Available online at www.HEFJournal.org

ISSN: 2785-2997

Journal of
Human, Earth, and Future

Vol. 7, No. 1, March, 2026

Application of Social Return on Investment (SROI) Method in Wetland Conservation

Ly Van Loi [1*], Piyakarn Teartisup [2], Prapeut Kerdsueb [2], Suwalee Worakunpiset [3]

[1] *Department of Environmental Management, College of Environment and Natural Resources, Can Tho University, Can Tho, Vietnam.*

[2] *Faculty of Natural Resources, Mahidol University, Nakhon Pathom 73170, Thailand.*

[3] *E-square Green Innovation Co. Ltd, Huamark, Bangkapi, Bangkok 10240, Thailand.*

Received 11 August 2025; Revised 18 December 2025; Accepted 02 January 2026; Published 01 March 2026

Abstract

This study was conducted to evaluate the effectiveness of the U Minh Thuong National Park (UMTNP) Conservation Master Plan for the 2019-2023 period. The Social Return on Investment (SROI) framework was applied to assess and integrate the economic, social, and environmental impacts on stakeholders, including local authorities, buffer zone communities, UMTNP, and the tourism community. The results showed that while the SROI ratio was only 0.99, reflecting a modest financial return where the total investment of 103.62 billion VND generated an accumulated impact value of only 110.01 billion VND over five years, the project still yielded many significant benefits. These benefits include improved ecosystem services, enhanced carbon sequestration capacity, and improved livelihoods for the community. Sensitivity analysis indicated that the number and spending of tourists, along with the carbon sequestration capacity, were the main factors affecting the investment outcomes. Scenario analysis revealed that by attracting higher-spending tourists and participating in the carbon credit market, the SROI ratio could reach 2.0. This underscores the importance of optimizing ecotourism strategies and leveraging sustainable financial mechanisms like the carbon market to ensure a balance between biodiversity conservation goals and local socio-economic development.

Keywords: Carbon Credit; Ecotourism; SROI; U Minh Thuong National Park; Wetland.

1. Introduction

The U Minh Thuong National Park (UMTNP) is one of three key areas within the Kien Giang Biosphere Reserve. It was recognized as the world's 2,228th and Vietnam's 8th Ramsar site [1]. It is also the largest remaining peat swamp forest conservation area in the Mekong Delta and the first ASEAN Heritage Park for peatlands in the region, as well as Vietnam's 5th ASEAN Heritage Park [2]. With these outstanding values, UMTNP not only plays a crucial role in maintaining biodiversity, protecting water sources, and regulating climate, but also significantly contributes to the livelihoods of local communities through activities such as aquaculture, afforestation, ecotourism, and other ecosystem services. According to UMTNP (2024), the park is home to many wild plant and animal species, with the presence of 260 species of higher vascular plants, 32 mammal species, 184 bird species, 54 reptile and amphibian species, 64 fish species, 209 insect species, and various aquatic animals [3].

However, UMTNP is facing serious challenges from climate change, land degradation, forest fires, and unsustainable resource exploitation. Over the past century, the forest area has declined significantly, from approximately 142,000

* Corresponding author: lvloi@ctu.edu.vn

https://doi.org/10.28991/HEF-2026-07-01-04

hectares in the 1930s to only 22,230 hectares in 2024, resulting in a massive loss of the endemic peat swamp forest ecosystem. After the historic forest fire in 2002, fire prevention and control became the top priority in the forest management strategy. Strict control measures, including restricting access to forest resources, were implemented, especially during the dry season, to minimize fire risks. These measures, however, have created new challenges by limiting livelihood opportunities for local people who heavily depend on forest product harvesting, fishing, and ecotourism. The conflict between conservation goals and the need for livelihood development has become a prominent issue, affecting the effectiveness and long-term sustainability of the area.

Furthermore, the increasingly evident impacts of climate change are exacerbating the difficulties faced by UMTNP. Extreme weather events like prolonged droughts, unusual floods, sea-level rise, and saltwater intrusion have severely affected agricultural production and community life [4-7]. Many common commercial crops in the buffer zone are frequently damaged due to water shortages in the dry season or flooding in the wet season, reducing household productivity and income. In this context of growing livelihood pressure, some turn to illegal activities such as wildlife poaching, overfishing, uncontrolled logging, and honey collection. These activities not only deplete natural resources but also disrupt the fragile ecological balance of the peat swamp forest ecosystem, creating an urgent need for new, sustainable management solutions that harmonize conservation and development.

In this context, it has become essential to quantify and demonstrate the multidimensional value of conservation projects. One of the prominent current methods is the Social Return on Investment (SROI) framework. This method is designed to measure and value the economic, social, and environmental benefits that a program or project generates [8-10]. The SROI is built on a series of basic principles: (i) involving stakeholders, (ii) understanding the changes, (iii) valuing what matters, (iv) only including what is material, (v) avoiding over-claiming, (vi) ensuring transparency, and (vii) verifying results [11, 12]. The SROI process typically involves six steps: defining the scope and stakeholders; building an outcomes map; collecting evidence and valuing outcomes; establishing the true impact through concepts like deadweight, attribution, and displacement; calculating the SROI ratio; and finally reporting, publishing and applying the results [13]. As a result, this method goes beyond the final number, helping managers gain a deeper understanding of the changes that have occurred, their level of influence, and the value the project has brought to society and the environment. Over the past decade, SROI has been successfully applied in various fields, from healthcare [14-16], sports [17, 18] to community development and empowerment [10, 19-21], tourism [11, 22], and more recently, extended to the environmental and conservation sectors [8, 9, 23]. For wetland conservation areas, where ecological values are often difficult to quantify and are not well-reflected by the market, the SROI is particularly meaningful for demonstrating the effectiveness and sustainability of investment programs. However, there are currently almost no studies in Vietnam that have applied SROI in the context of wetland conservation, especially at UMTNP.

