Residents' perception and impact of COVID-19 on ecotourism in West Africa: The case of Banco National Park in Côte d'Ivoire

Bruno Enagnon Lokonon [*], Essomanda Tchandao Mangamana, Romain Glèlè Kakaï

Laboratoire de Biomathématiques et d'Estimations Forestières, Faculté des Sciences Agronomiques, Université d'Abomey-Calavi, 04 BP 1525, Cotonou, Benin

ABSTRACT

Ecotourism, as a means of fostering socio-economic level of local communities and contributing to the conservation of forest resources, is important for development in low-income countries. This work investigates the extent to which local people support the continuation of ecotourism during the COVID-19 pandemic and their attitudes towards resource conservation in Banco National Park in Côte d'Ivoire using social exchange theory (SET) as a foundation. A closed-ended questionnaire was used to conduct a survey with 150 informants selected among residents around the park. The data were analyzed using descriptive, correlational, and Partial Least Squares Structural Equation Modelling (PLS-SEM) approaches. The results showed that residents' perception of the impacts of ecotourism strongly affects their support for tourism development during the COVID-19 pandemic ($\beta = 0.918$, $p < 0.05$). The socio-cultural ($\beta = 0.275$, $p < 0.05$) and environmental ($\beta = 0.309$, $p < 0.05$) benefits of ecotourism are the key determinants of the residents' perception and their support for ecotourism within the park during COVID-19 pandemic. The findings also revealed that economic benefits from ecotourism are linked to residents' perceptions of the qualities of the tourism place ($\beta = 0.363$, $p < 0.05$). Overall, local people around Banco Park recognize that ecotourism produces more benefits than detriments. The COVID-19 pandemic, a painful and unexpected event, has not blunted their support for the continuation of ecotourism. This study calls for the integration of local residents' opinions in the development of the ecotourism sector in Côte d'Ivoire. It is a first step in determining residents' attitudes towards ecotourism in West Africa in a post-COVID context, and the results constitute a starting point for future studies.

1. Introduction

The International Union for Conservation of Nature (IUCN) defines ecotourism as environmentally sound travel and visitation to relatively undisturbed natural sites, motivated by the observation and appreciation of nature (and all its associated features), that promotes conservation, minimizes visitor impact, and facilitates the active socio-economic participation of local people [1]. In Côte d'Ivoire, the ecotourism sites are composed of 16 Protected Areas (PAs) with a total area of approximately 2,100,000 ha. This represents 6.5 % of the national territory [2]. The specific diversity of the 16 PAs is composed of 4800 species of African forest flora, 232 species of mammals, including 12 endemic species, 712 species of birds, and 56 species of amphibians. This study focuses on Banco

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National Park, which is one of the 16 PAs in Côte d'Ivoire.

The choice of this park is justified by its significance for ecotourism, as it is the most visited park in the country per year [2]. Banco National Park is a peri-urban park located in the heart of the economic capital of Côte d'Ivoire, Abidjan. The COVID-19 pandemic has mostly impacted the economic capital where Banco Park is located [3].

The ecotourism industry in Côte d'Ivoire has experienced contrasted phases of development and regressions related to the economic and political events punctuating the recent history of the country [4]. The ecotourism sector in Côte d'Ivoire was revitalized following the 58th meeting of the UNWTO Commission for Africa in 2016 [2], but the COVID-19 pandemic has since broken this trend. Côte d'Ivoire recorded its first case of COVID-19 on March 11, 2020, with an Ivorian arriving from Italy [3]. On March 16, 2020, five days after the first case was identified, the National Security Council issued 13 restrictive measures to limit the spread of the epidemic. The measures included a 15-day renewable suspension of entry into Côte d'Ivoire for non-Ivorian travelers from countries with more than 100 confirmed cases of COVID-19. On March 23, a state of health emergency was declared. Additional restrictions were imposed, including a curfew from 9 p.m. to 5 a.m. and a prohibition on unauthorized travel between Greater Abidjan and the country's interior. The epidemic became essentially an urban epidemic: 95 % of cases were declared in Greater Abidjan. The urban containment was extended until July 15. On July 1, 2020, Côte d'Ivoire reopened its airspace, which had been closed since March, to international flights, and all arriving passengers subjected to systematic health checks [3].

In Côte d'Ivoire, the COVID-19 pandemic has had a severe impact on slums and informal sectors, leading to income and job losses due to the closure of workplaces [5]. This has also been the case for people living around the Banco Park due to restrictive measures. The interruption of air travel and the containment and isolation of Abidjan from the other localities in Côte d'Ivoire have affected the number of tourists entering the Banco Park. Indeed, based on annual data on tourist visits in the Banco Park from the Ivorian Office of Parks and Reserves, there has been an 89.46 % decrease in visits in 2020 compared to 2019 when the restrictive measures were implemented in Abidjan (unpublished). The consequence was job and income losses for residents who rely on tourism-related activities [6]. Knowing that local people around protected areas often have limited resources and depend on natural resources [7,8], this may increase illegal activities such as poaching and cutting in the park [9].

