



# Tourism development affects on farmers household's livelihood: Case study in Vietnam

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## Abstract

Tourism development effects on the livelihood and income of farmers. This study applies the Livelihood Effect Index (LEI) to assess the degree of effect on the farmer's livelihood under tourism at 3 study sites, namely Dien Bien Phu city, Dien Bien district and Muong Nhe district, Vietnam. The LEI index consists of 5 main factors, including Natural capital (N), Human capital (H), Physical capital (P), Social capital (S), Financial capital (F). Results show that the Livelihood Effect Index in Dien Bien Phu city, Dien Bien district, and Muong Nhe district is 0.42, 0.43, and 0.37, respectively. This reflects the moderate level of effect on livelihood by tourism. However, tourism still has a positive impact on the income of farmers, as reflected by 39.39% of total households with increased income through tourism, and 65.43% of households considering tourism as a stable income source. In order to tourism generate main income source for farmers, some solutions are recommended, such as increasing investment capital by local government, upgrading transportation infrastructure, supporting knowledge and skills in tourism business, and subsidizing interest rate for farmers to encourage them to invest in tourism business.

**Keywords** Tourism development · Livelihood effect index · Farmers household's livelihood

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## 1 Introduction

Tourism development brings positive benefits to farmer's livelihood, such as income increase, infrastructure development, transportation improvement, job creation. One other side, tourism also causes competition for land use, commodity price increase, cultural differentiation, and increase in social evils (Aggarwal & Tiwari, 2014; Balodi et al., 2014; Dressler & Fabinyi, 2011; ILO-International Labor Organization, 2012; Tomankova, 2018).

In the context of tourism bringing both positive benefits and negative impacts to farmers in Dien Bien province, Vietnam, the study was conducted to analyze the extent of tourism's impact on farmer's livelihood. This study was conducted at 3 study sites, including Dien Bien Phu city, Dien Bien district, Muong Nhe district, Vietnam, where the number of farming households having tourism-related livelihoods including both direct and indirect activities, accounts for about 40% and is uneven among districts in the province (Field survey results, 2020), from there, determine the extent of the effect of tourism on farmer's livelihood through Livelihood Effect Index (LEI) analysis. The research is to determine which factors are being strongly or slightly affected by tourism, so that there bring recommended solutions to balance between maintaining tourism development and ensuring farmer's livelihood, protecting natural resources for the rural area.

## 2 Literature review

Tourism is seen as an industry that can promote economic and human development (UNCTAD-United Nations Conference on Trade & Development, 2008) and regenerate rural areas, especially those areas heavily affected by traditional farming practices (Chen et al., 2018; Lee, 2008; Stronza & Gordillo, 2008; Zeppel, 2006). Farmers are vulnerable, especially in the context of climate change (Nam et al., 2022), agricultural tourism is also a contribution to increase income for farmers (Song et al., 2022). Tourism also plays an important role in poverty reduction (Ashley, 2000; Goodwin, 2003; Lapeyre, 2010; OECD-Organization for Economic Co-operation & Development, 2008) as a driver of job creation and acceleration for both developing (Briedenhann & Wickens, 2004; Haggblade, Hazell, & Reardon, 2007; Hall, 2004) and developed economies (Cánoves et al., 2004; Lane & Long, 2000; MacDonald & Jolliffe, 2003). The development of tourism-related businesses can contribute greatly to government tax revenue and local development (Ashley, 2000; Pearce & Atkinson, 1993). Thus, previous studies have shown that tourism has an important role in creating jobs, thereby increasing income for people in rural areas.

In addition, tourism has positive impacts on economic development and improves the households' livelihood (Lapeyre, 2010; Liu et al., 2012; Mbaiwa & Stronza, 2010), because through tourism development, some can benefit through new job opportunities, increased income or benefit from aid programs of the government and NGOs (Anup & Parajuli, 2014; Christof & Norman, 2014; Gronau, Winter, & Grote, 2016; Wang et al., 2018). Some have found formal employment, for example, boat operators, resort staff or salespeople (Balodi et al., 2014; Christof & Norman, 2014) indicating that households engaged in various tourism activities, have an average annual income much higher than households engaged solely in agriculture. Moreover, tourism development also helps to increase additional tax revenue, benefits from receiving foreign exchange, improves health

services, education, infrastructure and empowers local people (Bennett & Dearden, 2014; Ko & Stewart, 2002; Li et al., 2006; Tao & Wall, 2009). Shortly, tourism not only develops the household's and region's economy, but also helps rural labors acquire new skills such as selling, driving, being a tour guide, restaurant management, hotel management.