Therefore, applying SROI to evaluate the effectiveness of the UMTNP Conservation Master Plan for the 2019–2023 period has significant scientific and practical importance. From a scientific perspective, this will be one of the pioneering studies to apply this tool to wetland conservation in Vietnam, helping to expand the scope of environmental economics and provide empirical evidence for the SROI method. From a practical perspective, the research results will provide a convincing quantitative basis for policymakers, management agencies, and donors, thereby promoting resource mobilization, strengthening benefit-sharing mechanisms, and scaling up community-based management models. Furthermore, the study can also provide lessons learned for application in other wetland areas in Vietnam that are also seeking sustainable management models that integrate community livelihoods. Specifically, this study focuses on the following key objectives: (i) identifying the stakeholders involved in the conservation plan, (ii) quantifying the investment value of stakeholders, (iii) analyzing stakeholder changes during project implementation, and (iv) evaluating the project's investment effectiveness through the SROI ratio.

2. Material and Methods

2.1. Study Area

UMTNP is located in the Minh Thuan and the An Minh Bac communes, Kien Giang province. It is one of the last remaining peat swamp forests in Vietnam and Southeast Asia. With coordinates from 9°31’ to 9°39’N and 105°03’ to 105°07’E, the park plays a vital role in preserving the region’s unique wetland ecosystem. Established as a Nature Reserve in 1994 and upgraded to National Park status in 2002, UMTNP protects 8,053 ha of peat swamp forest. It was designated as Vietnam’s 5th ASEAN Heritage Park in 2012-the first peatland site in the region and as the 8th Ramsar Site in Vietnam in 2015. The park, covering 21,107 ha, includes an 8,038 ha strictly protected core zone and a 13,069 ha buffer zone inhabited by over 19,600 people who rely on agriculture, aquaculture, and sustainable forest use. UMTNP’s conservation efforts not only safeguard biodiversity but also support the livelihoods of surrounding communities. Figure 1 shows the study area in detail.

Figure 1. Study site

2.2. Data Collection

Data were collected from comprehensive secondary sources, including biodiversity monitoring records, financial documents, and statistical reports from park authorities and local government. Monitoring data from UMTNP's regular biodiversity programs was especially important for tracking changes in flora, fauna, and wetland ecosystems. The study also drew on scientific publications from reputable domestic and international journals, as well as data from past and ongoing projects in the area, to strengthen theoretical and practical evaluations. Additionally, local agency data, including legal documents and annual statistics, provided essential context on policy and management. Synthesizing these sources enabled a comprehensive assessment of UMTNP's current status and conservation potential.

2.3. Scope of Assessment

This study adopts a structured SROI framework to assess the economic, environmental, and social returns generated by the UMTNP conservation program from 2019 to 2023. This is an important project with a direct impact on the entire natural area managed by the National Park, with a total area of 8,509.59 ha, of which the core zone accounts for 8,038 ha and the buffer zone accounts for 471.59 ha. The evaluation covered three core components: fire prevention, biodiversity restoration, and community livelihood development: (1) a fire prevention and fighting component, focusing on measures to prevent and handle forest fires in dry conditions; (2) a forest resource protection and restoration component, including biodiversity monitoring, protection of rare species, and restoration of degraded areas; and (3) a community livelihood development component, aimed at improving the socio-economic conditions for people in the buffer zone through sustainable livelihood models. Stakeholders included the provincial government, UMTNP management, local communities, and tourists.

2.4. Data Analysis

The SROI is a comprehensive impact evaluation method developed by the Roberts Enterprise Development Fund (REDF) in the United States in the mid-1990s [24]. This metric is expressed as a ratio that relates the cost of investment to the value of the benefits created, adjusted from a typical cost-benefit analysis. In 2003, in the UK, the New Economics Foundation refined the methodology developed by REDF by giving greater prominence to stakeholder involvement throughout the entire social value assessment process [11, 25]. The application of SROI analysis serves two main purposes encompass improving resource allocation or legitimizing the performance of organizations and projects [26, 27]; and providing clear evidence of the sustainability and social value generated by activities or organizations by identifying, managing, and communicating their impacts across three dimensions: economic, social, and environmental [10, 28, 29].