Participatory management of the Banco Park began in 2002 with the aim of involving local people in income-generating activities related to the development of ecotourism on the site [10]. This approach aimed to combat the illegal exploitation of the park's resources (charcoal cutting, poaching, harvesting of medicinal plants, market gardening, etc.). Unfortunately, two events, namely the political crisis and the health crisis linked to COVID-19, have created fear and uncertainty within the population about social development.

Several studies have assessed the impact of COVID-19 on ecotourism [11–14], but very few have focused on local people's perceptions, especially in West Africa. In recent decades, there has been increased interest in the assessment of residents' attitudes towards ecotourism [15]. However, such an assessment remains much more limited in West Africa compared to other parts of the world [16].

This study aims to use the Social Exchange Theory (SET) framework to analyze the local people's abilities to support the continuation of ecotourism in the park of Banco during the COVID-19 pandemic and their attitudes towards the conservation of the resources in the park. SET has proven to be a suitable theoretical framework for understanding local people's perceptions [13,17]. Research questions addressed in this study are: (i) what factors influence residents' support of ecotourism and its continuation during the COVID-19 pandemic in Banco Park? (ii) What variables determine residents' perceptions of ecotourism in Banco Park? And (iii) what are the determinants of the socio-cultural, economic, and environmental importance of ecotourism for local people around Banco Park?

2. Literature review and hypotheses formulation

Tourism can be seen as a two-faceted entity due to its impact on destination and host communities. Several studies on tourism development have assessed residents' behaviours in relation to perceived personal benefit from the activity [18–20]. A number of studies have also explored residents' attitudes towards tourism during the COVID-19 pandemic [20–22]. The results from these studies showed that residents may have approval or disapproval attitudes towards tourism development. Previous studies recognize the role of locals in tourism development as its success depends on active support and hospitality from residents [20]. The perception on tourism varies between regions and even among individuals from the same region.

These differences may result in diverse levels of community involvement in the decision-making process regarding local tourism [23]. For reference [24], tourism has three impact categories, namely environmental, economic, and socio-cultural impacts. Tourism can contribute to job opportunities, improve local economies and increase the willing to protect the natural and environmental resources on which tourism depends [20]. However, tourism can also bring costs for residents reflected mainly in commodity price inflation, rising costs of living, loss of cultural identity [20]. In the face of COVID-19 pandemic, some residents have already shown their discrimination against tourism [25], while others may want to accept tourism in their regions to support the recovery of the economy [26,27]. In West Africa, and in Côte d'Ivoire in particular, it is still unclear the residents' attitudes towards ecotourism amid a life-threatening pandemic such as COVID-19. This study aims to contribute to fill this gap. From the above, the following hypotheses were formulated to assess residents' perception of ecotourism and its continuation during the COVID-19 pandemic in Banco Park:

Hypothesis H1. Residents' perception of ecotourism positively influences their support to ecotourism and its continuation during the COVID-19 pandemic.

Hypothesis H2. A good perceived image of Banco Park is positively associated with the support to ecotourism and its continuation during the COVID-19 pandemic.

Hypothesis H3. Economic benefits positively affect residents' perception of ecotourism.

Hypothesis H4. Socio-cultural benefits positively affect residents' perception of ecotourism.

Hypothesis H5. Environmental benefits positively affect residents' perception of ecotourism.

Hypothesis H6. Residents' awareness of ecotourism importance is associated with the perceived economic benefits.

Hypothesis H7. Residents' awareness of ecotourism importance is associated with the perceived socio-cultural benefits.

Hypothesis H8. Residents' awareness of ecotourism importance is associated with the perceived environmental benefits.

Hypothesis H9. Perceive a good image of Banco Park is associated with economic benefits from ecotourism.

Hypothesis H10. Perceive a good image of Banco Park is associated with socio-cultural benefits from ecotourism.

Hypothesis H11. Perceive a good image of Banco Park is associated with environmental benefits from ecotourism.

3. Material and methods

3.1. Study area

The Banco National Park, located in the south of Côte d'Ivoire in Abidjan at 5°21′ and 5°25′ north latitude and 4°1′ and 4°5′ west longitude (Fig. 1), is the focus of our investigation. It was established by decree of October 31, 1953, with an area of 3474 ha [4]. According to the current administrative division, the park spans the communes of Adjamé, Yopougon, and Abobo. It is known for its relic of dense evergreen and psammohygrophilous forest, and it is considered the "lung" of Abidjan [4]. The Banco River, which originates in the north of the park and flows through it to the south, is the main component of the park'sriver system. The main localities around the park are Anonkpoi-Koute, Abobo-Sagbe, Maca, Agban-Village, and Agban-Attie (Fig. 1). Several economic activities are developed by the local people in these localities, including artisanal and informal activities such as car junkyards, fish smoke shops, and commercial enterprises [10].