Contrary to the benefits mentioned above, there are many studies that have shown negative points from tourism development such as environmental pollution, rising commodity prices, children making money at a young age. There are also many concerns about the negative impact of tourism development on the environment affecting traditional culture (Christof & Norman, 2014; Krüger, 2005). Along with the increase in the number of visitors, solid waste management issues are increasingly concerned, such as polythene bags, food and beverage packaging at tourist sites, campsites, road and lakeside (Balodi et al., 2014). Although tourism contributes to poverty alleviation for a part of the local population, the benefits obtained are unevenly distributed, in which those with economic capital and higher educational attainment will benefit more (Blake et al., 2008; Chok et al., 2007; Harrison, 2008). With the expansion of tourism, the general ground price also increased as the price of food, land and other goods. While higher income is not enough to lead to higher living standards (because of price increasing) for those who cannot benefit from tourism, their economic situation has indeed deteriorated. In addition to the above price increase, tourism development also leads to other effects such as prostitution or security problems. (Christof & Norman, 2014; Neumeier & Pollermann, 2014) have shown that economic benefits of tourism can be very low, and especially for rural areas without attractive and competitive tourism resources. Thus, increasing income as indicated, people also face rising commodity price, leading to no real increase in living standard. Moreover, the rich decomposition increases day by day, environmental pollution, waste, and children dropping out of school early.

To compare the benefits and costs from tourism, Greiner (2010) used the concept of "net social benefit" to consider the social, economic and environmental impacts simultaneously. It considers whether the benefits are greater than the overall costs and derives that if regional tourism development adheres to ESD (Ecologically Sustainable Development) principles, increased tourism activity will bring economic benefits without incurring social and environmental costs. Therefore, tourism will be planned and managed in such a way and on a scale that it contributes to the generation of livelihoods for future communities without degrading the natural and social environment (Butler, 1999). Thus, in order to determine the net benefits brought by tourism, it is necessary to identify multiple dimensions, considering natural, social, human and financial capital. The influence of tourism on capitals is compiled from the following studies.

To examine the impact of tourism on farmer's livelihood, this study synthesizes experience and results from previous studies. From the original traditional concept of "capital" in economics, it has been further extended to "capital approach" used for theory of sustainable development (Ekins et al., 2008; Goodwin, 2003; Maack & Davidsdottir, 2015), which refers to five sources of capital: natural capital, social capital, human capital, physical capital and financial capital (Kulig et al., 2010; Maack & Davidsdottir, 2015). Scoones (1998) developed the definition of a sustainable livelihood as one that can cope with and recover from stresses and shocks, maintain, or enhance its capabilities and assets, and not depleting natural resources. Therefore, when tourism develops, the goal is maintenance and enhancement of capacities and assets, while not harming natural resources.

The sustainable livelihoods framework was further developed by DFID-Department for International Development (1999), which focuses on happiness and sustainability (well-being, security and capacity, vulnerability and resilience, and sustainability of natural

resources) rather than only economic growth (Atkinson & Hamilton, 2003; Bhandari & Grant, 2007; Pearce & Atkinson, 1993). The Sustainable Livelihoods Framework has proven to be an effective tool for assessing the impact of initiatives and identifying strategies to improve livelihoods sustainability (Lee, 2008; Su et al., 2018; Tao & Wall, 2009). Applying this approach allows researchers to assess the impact on (i) household assets, (ii) other household activities and strategies; (iii) different household goals and (iv) foreign policy environment (Ashley, 2000).

Previous studies (El Kasri et al., 2021; Floričić, 2020; Habeeb & Weli, 2020) have only focused on places where tourism services are available, this study extends to undeveloped tourism areas. At the same time, this study is also different from previous studies, in a way that this deals with the types of historical tourism or tourism associated with the daily life of ethnic minorities.

To sum up, in this study, five capitals were included, based on previous studies (Chen et al., 2018; Jeng, 1992; Wang et al., 2018) including Natural capital, Physical capital, Financial capital, Human capital, Social capital. Specifically, Natural capital is the level of effect on the cultivated land area, soil quality, water quality, other environmental quality by tourism development. Physical capital is understood as the extent to which the infrastructure in the area is affected by tourism, such as local infrastructure, electricity, housing asset, garbage disposal services. Financial capital that is the degree of influence on having money, access to loans by tourism. Human capital research on the effects of tourism for health status, qualifications and skills of labors. In addition, tourism activities also help them improve their language skills (learn new languages), marketing skills (especially in restaurant and hotel services) and translation skills. Social capital, tourism development offers the opportunity to meet people from many different countries and contribute to the preservation of traditional cultural rituals. However, there are some views that the ties between the family and the community are being lost. Many people are no longer able to communicate in the original local language. On the other hand, some expressed concern about the impact of tourism business activities on their communities, with the gap between rich and poor widening and losing traditional socio-cultural values, environmental degradation.

