessity to sustain and compete in international markets. A majority of the farmers responded that they were practicing sustainable coffee production. Mostly they are aware of the environmental aspect of sustainability as the coffee is grown by them is exported to international markets. The research concluded that the independent variables economic aspect, social aspect, and environmental aspect of sustainable production practices have a significant positive relationship with competitiveness. This study reveals that there is no significant relationship between the environmental aspect of sustainable production practices and competitiveness, however, environmental sustainability has been considered as the most important factor for competitiveness these days. But the farmers in Gulmi have been considering the environmental aspect and their coffee has been competing in the international market.

Conflict of Interest

No conflict of interest existed between authors while preparing this article.

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