3.2. Model theoretical framework

This study considered Social Exchange Theory (SET), which is widely used framework to understand social behavior [16,28–30]. SET is usually used to understand the quality of relations between people and between people and resources under specific conditions. The highlighted condition that necessitates this work is the COVID-19 pandemic. The COVID-19 pandemic has affected the interaction between people and natural resources in West Africa, and it is important to understand at what scale the pandemic has caused damage to this interaction in the sector of ecotourism. One of the advantages of using this approach is that it can explain perceptions and
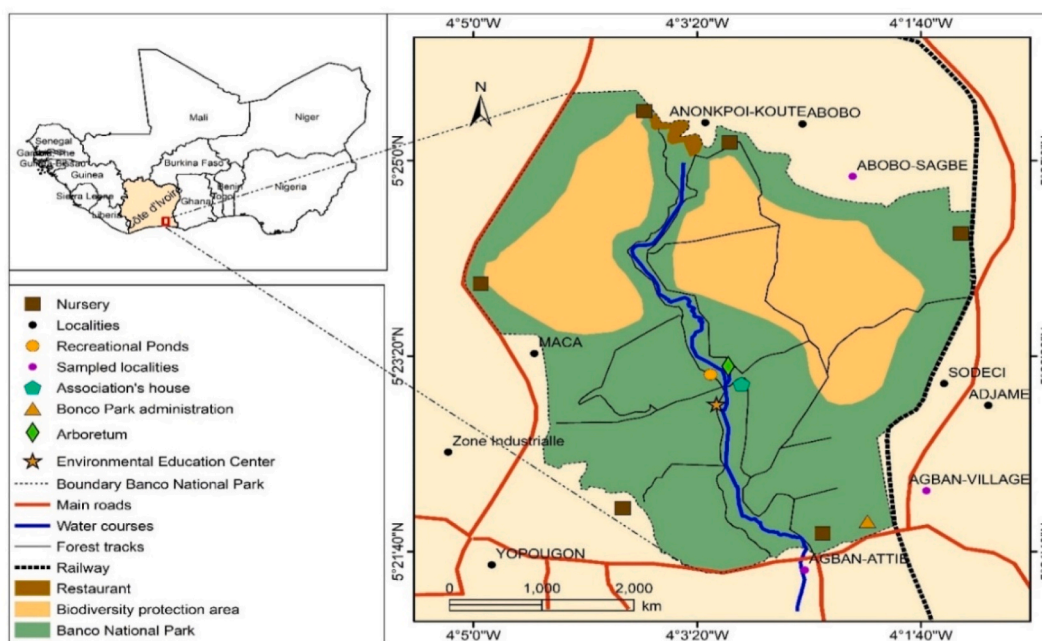

Fig. 1. Map of Banco national park showing the sampled localities.

examine relationships both individually and collectively [31]. Three aspects of ecotourism were considered in this work: economic, environmental, and social. Ecotourism is known to create job opportunities, increase income for residents, allow environmental conservation, and preserve traditional cultural heritage [32]. SET suggests that people's attitudes toward ecotourism are influenced by the importance of ecotourism for themselves, their communities, and the image of the allocated sites for this activity [33,34]. The theoretical framework of this work is defined in Fig. 2 and is adapted from Ref. [13].

3.3. Data collection

First, an exploratory study was conducted with 30 randomly selected residents [35]. The proportion of people knowing the Banco park and with direct and indirect implications in the management of the park was determined to be P = 27/30, P ∼ 0.9. With the value of P, the sample size was computed using the normal approximation of the binomial distribution [35]:

$$n = U_{1-\alpha/2}^2 \left[P(1-P) / d^2 \right],$$

where:

- n is the total number of sampled residents;
- $U_{1-\alpha/2}$ = 1.96 for α = 0.05;
- P is the estimated proportion of the participants in the exploratory study.
- d is the expected error margin of any parameter to be estimated from the interviews (d is equal to 5 %).

The sample size was estimated at n = 150 respondents, randomly selected around the park. The respondents must have direct and/ or indirect implications in the management of the park. The survey was undertaken between April and June 2022. The research tool was a closed-ended questionnaire designed following reference [13] (see the questionnaire in the supplementary material). The main response variable in the study was support for ecotourism and its continuation during the COVID-19 pandemic (ECC). The explanatory variables influencing the ECC were residents' perceptions of ecotourism (RPE), the perceived image of Banco Park (PI), socio-cultural (SCE), economic (EE), environmental (EI) factors, and residents' awareness of ecotourism's importance (AEI). Each variable was measured using a five-point Likert scale, with (1) indicating strongly disagree, (2) indicating disagree, (3) undecided, (4) agreeing, and (5) strongly agreeing. Items were defined for each variable, and each item was measured using the five-point Likert scale. Table 1 below summarizes the variables and the associated items.

3.4. Statistical analysis

3.4.1. Descriptive statistics
Descriptive statistics were used to analyze the demographic characteristics of the sampled respondents. Moreover, mean values, standard deviation, skewness and kurtosis values of the Likert scales for all the constructs and their items were computed.