### 3 Methodology

#### 3.1 Study sites

The number of tourists to Dien Bien province has increased steadily over the years. With the increased number of tourists, it has brought revenue to the province's budget, contributing to job creation and increasing farmer household's income. However, compared to more than 85 million domestic tourists and over 18 million international visitors to Vietnam in 2019, the number of visitors to Dien Bien province is still very low. Visitors to Dien Bien are mainly domestic tourist (accounting for over 78%), while international tourists are very few. The study selected 3 study sites with different locations and economic situation in Dien Bien province, including:

- (i) Dien Bien Phu city is the economic center of the province, where there is potential for historical tourism development with historical relics, potential for community

tourism with cultural villages. In Dien Bien Phu city, farmers are combining their livelihoods between agriculture and tourism.

- (ii) Dien Bien district is a district located around Dien Bien Phu City and easily connected with Dien Bien Phu city. Dien Bien district has many tourist attractions and the impact of tourism on farm households is the most obvious.
- (iii) Muong Nhe district has the most remote geographical area, located in the western-most part of Vietnam, and is the most difficult district of Dien Bien province. Due to the underdeveloped economic conditions, the main production is agriculture, the infrastructure is lacking, the education level and the living standards of ethnic groups in the area are still low. Although there is potential for eco-tourism, tourism has not had much impact on the livelihoods of farmers in Muong Nhe district.

### 3.2 Data

According to Yamane (1967), the number of samples were selected to ensure statistical significance as follows:

$$n = \frac{N}{(1 + Ne^2)}$$

In there:

$N$  is the population.

$n$  is the number of samples needed to investigate to ensure representativeness.

$e$  is the level of statistical significance (e.g., the significance level is 95% so  $e=0.05$ ).

A questionnaire was designed and conducted to interview 622 farmer households in the 3 study sites. The information collected from the questionnaire focused on the socio-economic characteristics of household head, the household's livelihood situation, and the effects of tourism development on farmer household's livelihood (Table 1).

### 3.3 Livelihood effect index: LEI

Livelihood Effect Index (LEI) is used to calculate the effect of a certain factor on livelihood capital: human capital, natural capital, physical capital, social capital, financial capital. In this study, the LEI was estimated based on the key factors proposed by (Hahn et al., 2009; Ran et al., 2021; Wang et al., 2022; Wu et al., 2021), the author only estimated the Livelihood Effect Index to clarify the effect of tourism development on the farmers household's livelihood in different study sites. From there, comparison of the effect of tourism development among 3 study sites Dien Bien province was conducted.

The calculation of the Livelihood Effect Index (LEI) follows four steps:

Step 1: The study identified the main factors and components of the LEI index (Table 2)

**Table 1** Survey sample in three study sites

Study site	Number of samples (household)	Rate (%)
Dien Bien Phu city	269	43.25
Dien Bien district	224	36.01
Muong Nhe district	129	20.74
Total	622	100

**Table 2** Main factors and component of the LEI index

No	Main factor	Component in the main factors
1	Natural capital (N)	Cultivated land area, soil quality Water quality Other environmental quality
2	Human capital (H)	Health status Qualifications and skills of the household head and main workers
3	Physical capital (P)	Housing quality Assets for production and daily life Local infrastructure
4	Social capital (S)	Join a local association Community relations Safe, Reputable
5	Financial capital (F)	Save Access to loans

### Step 2: Normalize the data

Data is measured according to different systems and has different units. Therefore, the data need to be normalized, so it does not depend on the unit of measurement allowing consideration on the positive—negative relationship between the factors. Data normalization is applied according to the method in the human development index report of UNDP-United Nations Development Program (2007) \_ENREF\_53.

$$[X_{ij}] = \frac{X_{ij} - \text{Min}X_{ij}}{\text{Max}X_{ij} - \text{Min}X_{ij}} \quad (3.1)$$

$$[X_{ij}] = \frac{\text{Max}X_{ij} - X_{ij}}{\text{Max}X_{ij} - \text{Min}X_{ij}} \quad (3.2)$$

where:

- Formula 3.1 is used for components with a positive relationship, while formula 3.2 is used for components with negative relationship.

$[X_{ij}]$  = is the normalized value of  $X_{ij}$ ;

$X_{ij}$  are the original values (real values) of the  $i$ th component of commune  $j$ ;

$\text{Min}X_{ij}$  and  $\text{Max}X_{ij}$  are the minimum and maximum values, respectively, of the data series  $ij$ .