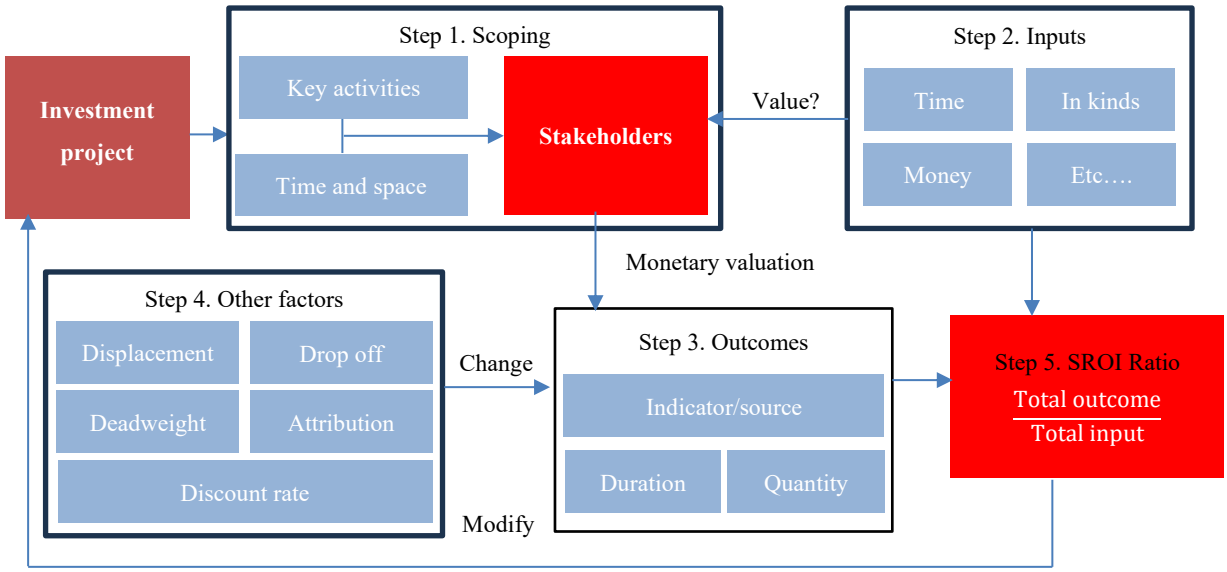

Figure 2. SROI process

The SROI has been successfully applied in evaluating the effectiveness of conservation programs for natural areas [8, 13, 23]. Monetary proxies were assigned to outcomes using conservative market-based estimates and policy-referenced benchmarks. The five-step SROI process includes scoping, input identification, outcome mapping, adjustment for displacement, drop off, deadweight and attribution, and ratio calculation was applied to quantify total impact (Figure 2). At the same time, a sensitivity analysis was conducted to test the robustness of assumptions related to visitor volume, carbon credit values, and ecosystem service monetization. First, it is necessary to establish the scope and stakeholders by defining the SROI assessment objectives and identifying stakeholders who may be affected by or contribute to the project. Next, map the impact by developing a value chain to describe how input resources are transformed into outcomes and impacts. The third step is establishing value, where data on outputs and impacts are collected, and non-financial outcomes are converted into monetary value. Then, determine the stakeholder changes generated by the project's activities. Stakeholder changes can be affected by various factors; therefore, detailed analysis and integration of impact factors are needed to calculate the final change value for each stakeholder. Finally, calculate the SROI ratio by dividing the total value generated by the total investment cost. If this ratio is high, the investment efficiency is greater; conversely, the smaller the ratio, the more consideration should be given to adjusting the investment project to achieve the highest possible ratio. According to Naklungka et al. (2023), if the SROI is greater than 1, the activities should be implemented [8]. Alternatively, an SROI ratio greater than 1 indicates that the benefits obtained exceed the initial investment costs, and vice versa [30].

- The general formula used to calculate SROI is as follows [8, 13, 23]:

$$\text{SROI} = \frac{Total\ present\ value}{Total\ inputs} \quad (1)$$

where; Total inputs: total investment; and Total present value = $\sum_1^n \frac{Value\ of\ impact\ in\ year\ j}{(1+r)^j}$.

where; n: impact duration (year); j: ranges from 1 to n; r: discount rate; and value of impact: total outcome – deadweight – attribution.

3. Results and Discussion

3.1. Stakeholders and Investment Types of Stakeholders in the UMTNP Conservation Project

3.1.1. State Management Agency

The Provincial People's Committee invests local funds to implement seven key programs: biodiversity management, fire prevention, forest restoration, scientific research, plant collection garden establishment, education and livelihood support, and infrastructure development. Annual budgets, averaging 10 billion VND, come from local and central sources (Figure 3). Investments aim to restore peatland ecosystems, increase forest cover, improve biodiversity, and contribute to national goals of a 30% GHG reduction by 2030 and net zero emissions by 2050.

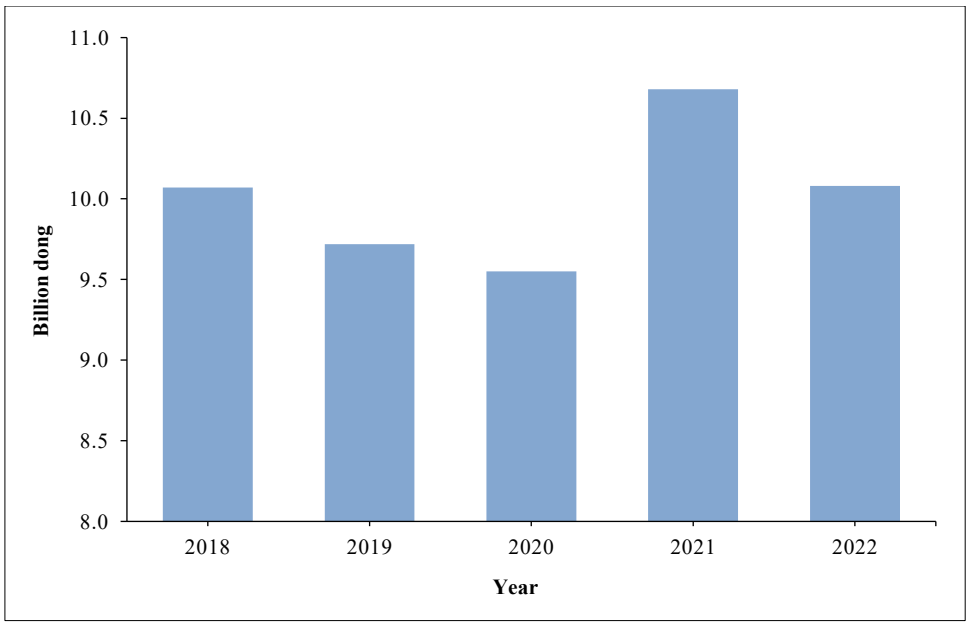

Figure 3. Allocation of provincial budget resources for UMTNP over the years. Source: Kien Giang Provincial People's Council (2017-2021) [31-35]

3.1.2. Project Implementing Unit

UMTNP's staff (49 people) directly implement conservation and livelihood development activities, including biodiversity monitoring, scientific research, environmental protection, and stakeholder coordination. These staff benefit from capacity building, access to new technologies, and improved working conditions, making them primary stakeholders who are affected by project outcomes. Conservation activities leverage existing human resources and facilities, emphasizing reforestation skills, forest protection knowledge, and sustainable engagement with local communities. Investments include staff time, training, and research, which support effective forest monitoring, reduce illegal hunting, enhance biodiversity conservation, and strengthen UMTNP's reputation through ecotourism promotion.