3.4.2. Spearman correlation analysis
Since Likert scales are ordinal data, we used non-parametric test for the analyses [36]. Spearman correlation was performed to assess the relationship between the variables.
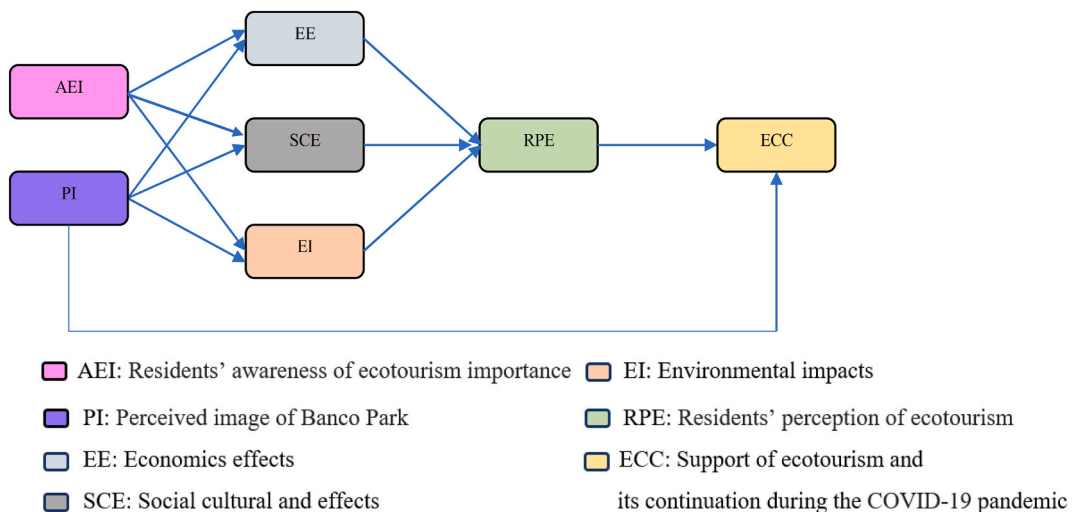
Fig. 2. Diagram of the Social Exchange Theory framework.

- AEI: Residents' awareness of ecotourism importance
- PI: Perceived image of Banco Park
- EE: Economics effects
- SCE: Social cultural and effects
- EI: Environmental impacts
- RPE: Residents' perception of ecotourism
- ECC: Support of ecotourism and its continuation during the COVID-19 pandemic

Table 1
Variables and their associated items adapted from Ref. [13].

Variables	N° items
ECC	**Support of ecotourism and its continuation during the COVID-19 pandemic (ECC)**
	1 During the COVID-19 pandemic, ecotourism activities should continue in the park.
	2 I want to see tourists in the park during the COVID-19 pandemic.
	3 I express my support to ecotourism continuation during COVID-19 pandemic in Banco park.
RPE	**Residents' perception of ecotourism (RPE)**
	1 Ecotourism in the park must be based on the nature protection and residents' culture.
	2 Ecotourism in Banco park should be based on environmental education.
	3 Ecotourism during COVID-19 pandemic should promote environmental awareness among locals.
PI	**Perceived image of Banco Park (PI)**
	1 There is a friendly collaboration between visiting tourists and residents of the park.
	2 The environment of this park is beautiful and attractive.
	3 The park officials do their job well.
SCE	**Socio-cultural effects (SCE)**
	1 The public services have improved around Banco park during COVID-19 pandemic.
	2 During COVID-19 pandemic, residents and tourists had more recreational opportunities.
	3 Tourists had many shopping opportunities during COVID-19 pandemic.
EE	**Economic effects (EE)**
	1 The ecotourism is important for residents' income, even during COVID-19 pandemic.
	2 The economic benefits from ecotourism are greater than its negative consequences.
	3 More job opportunities could be created for residents during the pandemic.
EI	**Environmental impacts (EI)**
	1 The presence of tourists during COVID-19 has a negative effect on the environment.
	2 The park becomes very crowded due to the presence of tourists during COVID-19 pandemic.
	3 Long-term planning by ecotourism official's in the park can control the negative impacts of COVID-19.
AEI	**Residents' awareness of ecotourism importance (AEI)**
	1 I am aware of the government's role in the development of ecotourism in the Banco park.
	2 I am aware of economic importance regarding ecotourism development during COVID-19 pandemic.
	3 I am aware of cultural importance regarding the development of ecotourism.

All 150 respondents in the study were informed about the objectives of the study and gave their consent to participate. The social exchange theory (SET) was used in this study as a foundation and adapted from Ref. [13]. The work was performed in accordance with relevant guidelines/regulations including the Declaration of Helsinki.

3.4.3. Common method bias

As all data originates from the same survey, common method bias has been assessed. Following reference [37], a multicollinearity assessment was performed. It was noted that all variance inflation factors were less than 3, indicating that the data considered is free from common method bias.