According to this method, normalization is performed for the data from the lowest level, which are the components. The normalized data range from 0 to 1.

### Step 3: Calculate the main factors

After normalizing the data of the constituent components, the value of the main factor will be the average of the components (after normalization) according to the formula 3.3 below:

$$M_C = \frac{\sum_{i=1}^n [X_{ij}]}{n} \quad (3.3)$$

where:

- $M_C$  is the value of main factor;
- $n$  is the number of constituent components belonging to that main factor.
- $X_{ij}$  is the value of the component  $i$ th at commune  $j$  normalized.

Step 4: Calculation of Livelihood Effect Index:

$$R_C = \frac{\sum_{i=1}^n W_{M_i} M_i}{\sum_{i=1}^n W_{M_i}} \tag{3.4}$$

where:

- $R_C$  are the main factors H/N/F/P/S of each commune.
- $M_i$  is the  $i$ -th principal factor value determined at the formula 3.3
- $W_{M_i}$  is the number of components that make up the  $i$ -th main factor or weight of the principal factor.

After the funding sources are determined, the LEI is calculated according to the following formula:

$$LEI = \frac{\sum_{i=1}^n W_{M_{ci}} R_{ci}}{\sum_{i=1}^n W_{M_{ci}}}$$

where:

- LEI: livelihood effect index of communes and wards in the study.
- $R_{ci}$  is the value of livelihood capital calculated in the formula (3.4);
- $W_{M_{ci}}$  is the number of factors that make up the  $i$ th main factor of each commune or weight of the main factor.

The LEI value ranges from 0 (smallest influence) to 1 (highest influence).

By referring to previous studies, the study classifies the level of influence as follows (Table 3):

## 4 Results

### 4.1 Socio-economic characteristics of respondents

The study was conducted to survey on 622 farm households in Dien Bien province. The interviewees are the heads of households or their representatives who are the decision makers in the household.

The elder respondents have a lot of experience in agricultural production activities (Table 4). However, elderly household heads may find it difficult to access new technologies and business skills in the tourism sector. The head of household is male, accounting

**Table 3** Classification of the level of livelihood effect index—LEI. Source (Botero & Salinas, 2013; Sattar et al., 2017; Urothody & Larsen, 2010)

Value range	Classification of the level of livelihood effect (LEI)
0–<0,25	Low
0,25–<0,5	Medium
0,5–<0,75	High
0,75–1	Very high

**Table 4** Socio-economic characteristics of the survey sample. Source: Field Survey results (2020)

Characteristic	Quantity (Farmer)	Ratio (%)
1. Age of household head		
≤25	12	1.9
26—35	118	18.8
36—45	168	26.8
46—55	147	23.4
≥55	177	28.2
2. Gender of household head		
Female	132	21.2
Male	490	78.8
3. Ethnicity		
Kinh	27	4.3
Thai	512	81.5
Mong	35	5.6
Dao	2	0.3
Others	46	7.3

for a large proportion, in a highland province like Dien Bien province. Livelihood activities are often based on agriculture. However, using human labor is a major difficulty for households with many female employees. Regarding of ethnicity: With many ethnic groups residing, each ethnic group has different culture and customs. This feature helps the province to have a lot of potential for cultural tourism, attracting international tourists to come to experience the culture. However, ethnic minorities have low educational attainment, and many farmers face difficulties in accessing public services such as electricity, sanitation, and clean water.

In Dien Bien province, the tourism development has attracted 40.19% of farm households to participate in many activities to provide tourism services and accompanying services, such as handicraft products, business activities, transportation business, accommodation (Table 5). The development of tourism lead to the development of other economic sectors because tourism products are related to many other sectors in the economy. When tourists start the trip, they use services, such as telecommunications, transportation, finance, commerce, entertainment services, and health care services. When an area becomes a tourist destination, tourists make the demand for all goods and services increase significantly.