3.1.3. Local Community

Seventy-six buffer zone households participate in seasonal sustainable resource use, including forest honey harvesting (November-March), collecting non-timber forest products, and engaging in ecotourism activities (June-October), and fishing (July-December, with *Oxyeleotris marmorata* from October-April). Through responsible practices, these households generate income, reduce illegal exploitation, and foster conservation efforts. While they prioritize stable techniques, climate change further exacerbates their vulnerability [36]. Households primarily invest labor and time in forest protection, sustainable collection of non-timber products, and ecotourism-related work. Each household is contracted for approximately 4.5 ha of agroforestry land until 2044; however, widespread land misuse reflects weak compliance, with only 2 of 74 households meeting contractual commitments. Restoring 1 ha of Melaleuca forest requires an investment of 25-50 million VND/ha [37]. Income-sharing arrangements include a 70/30 profit split (households/park) for non-timber products and a 50/50 split for beekeeping activities.

3.1.4. Tourism Community

From 2019 to 2021, approximately 111,087 tourists visited UMTNP, generating revenue for conservation efforts, particularly during the peak period from June to December. However, tourism activities were disrupted after 2021 due to the COVID-19 pandemic, reducing income and posing challenges for conservation funding. UMTNP's rich biodiversity and historical significance offer high ecotourism potential, featuring key species such as *Manis javanica*, *Aonyx cinerea*, *Viverricula indica, Pteropus vampyrus*, and the Mekong Delta's largest bird sanctuary [2]. Historical sites associated with Vietnam's resistance wars add significant cultural value. Visitor satisfaction is influenced by natural resources, infrastructure, accommodation, pricing, and service quality, with tourism resources identified as the strongest factor [38]. Between 2010 and 2017, UMTNP received an average of ~46,400 visitors per year, with annual growth of 17%. Tourists contribute financially through entrance fees, services, and participation in conservation-oriented activities, directly supporting conservation funding, promoting sustainable ecotourism, and raising awareness of wetland and biodiversity protection.

3.2. Investment Value of Stakeholders in the UMTNP Conservation Project

Stakeholder investments in the UMTNP conservation project are considered to include all cash, in-kind contributions, or time that the entity invests in the project's activities. All investments will be converted into monetary value through various methods to reflect the actual contribution of each party. Table 1 details the investment value of stakeholders in the UMTNP conservation project. The total investment for the project amounts to 103.62 billion VND, with the Kien Giang Provincial People's Committee contributing the largest share at 89.09 billion VND, accounting for the highest proportion. Besides, the tourism community also contributes a significant investment source through tour costs and time spent visiting UMTNP. During the period from 2018 to 2021, total revenue from tourists reached 14.53 billion VND, according to UMT's database. This shows the interest and direct investment of tourists in experiencing and exploring nature at UMTNP, while indirectly contributing to the conservation and sustainable development of the area. Meanwhile, UMTNP and the buffer zone community, although actively participating in conservation activities, do not have direct investments converted into monetary value. UMTNP contributes significantly in terms of personnel and time to activities such as planting and regenerating forests, scientific research, forest protection patrols, developing ecotourism, and raising community awareness. Because these activities fall under the daily work responsibilities of UMTNP personnel, their invested time is not counted as an additional investment convertible into money. The buffer zone community also participates in exploiting natural resources and developing ecotourism. Due to utilizing available resources and primarily manual exploitation methods, the community does not have significant initial investment costs, resulting in their investment value not being calculable in cash. Overall, the combination of investment sources from the state budget, conservation personnel, local communities, and tourists creates a diverse and sustainable financial system, contributing to protecting the wetland forest ecosystem as well as promoting ecotourism development at UMTNP.

Table 1. Stakeholder investment

No.	Stakeholder	Investment type	Investment value (VND)	Total investment value (VND)
1	Kien Giang Provincial PC	Investment program for management and protection of forest biodiversity resources.	17,260,000,000	89,090,000,000
		Investment program for forest fire prevention and fighting	22,180,000,000	
		Investment program for forest ecosystem restoration	12,450,000,000	
		Investment program for scientific research	8,300,000,000	
		Investment program for building a plant collection garden.	2,500,000,000	
		Investment program for propaganda, education on forest protection, environmental protection, and support for community livelihood development.	2,100,000,000	
		Investment program for infrastructure and equipment development	24,300,000,000	
2	UMTNP	Time for planting and forest regeneration	-	0
		Time for implementing scientific research activities	-	
		Time participating in forest protection patrol activities	-	
		Time for ecotourism activities operations	-	
		Time for propaganda to raise public awareness	-	
3	Buffer Zone Community	Investment time in natural resource exploitation activities and ecotourism exploitation activities	-	0
4	Tourism Community	Tour costs and tour time	14,529,640,000	14,529,640,000
		Total		103,619,640,000

The investment capital for this project will be implemented over 5 years, with an average annual amount of about 21 billion VND, equivalent to approximately $800,000. The expected capital structure includes 70% from the state budget, 16% mobilized from domestic and foreign organizations, and 14% from the contribution of the tourism community. With this substantial capital source, the project expects to strongly promote the conservation of the wetland forest ecosystem, develop sustainable ecotourism while enhancing awareness and livelihoods for the local community.