3.4.4. Partial least squares structural equation modelling (SEM)

This study used Structural Equation Modelling to assess residents' support for ecotourism in the Banco Park. Two different approaches exist for SEM: covariance-based SEM (CB-SEM) and variance-based SEM. Among the variance-based SEM, the partial least squares structural equation modelling (PLS-SEM) is a non-parametric method superior to CB-SEM in terms of sample size and data normality and for complex models [38]. Therefore, we considered using PLS-SEM to perform the model. The R package seminr was used to implement the model. The model was run following a two-step method, with the measurement model being run first, followed by the structural model. Goodness of fit tests and different metrics were used to assess the relevance of the model.

All analyses were performed in R software version 3.6.1 [39].

Table 2
Socio-demographic characteristics of the residents.

	Size of sample	Percentage (%)
Locality:		
Agban-Attie	63	42
Agban-Village	45	30
Abobo-Sagbe	42	28
Age group:		
Youth (less than 30 years old)	36	24
Adults (more than 30 years old)	114	76
Gender:		
Men	120	80
Women	30	20

4. Results

4.1. Background of respondents

Table 2 shows the demographic characteristics of the residents sampled for the study. They respondents were from Agban-Attie (42 %), Agban-Village (30 %) and Abobo-Sagbe (28 %). The average age of the informants was 46.98 years, with 24 % of young people, and 76 % of adult people, respectively. In addition, 20 % of the respondents were women and 80 % were men.

The characteristics of the dataset were revealed through the computation of mean, standard deviation, skewness and kurtosis values for the constructs and their items (Table 3). The values of skewness (<3.0) and kurtosis (<5.0) indicated that the data was normally distributed [40]. Table 3 show that the respondents agree with the continuation of ecotourism during the COVID-19 pandemic in Banco Park (mean values for ECC1 and ECC2 > 4). They perceived also that ecotourism in the park must be based on the nature protection and their culture (mean values for RPE1>4). Moreover, the ecotourism is important for their income, even during COVID-19 pandemic (mean values for EE1 and AEI2 >4).

4.2. Correlation between the variables

Table 4 presents the Spearman correlations between the variables in the study. The table shows that there were positive correlations between the variables, and all the correlations were significant.

4.3. Analysis of the measurement model

The measurement model was assessed for reliability and validity. The composite reliability (CR), variance inflated factors (VIF), Cronbach's Alpha (RhoA), average variance extracted (AVE) and factor loading were computed to evaluate the convergent validity of the measurement model (Table 5). The CR coefficient and RhoA must be greater than 0.60 for adequate convergent validity of latent variables [41]. VIF should be less than 3 since a VIF value of more than 3 implies collinearity [38]. The AVE values must be greater than the cut-off of 0.5 [41]. Furthermore, the factor loadings of the items must be greater than 0.70 for measuring construct validity [38]. Overall, all goodness of fit measures are within the threshold limit, indicating adequate convergent validity of the measurement model.

Heterotrait-monotrait ratio of correlations (HTMT) and Fornell-Larcker criterion analysis [42,43] were used to assess the discriminant validity of the measurement model (Table 6). Table 6 shows the square root of the AVE values as the diagonal (in bold), while the Pearson correlation coefficient between the variables are below the diagonal. The values above the diagonal are the HTMT criterion. The square root of the AVE of a latent variable should be greater than its correlation scores with all other latent variables, and the HTMT criterion must be less than 0.90. Overall, both criteria confirm discriminant validity.

Table 3

Overview of variables and items.

Constructs and variables	Code	Mean	SD	Kurtosis	Skewness
Support of ecotourism and its continuation during the COVID-19 pandemic (Average)	ECC	3.79	0.80	2.05	−0.15
During the COVID-19 pandemic, ecotourism activities should continue in the park	ECC1	4.39	0.74	2.20	−0.75
I want to see tourists in the park during the COVID-19 pandemic	ECC2	2.97	1.29	1.91	0.30
I express my support to ecotourism continuation during COVID-19 pandemic in Banco park	ECC3	4.01	1.01	2.03	−0.54
Residents' perception of ecotourism (Average)	RPE	3.31	0.96	2.28	0.05
Ecotourism in the park must be based on the nature protection and residents' culture	RPE1	4.02	0.94	2.24	−0.53
Ecotourism in Banco park should be based on environmental education	RPE2	2.93	1.26	2.05	0.15
Ecotourism during COVID-19 pandemic should promote environmental awareness among locals	RPE3	2.97	1.29	1.91	0.30
Perceived image of Banco Park (Average)	PI	2.95	0.97	2.53	0.34
There is a friendly collaboration between visiting tourists and residents of the park	PI1	2.74	1.23	2.30	0.44
The environment of this park is beautiful and attractive	PI2	3.18	1.19	2.01	0.03
The park officials do their job well	PI3	2.93	1.33	1.91	0.29
Socio-cultural effects (Average)	SCE	2.61	0.98	2.92	0.66
The public services have improved around Banco park during COVID-19 pandemic	SCE1	2.43	1.21	2.90	0.83
During COVID-19 pandemic, residents and tourists had more recreational opportunities	SCE2	2.88	1.29	2.00	0.17
Tourists had many shopping opportunities during COVID-19 pandemic	SCE3	2.53	1.20	2.73	0.67
Economic effects (Average)	EE	3.04	0.77	2.69	0.42
The ecotourism is important for residents' income, even during COVID-19 pandemic	EE1	4.39	0.76	2.15	−0.77
The economic benefits from ecotourism are greater than its negative consequences	EE2	2.39	1.04	3.36	0.80
More job opportunities could be created for residents during the pandemic	EE3	2.36	1.05	3.09	0.69
Environmental impacts (Average)	EI	3.19	0.89	0.06	0.06
The presence of tourists during COVID-19 has a negative effect on the environment	EI1	2.81	1.27	2.09	0.29
The park becomes very crowded due to the presence of tourists during COVID-19 pandemic	EI2	2.79	1.20	2.38	0.42
Long-term planning by ecotourism official's in the park can control the negative impacts of COVID-19	EI3	3.98	0.97	2.24	−0.54
Residents' awareness of ecotourism importance (Average)	AEI	3.59	0.84	2.26	−0.15
I am aware of the government's role in the development of ecotourism in the Banco park	AEI1	3.04	1.16	2.22	0.10
I am aware of economic importance regarding ecotourism development during COVID-19 pandemic	AEI2	4.54	0.69	3.04	−1.18
I am aware of cultural importance regarding the development of ecotourism	AEI3	3.19	1.21	2.15	−0.09