## 4.2 The impact of tourism development on the livelihoods of farmers

### 4.2.1 The impact of tourism development on human capital

Results show that 45.6% of households engaged in providing tourism services have used tourism revenue to invest in education (Table 6). Specifically, farming households invest in their children's education, invest in themselves or other family members to participate in short courses, visit and study in other provinces. As a result, human resources in the farmer households are improved. Human resources in the tourism sector include all human

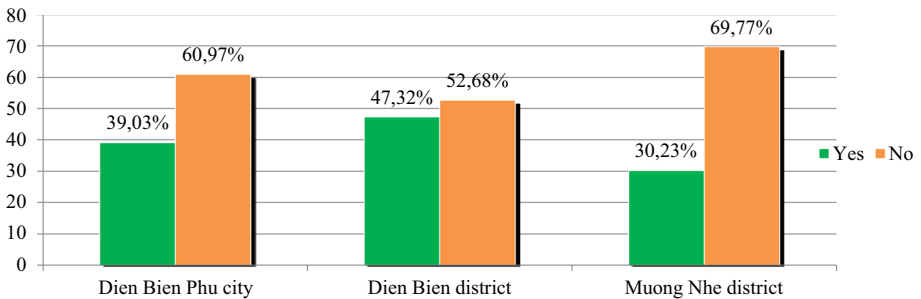


**Table 5** Tourism-based livelihood activities of households in Dien Bien province. Source: Field Survey results (2020)

Index	Quantity (Houshold)	Rate (%)
<i>1. Household has production and business activities related to tourism</i>		
Yes	250	40.19
No	372	59.81
<i>2. Production—business activities related to tourism</i>		
Crafts products	40	16.0
Shop business (food and drink, souvenirs)	77	30.8
Work for hire (salesman, driver, janitor)	104	41.6
Business in accommodation establishments	7	2.8
Transport business	7	2.8
Tour guide	3	1.2
Other (selling agricultural products, performing arts for tourists)	47	18.8

**Table 6** Impact of tourism development on human capital. Source: Survey results (2020)

Index	Measurement	Quantity	Ratio (%)
1. Households invest income from tourism in education	Household	114	45.6
2. Labor in the tourism industry	Person	256	100
- Labor with training	Person	163	63.67
- Labor without training	Person	93	36.33

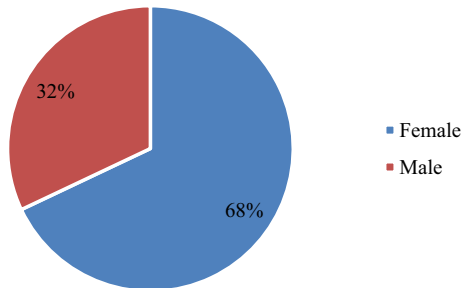


**Fig. 1** Percentage of households providing tourism services by location. Source: Field Survey results (2020)

resources directly and indirectly involved in the process of serving tourists. Direct human resources are those who directly serve tourists at hotels, restaurants, tour operators, tourist shops, and tourism management agencies. Up to 256 employees are involved in direct tourist services. In which, the proportion of trained and trained workers in tourism accounts for 63.67% (Fig. 1).

**Table 7** Influence of tourism development on the relationship of households. Source: Field Survey results (2020)

Level of influence	Quantity (household)	Ratio (%)
Very bad	–	–
Bad	11	1.77
Unchanged	269	43.25
Good	296	47.59
Very good	46	7.40

**Fig. 2** Proportion of direct labor in tourism sector by gender

#### 4.2.2 The impact of tourism development on social capital

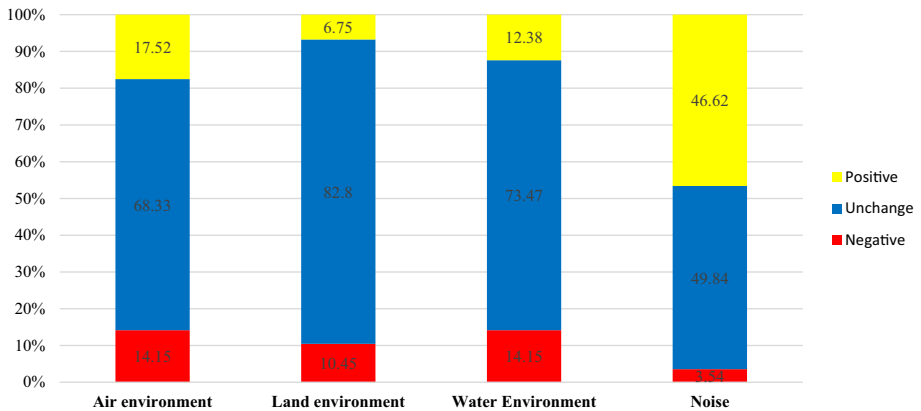
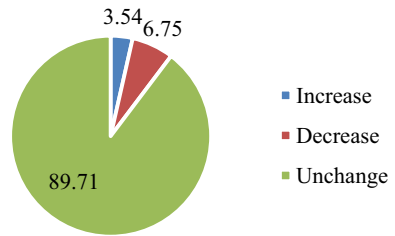
The study evaluates the influence of tourism development on the relationship the farmer households have with neighbors on varying level, from very bad to very good. The results show that the number of farmer households assessed that tourism development leads to a better relationship between farm households, which has a positive impact on the cohesion of farm households (Table 7). Due to the growing form of eco-tourism, community-based tourism requires linkages between farming households. Tourism business activities have helped farmers can cooperate and share benefits, thereby increasing cohesion in the community.