3.3. Stakeholder Changes

3.3.1. Description of Change

Stakeholder changes were analyzed scientifically, focusing only on direct, monetizable impacts from project activities. Each stakeholder's changes were assessed individually to avoid double counting. The project had the strongest influence on UMTNP staff and buffer zone residents, aligning with goals of peatland conservation and livelihood improvement. Livelihood stabilization increased income and capacity for participants, while conservation activities generated jobs suited to local skills. Effective resource protection-maintained biodiversity and enabled sustainable resource use, forming a foundation for stable community livelihoods. Successful wetland conservation also supported

sustainable ecotourism development, attracting visitors to experience UMTNP's natural values. Activities such as scientific research, afforestation, patrols, and awareness campaigns were actively implemented with the participation of staff and the community. Additionally, conservation success enhanced tourist appeal, contributing to local economic growth and providing visitors with stress relief and opportunities to connect with nature. As urban environmental pressures like noise and fine dust pollution rise, the demand for pristine natural spaces like UMTNP increases, underscoring the importance of effective conservation for ecological and socio-economic sustainability. Table 2 details the changes in key stakeholders.

Table 2. Changes in key stakeholders

Stakeholders	Outcome	Indicator	Quantity
1. UMTNP	Improved wetland ecosystem services	UMT forest area increased. Melaleuca forest stock increased	495,756 (m^3)
	Ecotourism thrives and achieves high efficiency	Average annual tourist arrivals to UMT. Based on growth rate over the years to forecast tourist arrivals in subsequent years	46,400/year; growth rate is 16.67%/year
	Enhanced role of UMT in the community	Community willingness to pay for conservation area protection	
2. Buffer Zone Community	Maintain sustainable livelihoods for the buffer zone community	Number of people have stable livelihood models	76
	Increased resilience of vulnerable communities	Number of people engaged in beekeeping and exploiting other resources. Average 30 beekeepers per household, each hive yields ~10 liters honey, 300 liters/season, ~30-40 million VND/year. 142 households in this occupation.	76
3. Tourism Community	Improved health. More connected to nature, raised awareness of wetland roles, understand nature's value, helping tourists teach their children.	Reduced risks from climate change (drought, floods, fires, etc.). Besides, travelers can alleviate stress and pressure in work and life. The indicator would be the number of tourists visiting UMT.	174,269

3.3.1.1. Changes at UMTNP

Improved Wetland Ecosystem Services

The project has made significant contributions to improving the wetland ecosystem at UMTNP through conservation activities and *Melaleuca* forest development. From 2018 to 2019, the total supplementary planting area reached 482.1 ha, the zoned area for regeneration promotion was 904 ha, and the forest care area amounted to 729.6 ha, equivalent to a *Melaleuca* forest volume of 495,756 m^3. The increase in forest area not only enhances CO_2 sequestration and carbon accumulation capacity but also strengthens ecosystem services, improves environmental quality, and promotes sustainable livelihoods for the local community. According to Dan et al. (2014), *Melaleuca* forests on peat and clay soils under 10 years old can accumulate approximately 29.92 tons C/ha and 15.18 tons C/ha, respectively, showing the significant carbon storage potential of this ecosystem [39]. Besides, the peat layers at UMTNP also play an important role in carbon storage. According to Thai et al. each cubic meter of peat can contain about 0.1 tons of carbon, with the total carbon stored in the National Park's peat estimated at up to 2.6 million tons [40]. Furthermore, *Melaleuca* forests on peatland are assessed to have higher soil carbon stocks compared to *Melaleuca* forests on clay soil and mangrove forests, reaching 545.78 MgC/ha [41]. This is a significant figure in the context of climate change, as wetland ecosystems can absorb and store large amounts of greenhouse gases, contributing to reducing CO_2 emissions into the environment. In addition, the payment for forest environmental services policy has created a stable income source, with expected revenue exceeding 1 billion VND per year after deducting management costs. When Kien Giang province implements additional payment policies for other environmental services such as industrial water supply and forest carbon, revenue from forest environmental services is projected to increase by an average of 10%/year. Notably, revenue from forest environmental leasing activities also brings significant economic benefits. In the initial phase, due to the need to focus on infrastructure investment for tourism, revenue was limited. However, once the ecotourism model becomes stable, revenue from forest environmental leasing units is expected to reach 2.5 billion VND/year, based on a 1% revenue contribution from 5 leasing units with an average revenue of 50 billion VND/unit/year.

Enhanced Biodiversity

Besides improving ecosystem services, the project also significantly contributes to conserving and restoring biodiversity at UMTNP. According to previous studies, the flora in this area is quite rich, with 243 species recorded by Tran (2001) [42]. By 2021, after verification investigations, the total number of plant species at the park increased to 260 species, belonging to 87 families and 2 vascular plant phyla. Notably, two new species, *Streptocaulon juventas* (Luor.) Merr. and *Coccinia cordifolia* (L.) Cogn., were recorded during the survey in November 2021. Among the plant families at the National Park, the five with the largest number of species include: Poaceae (41 species), Cyperaceae (28 species), Asteraceae (13 species), Fabaceae (11 species), and Rubiaceae (10 species). Regarding fauna, the species list at UMTNP is also very diverse, with a total of 539 species recorded. These include 32 mammal species, 184 bird species, 44 reptile species, 9 amphibian species, 64 fish species, and 209 insect species. The increase in the number of species

discovered through surveys demonstrates the effectiveness of conservation activities and reflects the recovery of the natural ecological environment. According to Szabo & Mundkur (2017), wetland areas can provide rich habitats for many plant and animal species, while also serving as important refuges for migratory species [43]. This is particularly significant for waterbirds at UMT, as this area is part of the migration network for bird species from East Asia and Australia. Wetlands are also places where sediment deposition forms soil, and where metabolic and energy exchange processes occur within the ecosystem, thereby maintaining nutrient cycles in nature [44].