Table 4

Correlations among variables.

	AEI	PI	EE	SCE	EI	RPE	ECC
AEI	1						
PI	0.32*	1					
EE	0.39*	0.45*	1				
SCE	0.32*	0.60**	0.53**	1			
EI	0.39*	0.37*	0.61**	0.45*	1		
RPE	0.38*	0.36*	0.43*	0.49*	0.51**	1	
ECC	0.39*	0.30*	0.40*	0.38*	0.53**	0.91[a]	1

[a] significance at 0.001 level, ** significance at 0.01 level, * significance at 0.05 level.

Table 5

Constructs/items and goodness of fit indices.

Construct/Associated Items	Factor Loading	VIF	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
ECC			0.69	0.83	0.62
ECC1	0.75	1.29			
ECC2	0.87	1.49			
ECC3	0.73	1.34			
RPE			0.78	0.87	0.69
RPE1	0.80	1.53			
RPE2	0.84	1.69			
RPE3	0.86	1.62			
PI			0.67	0.82	0.60
PI1	0.79	1.35			
PI2	0.80	1.3			
PI3	0.73	1.27			
SCE			0.72	0.84	0.64
SCE1	0.80	1.44			
SCE2	0.84	1.62			
SCE3	0.75	1.41			
EE			0.74	0.85	0.66
EE1	0.81	1.24			
EE2	0.84	1.35			
EE3	0.78	1.42			
EI			0.68	0.82	0.60
EI1	0.81	1.41			
EI2	0.74	1.44			
EI3	0.78	1.36			
AEI			0.76	0.86	0.67
AEI1	0.81	1.4			
AEI2	0.78	1.62			
AEI3	0.87	1.96			

Table 6

Discriminant validity.

	AEI	PI	EE	SCE	EI	RPE	ECC
AEI	**0.818**	0.72	0.67	0.611	0.719	0.625	0.447
PI	0.324	**0.776**	0.747	0.648	0.83	0.863	0.515
EE	0.388	0.448	**0.811**	0.521	0.563	0.521	0.415
SCE	0.323	0.604	0.532	**0.798**	0.558	0.499	0.554
EI	0.393	0.372	0.606	0.446	**0.777**	0.428	0.502
RPE	0.380	0.358	0.428	0.486	0.507	**0.832**	0.557
ECC	0.389	0.298	0.403	0.382	0.529	0.907	**0.786**

4.4. Analysis of the structural model

The adjusted coefficient of determination (R^2), the size of the path coefficients and the statistical significance of the path coefficients were used to analyze the structural model. The Adj R^2 values (EE: 0.256; SCE: 0.374; EI: 0.211; RPE: 0.33; ECC: 0.821) were all greater than the minimum value suggested by Ref. [44]. The effect size was measured by using the size of the path coefficients. A value of path coefficients <0.02 describes a small effect, whereas 0.15 means a medium effect, and >0.35 a strong effect size [41]. The significance of the path coefficients were examined and the relationships among the variables were tested using the non-parametric bootstrapping resampling method (5000 resamples). Overall, there were significant and positive relationships between the