The tourism development makes the demand for laborers in the tourism sector increase. For a highland province like Dien Bien province, tourism development has affected the position of women in the family. Tourism development provides opportunities for employment and income, thereby helping women increase their status in the family and society. Women make up 68% of the direct workforce in the province's tourism sector (Fig. 2). Given the high proportion of women involved in the tourism industry, it is clear that the tourism industry has the potential to be a vehicle for women's empowerment in Dien Bien province.

#### 4.2.3 The impact of tourism development on resource capital

Studies by Schott, Kalatas, Nercissians, Barkmann, and Shelia (2016), Su et al. (2018), Aggarwal and Tiwari (2014) have shown that tourism development has a great influence on land resources. Through the sale or acquisition of land, a farmer household's land can increase or decrease. In Dien Bien province, tourism businesses such as opening tourist resorts, building motels, hotels or constructing public works have affected the land resources of farmers.

**Fig. 3** Impact of tourism development on farmer household's land area. Source: Survey results (2020)



**Fig. 4** Assessment of negative externalities of tourism. Source: Survey results (2020)

Although the number of households losing or increasing their land area due to tourism development accounts for a small percentage, 3.54% and 6.75%, respectively, this shows that tourism has affected land resources (Fig. 3).

About 10% of farmer households believe that tourism development has made the air, soil and water environment worse (Fig. 4). Water pollution is attributed to increase in wastewater from tourism activities; air pollution is due to increased number of vehicles; degradation and soil erosion are due to deforestation or conversion of land use purposes.

#### 4.2.4 Impact of tourism development on physical capital

The test results show that the type of household and their assets have a relationship with each other. The percentage of households owning permanent houses and properties of tourism business households is higher than that of non-tourism households (Table 8). Thus, tourism development has contributed to helping households increase their capital.

#### 4.2.5 Impact of tourism development on financial capital

Comparison between the income of households with tourism business activities and those without tourism business was also conducted. Research shows that percentage of households doing tourism business has a much higher income than households without tourism

**Table 8** Situation of physical capital of households. Source: Survey results (2020)

Indicator	Household with tourism business		Household without tourism business		Chi-Square	DOF	Sig
	Quantity (household)	Ratio (%)	Quantity (household)	Ratio (%)			
1. Type of house					9.954	2	0.007***
Simple house	21	8.4	18	4.84			
Semi-solid house	141	56.4	253	68.01			
Solid house	88	35.2	101	27.15			
2. Household property owned							
<i>Refrigerator, air conditioner</i>					27.44	1	0.000***
Yes	206	82.4	237	63.71			
No	44	17.6	135	36.29			
<i>Motorcycle</i>					3.239	1	0.072
Yes	242	96.8	348	93.55			
No	8	3.2	24	6.45			
<i>Computer</i>					11.811	1	0.001***
Yes	38	15.2	25	6.72			
No	212	84.8	347	93.28			
3. Type of toilet that household is using							
Septic/semi-septic/sanitary	220	88	275	73.92	18.230	1	0.000***
Raw/without	30	12	97	26.08			

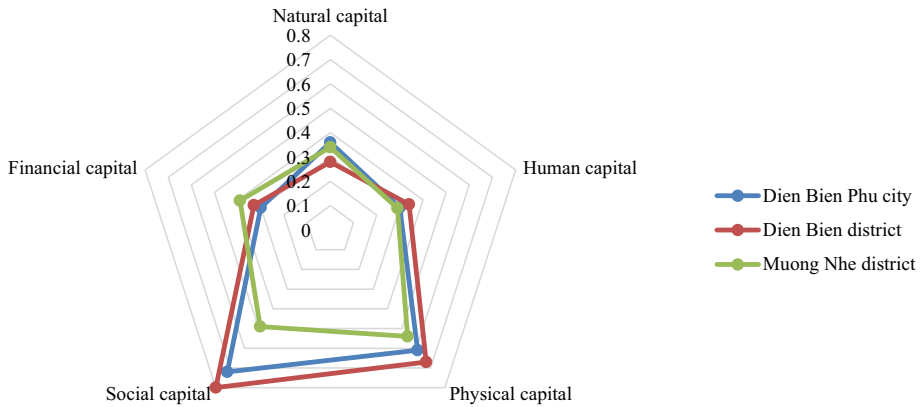
**Table 9** Average monthly income of households. Source: Survey results (2020)