Reduced Illegal Hunting

From 2010-2021, 494 violations were recorded, mostly illegal hunting, with cases dropping sharply after project implementation (477 before, 17 after). Additionally, there were 6 cases of violating regulations on forest fire prevention and fighting. The total number of violators handled reached 787 people, with 675 cases handled administratively before the project and 15 cases after the project, along with 40 cases handled criminally. Propaganda to raise community awareness was also conducted for 525 subjects, mainly residents in the buffer zone and surrounding areas (Figure 4). Despite reduced violations, encroachment became more sophisticated due to economic pressures and weak enforcement, highlighting the need for stronger education and law enforcement [45, 46].

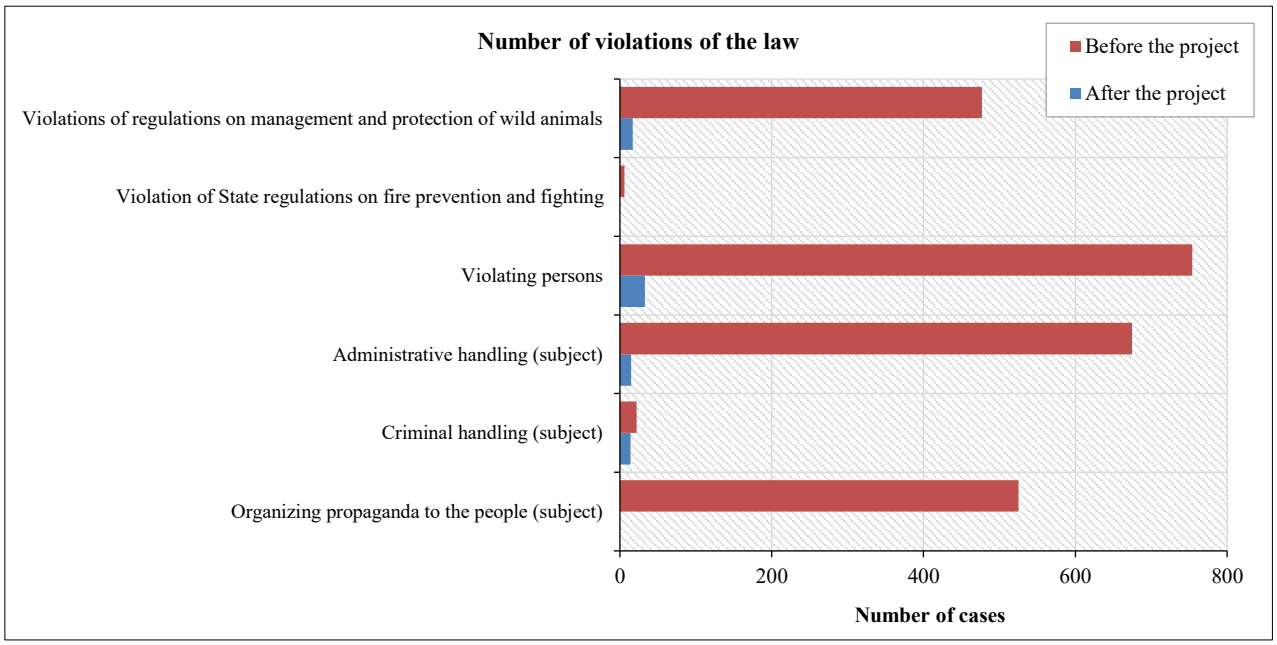

Figure 4. Situation of violations of the law on forest protection and development of the park from 2010-2021 [47]

Ecotourism Development

From 2010-2021, UMTNP welcomed 543,804 visitors (~45,317/year), with 65% in ecotourism and 22% in recreational fishing, generating 27.13 billion VND, averaging 2.26 billion VND/year (Table 3). This highlights the importance of ecotourism activities in creating sustainable revenue for the National Park. In addition, tourism activities in protected areas also create jobs, increase income, reduce migration of local people, improve the economic and social level for locals, help commercialize local products, and raise awareness of tourists and local people about environmental protection [48]. However, unmanaged tourism risks pollution and disturbance to wildlife [49]. UMTNP's tourism control measures-visitor limits and regulated exploitation-are vital for minimizing negative impacts.

Stabilized Livelihoods

The policy of downsizing staff according to Decree 29/2023/ND-CP of Vietnam aims to optimize the state management apparatus towards being lean but effective. However, this can lead to the risk of stable job loss for many officials, especially those with low educational qualifications or older individuals, causing difficulties in finding new jobs. In that context, this conservation project plays an important role in creating job opportunities and stabilizing livelihoods. Protecting the region's specific ecosystem not only helps maintain biodiversity but also promotes ecotourism development, creating sustainable income sources for officials and local communities. In addition, wetland ecosystems and peat layers can attract domestic and foreign investment sources, contributing to ensuring the work of the environmental management team. According to Honey (2008), ecotourism not only supports nature conservation but also brings significant economic benefits to local people, helping them become more attached to protecting natural resources [50]. However, to develop sustainable ecotourism and ensure long-term livelihoods for officials, support

policies, training, and management capacity enhancement are needed. Successful ecotourism projects often come with intensive training programs for local workers, helping them adapt to environmentally friendly tourism models [51]. In the Mekong Delta, besides developing ecotourism models, policies promoting cooperation between protected areas and local enterprises are needed to ensure economic benefits are distributed fairly and sustainably.