variables, except the relationships EE- > RPE (H3) and AEI- > SCE (H7) as shown in the path column of Table 7. The assessment of the direct effects on ECC showed that RPE ($\beta = 0.918$; $p < 0.05$) and PI ($\beta = 0.231$; $p < 0.05$) had positive and significant impacts on ECC, with strong effects for RPE (Table 7). This suggests that respondents who had good perception of ecotourism and a good image of Banco Park were more likely to support ecotourism and its continuation during the COVID-19 pandemic. The direct effects on RPE showed that there is a statistically significant and positive relationship between RPE and both SCE ($\beta = 0.300$; $p < 0.05$) and EI ($\beta = 0.337$; $p < 0.05$) and that EE ($p > 0.05$) is not a significant predictor of RPE. This means that people who perceived socio-cultural and environmental benefits from ecotourism tended to agree that ecotourism has positive effects. The direct effects on EE revealed that AEI ($\beta = 0.280$; $p < 0.05$) and PI ($\beta = 0.363$; $p < 0.05$) had a positive and significant effects on EE. In other words, those who were aware of ecotourism's importance and perceived a good image of Banco Park were more likely to perceive its economic effects. Similarly, the direct effects on SCE indicated that PI ($\beta = 0.561$; $p < 0.05$) had positive and significant effects on SCE while AEI ($p > 0.05$) effects on SCE were not significant. In other words, residents who a good image of Banco Park were more likely to perceived its socio-cultural effects. The direct effects on EI showed that PI ($\beta = 0.276$; $p < 0.05$) and AEI ($\beta = 0.312$; $p < 0.05$) had positive and significant effects on EI. This suggests that informants who had a good image of Banco Park were aware of ecotourism's importance were more likely to perceived environmental benefit of ecotourism.

Residents' RPE, EE, SCE, and EI were used as the mediator and were tested through a bootstrapping resampling method (5000 resamples). The findings show that the residents' perception of ecotourism (RPE) mediated socio-cultural effects (SCE) and Environmental impacts (EI) on their support of ecotourism and its continuation during the COVID-19 pandemic (ECC) ($\beta = 0.275$, $p < 0.05$; $\beta = 0.309$, $p < 0.05$, respectively) (Table 8). EI served as mediator between AEI and RPE and between PI and RPE. Moreover, SCE served as mediator between PI and RPE.

5. Discussion

This study aimed to assess residents' attitudes towards ecotourism during the COVID-19 crisis and the pandemic's impact on the sector. In Africa, wildlife-based tourism contributed US\$120.1 billion directly to global GDP in 2018 [45]. The World Travel and Tourism Council (WTTC) predicted that in a best-case scenario, Africa will experience a US\$53 billion loss in travel and tourism GDP by 2020 [46]. Understanding the residents' opinions in such a chaotic context of the COVID-19 pandemic on tourism is important due to socioeconomic environment of the countries. The results from this study can provide tourism development planners in a country like Côte d'Ivoire with a better understanding of local residents' attitudes for designing a suitable reopening plan.

Based on the Social Exchange Theory (SET), this study constructed a theoretical model to deepen the understanding of residents' support for ecotourism in the context of the COVID-19 pandemic. From the 11 hypothesized relationships, 9 were accepted. Therefore, the SET is reliable to understand residents' support of ecotourism and their perception of its continuation during the COVID-19 pandemic in the Banco Park. indeed, we found that, residents' perception of ecotourism positively influences their support to ecotourism and its continuation during the COVID-19 pandemic (H1). A good perceived image of Banco Park is positively associated with the support to ecotourism and its continuation during the COVID-19 pandemic (H2). Socio-cultural benefits positively affect residents' perception of ecotourism (H4). Environmental benefits positively affect residents' perception of ecotourism (H5). Residents' awareness of ecotourism importance is associated with the perceived economic benefits from ecotourism (H6). Residents' awareness of ecotourism importance is associated with the perceived environmental benefits from ecotourism (H8). Perceive a good image of Banco Park is associated with economic benefits from ecotourism (H9). Perceive a good image of Banco Park is associated with socio-cultural benefits from ecotourism (H10). Perceive a good image of Banco Park is associated with environmental benefits from ecotourism (H11).

Overall, local people around Banco Park recognize that ecotourism produces more benefits than detriments. The COVID-19 pandemic, a painful and unexpected event, has not blunted their support for the continuation of ecotourism. This is certainly due to the sociocultural benefits they derive from ecotourism. Indeed, local residents from our study tend to positively evaluate the sociocultural impacts of tourism. This result is similar to that of reference [47], who argued that when residents have a better perception of positive sociocultural impacts, they support tourism development. Positive social impacts are related to creation of new jobs and local businesses, improvement of living standards and development of new recreation facilities [19].

Concerning the resident's perception of environmental impacts, reference [48] found that, depending on the area of residence, citizens could vary this type of perception, with residents in rural areas being more perceptive about environmental positive impacts than those residing in urban or eminently tourist areas, whose perception will be inclined towards other types of impacts, such as the economic impacts associated with the activity. However, this is not the case for the residents of Banco Park, who, despite being in an urban area, perceived the environmental importance of ecotourism. This could be partially due to the implication of young people as well as women in micro-projects of an environmental nature, in particular by granting concessions to local residents related to transportation and waste management [4].