Average income	Household with tourism business		Household without tourism business	
	Quantity (household)	Ratio (%)	Quantity (household)	Ratio (%)
< 5 million VND	40	16.00	212	56.99
5–10 million VND	167	66.80	140	37.63
10–15 million VND	26	10.40	11	2.96
15–20 million VND	11	4.40	8	2.15
> 20 million VND	6	2.40	1	0.27
Chi-square	110.21			
df	4			
Sig	0.000			

business. Most of the tourism business households have incomes ranging from 5 to 10 million VND/month and from 10 to 15 million VND/month. A few farming households have an income of 15–20 million VND/month and over 20 million VND. Most of these households are tourism businesses (Table 9).

**Table 10** LEI based on 5 main factors. Source: Analysis from survey results (2020)

No	Main factor	Number of constituent component	Dien Bien Phu city	Dien Bien district	Muong Nhe district
1	Natural capital	6	0.36	0.28	0.34
2	Human capital	3	0.30	0.34	0.29
3	Physical capital	3	0.61	0.67	0.54
4	Social capital	3	0.72	0.80	0.49
5	Financial capital	6	0.30	0.33	0.39
LEI			0.42	0.43	0.37



**Fig. 5** Diagram showing the LEI value on natural capital, human capital, physical capital, social capital and financial capital. Source: Analysis from survey results (2020)

### 4.3 Assessing the impact of tourism development on farmers’ livelihoods

#### 4.3.1 Impact of tourism development on livelihood capital

The LEI—Livelihood Effect Index is based on 5 main factors, including: natural capital (N), human capital (H), physical capital (P), social capital (S), capital finance (F). The LEI value is estimated and classified in the 3 different study sites, namely: Dien Bien Phu city, Dien Bien district and Muong Nhe district. Finally, comparing the LEI value to consider the level of tourism development in these study sites was conducted.

The average LEI results show that tourism development has affected the livelihood capital of farm households. The LEI value in all three study areas ranges from 0.33 to 0.5, in which the LEI of Dien Bien Phu city and Dien Bien district is higher than Muong Nhe district (Table 10). This result shows that influence of tourism development on the farmers’ livelihoods in Dien Bien province is at an average level. In other words, tourism has not yet made a big change in the livelihoods of farmer households (Fig. 5).

**Table 11** Tourism-income level in farmer households. Source: Survey results (2020)

Indicator	Quantity (household)	Ratio (%)
<i>1. Monthly income from tourism</i>		
< 3 million VND	128	51.2
3–6 million VND	88	35.2
6–10 million VND	28	11.2
≥ 10 million VND	6	2.4
<i>2. Average rate of income from tourism</i>		
< 50%	104	41.63
50–70%	91	36.4
70–90%	39	15.6
≥ 90%	16	6.4

**Table 12** Change household income due to tourism development. Source: Survey results (2020)

Indicator	Quantity (household)	Ratio (%)
<i>1. Change in income</i>		
Increase	245	39.39
Unchanged	370	59.49
Reduction	7	1.13
<i>2. Monthly income increase</i>		
< 5 million VND	199	81.22
5–10 million VND	42	17.14
≥ 10 million VND	4	1.63

### 4.3.2 Impact of tourism development on household income

Tourism activities contribute to poverty reduction, income increase, job creation, and farmer livelihoods improvement in tourist destinations. To better clarify the impact of tourism development on income, the study estimated monthly tourism income for farmer households.

Through monthly income level from tourism business activities, the percentage of households with different income levels is calculated out of the total 250 households that have participated in providing tourism services. Households engaged in tourism business with income from tourism under 3 million VND accounted for 51.2%, while those with income amounting to 3 to 6 million VND monthly accounted for 35.2% (Table 11). Only 6.4% of farmer households have income from tourism accounting for over 90%. This shows that the participation of households in tourism activities is not high.

Up to 39.39% of respondents assessed that tourism development has increased income for households. Up to 81.22% of households have an increase in monthly income of less than 5 million VND/month. Only a small percentage, 1.63%, of households increased their income at more than 10 million VND/month (Table 12). Thus, tourism development has created opportunities for many households to increase their income. However, the income growth rate of households is still low, showing that the efficiency of tourism business is not high.