Table 3. Statistics on the number of visitors and revenue from 2010-2021 at UMTNP [47]

Year	Total	Visiting	Scientific study	Fishing	Income (VNĐ)
2010	27,856	17,139	275	10,442	973,200,000
2011	40,522	27,654	324	12,544	1,245,100,000
2012	42,815	26,499	317	15,999	1,563,310,000
2013	44,213	29,692	372	14,149	2,050,210,000
2014	46,207	25,138	386	20,683	2,496,610,000
2015	50,040	38,219	397	11,424	2,600,000,000
2016	57,680	41,816	452	15,412	3,577,426,000
2017	60,202	55,144	268	4,790	3,946,920,000
2018	63,182	57,245	325	5,612	4,701,700,000
2019	41,271	36,608	426	4,237	3,972,500,000
2020	43,202	39,046	314	3,842	3,890,400,000
2021	26,614	23,756	102	2,756	1,965,040,000
Total	**543,804**	**355,154**	**3,116**	**121,890**	**27,126,976,000**

Enhanced Staff Capacity

Besides ensuring livelihoods, scientific research activities within the framework of conservation projects help enhance the professional capacity of UMT management staff. Applying advanced technologies such as GIS, maps, and remote sensing images in conservation work not only improves monitoring efficiency but also helps staff access modern scientific methods. In addition, the biodiversity inventory process helps staff enhance their understanding of classifying plant and animal species, thereby building detailed databases serving management work. Particularly, analyzing data and understanding the relationships between subjects will help staff develop logical thinking and view problems multi-dimensionally, thereby enhancing the ability to analyze supporting issues. Advising leaders at all levels during important decision-making processes regarding biodiversity conservation. According to Nizamani et al. (2023), using GIS and remote sensing technology significantly improves ecosystem conservation efficiency, especially in wetland management [52]. However, the challenge is how to ensure the effective transfer and reception of these new technologies in the context of the staff's limited scientific and technological capacity. Jacobson et al. (2006) emphasized that enhancing staff capacity should not stop at theoretical training but needs to be combined with practical field practice [53]. This can be done through cooperation programs with international research organizations, expert exchanges, and learning experiences from successful conservation models worldwide. Additionally, mechanisms for monitoring and evaluating the effectiveness of training programs are needed to ensure that new knowledge and skills are truly applied in practice.

3.3.1.2. Changes in the Buffer Zone Community

Improved Income

Participation in sustainable resource exploitation-such as harvesting 101 medicinal plant species, 39 edible species, native fish, and honey-has helped buffer zone residents improve income while protecting the ecosystem. Non-timber forest products like honey or medicinal plants can contribute up to 50% of household income near protected areas [54]. Besides resource exploitation, the local community can participate in other project activities such as forest protection patrol teams or afforestation, both increasing income and contributing to environmental protection. Research by Adams et al. (2004) indicates that people’s direct participation in forest protection not only helps raise conservation awareness but also creates economic incentives, helping reduce pressure on forest resources due to over-exploitation [55]. Particularly, the development of ecotourism at UMT opens opportunities to build new livelihood models linked to tourism, helping people significantly improve income through tourism services, handicrafts, and local products. When livelihoods are diversified, the community is no longer overly dependent on weather conditions and natural fluctuations, thereby minimizing risks from the impacts of climate change. Livelihood diversification is an important strategy helping households adapt to environmental and economic risks and minimize vulnerability [56, 57]. This integrated livelihood model not only stabilizes income but also supports sustainable ecosystem management.

Enhanced Conservation Awareness

Awareness-raising programs have helped change local attitudes, reducing illegal exploitation. From 2010-2021, 494 violations were recorded, mostly before project implementation, highlighting the urgent need for community education. Research shows that poverty and low biodiversity awareness often push residents into illegal resource use [58, 59]. Therefore, through propaganda programs, education, and creating alternative livelihoods, people's awareness can be raised, helping minimize illegal hunting and exploitation. In addition, research by Brooks et al. (2012) has shown that conservation strategies involving community participation are often more effective than top-down approaches [60]. Therefore, strengthening community integration into the conservation process, such as through sustainable livelihood models and ecotourism, can help enhance awareness of protecting natural resources while ensuring long-term economic benefits for buffer zone residents.

3.3.1.3. Changes in the Tourism Community

Ecotourism at UMT helps visitors appreciate *Melaleuca* forest ecosystems, understand wetland restoration, and recognize the role of community participation in conservation. Learning about biodiversity reduces demand for wild species and encourages responsible behavior. Beyond education, contact with nature offers health benefits-reducing stress, improving cardiovascular and immune function, and enhancing mental well-being [61, 62]. Activities such as hiking and wildlife observation help participants relax, reduce anxiety and depression, thereby enhancing mental recovery capacity. Furthermore, ecotourism also plays an important role in creating emotional connections between people and nature, thereby enhancing environmental protection awareness. According to Sthapit et al. (2022), when tourists have memorable nature-based tourism experiences, they tend to develop an attachment to nature and increase their responsibility towards the living environment [63]. This also contributes to building a sustainable ecotourism community, where tourists not only consume services but also act as ecosystem protectors. Additionally, visiting UMT's historical sites deepens understanding of Vietnam's revolutionary history, educating younger generations about national traditions and sacrifices. Figure 5 summarizes the impact of nature tourism on patients' physical and mental health.

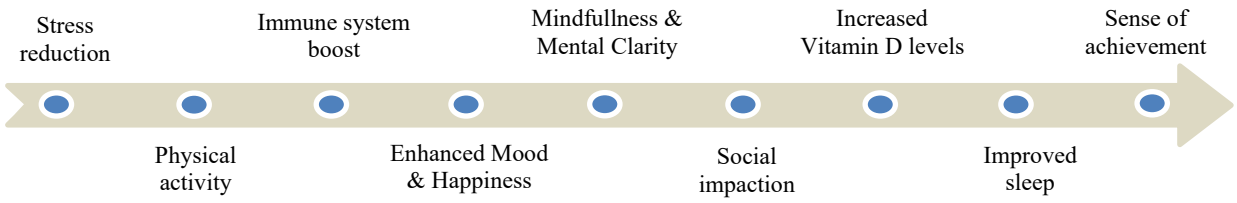

Figure 5. Impact of nature tourism on patients' physical and mental health

Overall, ecotourism at UMT brings many comprehensive benefits, from expanding understanding, enhancing conservation awareness, improving physical and mental health to promoting community connections and preserving historical heritage. These benefits further strengthen the value of the sustainable ecotourism model and encourage active participation from both tourists and local communities.