Regarding the economic effects, this study revealed that there is positive but non-significant relationship between economic impacts of ecotourism and residents' support for this activity. However, residents' awareness of ecotourism importance and their perception of the place image are significantly associated with the perceived economic benefits from ecotourism (H6 and H9). This result suggests that a more positive perception of place leads to more favorable perceptions of the economic impacts of tourism. Thus, perception of place and residents' awareness of ecotourism importance seems to be the prism through which residents assess the economic impacts of ecotourism [19].

These findings must be nuanced by the work of reference [2] and reference [4]. According to Ref. [4], the involvement of populations in the management of Banco Park remains mitigated, and conflicts between managers and populations are still recurrent. This

Table 7
Results from the structural model.

hypotheses	Path	Beta	SD	t-Value	Decision
H1	RPE- > ECC	0.918	0.016	55.739*	Accepted
H2	PI- > ECC	0.231	0.063	3.651*	Accepted
H3	EE- > RPE	0.066	0.093	0.710	Rejected
H4	SCE- > RPE	0.300	0.080	3.788*	Accepted
H5	EI- > RPE	0.337	0.066	5.011*	Accepted
H6	AEI- > EE	0.280	0.084	3.245*	Accepted
H7	AEI- > SCE	0.147	0.075	1.876	Rejected
H8	AEI- > EI	0.312	0.088	3.472*	Accepted
H9	PI- > EE	0.363	0.074	4.888*	Accepted
H10	PI- > SCE	0.561	0.066	8.460*	Accepted
H11	PI- > EI	0.276	0.087	3.137*	Accepted

Note: t-value above 1.96 considered significant at * $p < 0.05$.

Table 8
Results from the mediating effects.

Path	Beta	SD	t-Value	Decision
EE- > RPE- > ECC	0.061	0.086	0.709	Rejected
SCE- > RPE- > ECC	0.275	0.073	3.796*	Accepted
EI- > RPE- > ECC	0.309	0.062	4.892*	Accepted
AEI- > EE- > RPE	0.019	0.029	0.627	Rejected
AEI- > SCE- > RPE	0.045	0.028	1.517	Rejected
AEI- > EI- > RPE	0.105	0.037	2.736*	Accepted
PI- > EE- > RPE	0.024	0.035	0.681	Rejected
PI- > SCE- > RPE	0.167	0.046	3.653*	Accepted
PI- > EI- > RPE	0.093	0.035	2.577*	Accepted

Note: t-value above 1.96 considered significant at * $p < 0.05$.

has led to the loss of numerous parks' resources and certain peripheral neighborhoods. According to Ref. [2], despite the numerous actions carried out by the Ivorian Office of Parks and Reserves for ecotourism development, local visits to the Banco Park remain limited, and stakeholders are less involved in the park's management. The main reasons for the limited number of local visits are the lack of knowledge of the tourist potential of the national parks and reserves, prejudices linked to them, a lack of tourist culture, and ignorance of the visiting process [2]. As far as the involvement of stakeholders is concerned, the lack of a common vision and socio-cultural constraints explain their reluctance [4].

This work has some limitations, which provide opportunities for future studies. First, the present study has been undertaken using a quantitative approach. A qualitative and mixed (quantitative and qualitative) approach could be considered by future studies for a more in-depth analysis of local people's perceptions of ecotourism in West Africa. This study considered a sample size of 150 individuals which is considered small. Future studies could involve a larger number of participants to increase the reliability and generalizability of the findings.

6. Conclusions and implications

This work highlights the positive attitude of local people towards ecotourism and their desire for its continuation during COVID-19 pandemic in Banco National Park. The socio-cultural and environmental benefits from ecotourism are the key determinants of the residents' support for ecotourism in the park. The Banco national park, located in the heart of Abidjan (the economic capital of Côte d'Ivoire), is considered the lung of the city, and it is crucial to safeguard this heritage to mitigate the effects of climate change. A real participatory management approach should be applied for the sustainability of this important resource. From this study, some practical implications can be derived for the development of ecotourism in Côte d'Ivoire. First, the fact that economic effects are not a significant predictor of residents' support for ecotourism means that economic effects of tourism have not been understood and tangible enough to change their perception. Officials of Banco Park should design behavioural change campaigns and education programmes on socio-economic importance that will enhance residents' attachment to the park. Second, socio-cultural and environmental benefits were found to be significant determinants of support for tourism development. Therefore, marketing campaigns can be used to enhance residents' awareness regarding the socio-cultural and economic benefits they receive from tourism. Third, this study showed that tourists are welcome in the Banco Park since the residents are favorable to their arrivals. This can be a source of confidence for tourists who may have doubts about this destination.

Data availability statement

Data associated with this study has not been deposited into a publicly available repository. It will be made available on request.

CRediT authorship contribution statement

Bruno Enagnon Lokonon: Conceptualization, Formal analysis, Methodology, Software, Writing – original draft, Writing – review & editing. **Essomanda Tchandao Mangamana:** Writing – review & editing. **Romain Glèlè Kakaï:** Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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