## 5 Implication

This study was conducted in the mountainous areas of Vietnam, where there are many ethnic minorities, the economy is still underdeveloped. Results show the LEI—Livelihood Effect Index in Dien Bien Phu city, Dien Bien district, and Muong Nhe district is 0.42, 0.43, and 0.37 (Table 10), respectively, showing the influence of tourism on farmers' livelihood in three study sites at medium level. This means that tourism has a weak impact on farmers's livelihood where the economy is less developed, moderate impact on farmers in economically developed areas.

Furthermore, Dien Bien Phu city, where there is economic development, has high influence of tourism development on natural capital, there are many changes in resources such as land, water, and environment.

Dien Bien district has also a place of economic development, the most effected social capital from tourism activities. In Dien Bien district, their form of community-based tourism has encouraged the people to expand their relationships and increase connection with surrounding households to develop tourism together.

While Muong Nhe district where the economy is underdeveloped, financial capital effected by tourism development than the other two sites which is mainly due to lack of capital. Tourism activities have not really developed, so the tourism-income in Muong Nhe district is still low.

Regarding negative impacts, this study also highlights the negative impacts of tourism. That is a small number of farmer households stated that tourism development causes a decrease in household income because commodity prices in the region rise faster than incomes. Research results by (Aggarwal & Tiwari, 2014; He et al., 2021; Henry M. Ijeomah, 2012; Hwang & Lee, 2015) all concluded that tourism has effected the goods price, traditional livelihood activities. Although only 1.13% of farmer households have their income reduced due to tourism, this still shows a negative side of tourism development.

Another negative side, tourism and the environment have a relationship together. Environment and landscape, forestry are necessary conditions for tourism development. In the process of tourism development, tourism-related activities have an impact on the environment. Tourism development helps to preserve, embellish, and improve the environment in tourist areas. However, there are many studies such as that of (Atik, Altan, & Artar, 2010; Gaughan et al., 2009; Soriya, 2006; Wang & Liu, 2013) which show that tourism development can increase water pollution, waste, noise.

This study implies that in mountainous areas, the economy is underdeveloped, natural conditions are difficult, and there are many ethnic minorities. This study has shown that tourism has both social benefits and social costs for ethnic minorities in Dien Bien province. However, the extent of tourism's impact on capitals such as natural capital, human capital, physical capital, and financial capital is still at moderate level in Dien Bien province. The most obvious impact is that tourism increases incomes for ethnic minorities, but also creates water pollution, waste, and increased commodity prices. The nature of LEI is momentary, while tourism development and farmers' livelihood in mountainous areas have a long-term relationship, therefore, ethnic people need to determine to protect resources, capitals in the long-term during tourism development context.

## 6 Conclusion

This study was conducted in the mountainous areas of Vietnam, where there are many ethnic minorities, to analyze the positive and negative effects of tourism on farmer's livelihood. Previous studies have mainly studied in developed tourism areas, this study has been different, that is, carried out in mountainous areas, ethnic minorities, community-based tourism, and eco-tourism. Base on a synthesis of previous studies, the study used the LEI to examine how tourism affects farmers' livelihood, including such as: Natural capital (cultivated land area, soil quality, water quality, other environmental quality), Physical capital (housing quality, assets for production and daily life, local infrastructure), Financial capital (saving money, access to loans), Human capital (health status, qualifications and skills of the household head and main workers), Social capital (join a local association, community relations).

This study demonstrated that farmers' livelihoods were moderately affected by tourism development, with the LEI ranging from 0.37 to 0.43. Emphasize that, the results showed that 39.39% of households increased their income through tourism activities, and 65.43% of households assessed that tourism created a stable source of income. Regarding creating jobs, tourism also creates opportunities for many workers away from home to return to work locally. However, tourism also brings negative effects to farmers, with 59.6% of households saying that tourism development causes prices to increase, environmental pollution, it is clear that tourism development also increases the cost of living of households.

With the goal of balancing in the long-term, between tourism development and economic development of farmers in mountainous areas, for ethnic minorities, a number of solutions are given as follows: increasing investment capital, prioritizing the completion of traffic infrastructure, creating favorable conditions for passenger's travel, strengthening training programs on tourism business for ethnic minority workers, adopting policies to support ethnic minorities in changing jobs in an effective and sustainable manner. The local and national government needs to have financial policies to support interest rates for mountainous farmers in order to encourage people to expand investment and apply new technologies in tourism business. At the same time, local governments issue regulations so that tourism has less impact on the natural environment.

This study results can only be compared with another study when the same set of tools, methodology and the same selection of sub-components. Therefore, it is necessary to continue conduct other study for the standardization of sub-components so that the results can be compared when carried out in different locations. In addition, the following studies can apply econometric models to show the relationship between farmers' livelihoods and capitals.

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