3.3.2. Evaluate the Changes

UMTNP

Over the 5-year project implementation period, forest protection and development at UMTNP increased the value of ecosystem services, thereby generating income from forest environmental services. Currently, UMT earns approximately 1 billion VND annually from this service. Additionally, the wetland ecosystem plays a crucial role in CO_2 absorption and carbon sequestration. According to research by Dan et al. (2014), *Melaleuca* forests can absorb 15-35 tons of CO_2 /ha/year [39]. Meanwhile, research by Mitsch et al. (2013) indicates that tropical wetlands can absorb an average of 7 tons of CO_2/ha/year, and each mature *Melaleuca* tree can store approximately 50-70 kg of CO_2 per cubic meter of wood [64]. With the *Melaleuca* forest area covering 69% (equivalent to 5,578.83 ha) and wetland forests along with other forest types covering 40% (equivalent to 8,449 ha), the total annual CO_2 absorption is calculated at 139,470.75 tons and 18,443.775 tons, respectively. Furthermore, the peatland area, spanning approximately 3,906.6 ha, is estimated to sequester around 2,682,211.2 tons of carbon (C) per year, contributing to an annual reduction of approximately 18,796 tons in CO_2 emissions from peat decomposition. Based on the carbon credit price of $5 per credit-the rate used in transactions between Vietnam and the World Bank-the monetary value derived from CO_2 absorption amounts to millions of USD annually. In addition, ecotourism serves as another significant source of revenue for UMT. On average, the park welcomes around 43,567 visitors each year, experiencing an annual growth rate of 16.67%. Each visitor contributes an average of 45,000 VND through entrance fees, generating substantial income. Moreover, UMT retains 75% of the revenue generated from the harvesting of non-timber forest products. This income helps supplement staff salaries and supports ongoing conservation initiatives (Table 4).

Table 4. Assessment of changes in value for stakeholders

Stakeholders	Duration	Monetary valuation method
1. VQG UMT	5	Forest protection and development help increase the value of ecosystem services, thereby generating income from forest environmental services and from payments received for providing these services (PES - Payment for Ecosystem Services schemes). Therefore, the income obtained from these forest environmental service payments is used to calculate the value associated with the changes/improvements in forest environmental protection. Currently, UMT earns approximately 1 billion VND annually from forest environmental services.
	5	Protecting the wetland ecosystem also helps sequester significant amounts of carbon, both in the peat layer and in forest vegetation. Specifically, according to research by Dan et al. (2014), Melaleuca forests can absorb 15-35 tons of CO_2/ha/year [39]. Research by Mitsch et al. (2013) indicates that tropical wetlands can absorb from 5 to 10 tons of CO_2/ha/year, and globally, these forests are noted to have an average sequestration rate of approximately 7 tons of CO_2/ha/year [64]. Furthermore, a mature *Melaleuca* tree can store approximately 50-70 kg of CO_2 per cubic meter of wood, and due to their high density, *Melaleuca* forests can sequester tens of tons of CO_2 annually. The *Melaleuca* forest area constitutes about 69% of UMT National Park's total area, equivalent to 5,578.83 ha. The corresponding annual carbon absorption is 139,470.75 tons of CO_2. The area of wetland forests and other forest types makes up approximately 40% of the park's area, equivalent to 8,449 ha. The corresponding annual carbon absorption is 18,443.775 tons of CO_2. The peatland area covers about 3,906.6 ha [40], storing an estimated 2,682,211.2 tons of carbon (C). Annually, protection measures at UMT reduce CO_2 emissions from peat decomposition by 18,796 tons. The carbon credit price is based on the rate of $5 per credit, utilized in transactions between Vietnam and the World Bank for forest restoration projects.
	5	Increased revenue for the park from ecotourism activities and income from the legal harvesting of non-timber forest products (NTFPs). Based on an average annual visitor count of 43,567 and a growth rate of 16.67% per year. On average, each visitor spends 45,000 VND on entrance fees at UMT. Regarding NTFP harvesting, regulations stipulate that UMT retains 75% of the revenue to supplement salaries for officials and staff, and to support other conservation activities
2. Buffer zone community	5	Enhanced income through forest protection work. According to legal regulations, specifically Decree No. 75/2015/ND-CP (regarding mechanisms and policies for forest protection and development support) and Decision No. 24/2012/QD-TTg (regarding policies for investment and support for forest development), the payment rate for forest protection work typically ranges from 300,000 to 500,000 VND/ha/year. The total forest area managed by UMT and contracted out to 76 households is 412.19 ha, averaging 5.5 ha per household. Consequently, the total annual amount paid to these households under forest protection contracts is 164,876,000 VND.
	5	Households living in the buffer zone benefit greatly from UMT's ecosystem services, which provide significant support for their farming models. By analyzing the profits from these models, it's possible to calculate the value that UMT's protection contributes to the buffer zone community. Banana Cultivation: 31% of households participate, cultivating an average area of 2.2 ha per household, with an average income of 28.5 million VND/ha/year. Rice Cultivation: 16% of households participate, cultivating an average area of 3.7 ha per household. The average yield is 5.7 tons/ha/season. Currently, 5 of these households manage two crop seasons per year, while the rest manage one. Average income is 32.8 million VND/ha/season, resulting in a profit of 13.8 million VND/ha/season. Other Crop Cultivation: 35% of households engage in cultivating other crops, including various potatoes/tubers, assorted vegetables, scallions, arrowhead tubers (Sagittaria sagittifolia), and ginger. The average cultivation area is 2.2 ha per household. Average income is 78.2 million VND/ha/season. Aquaculture: Identified as a potential strength in the buffer zone, 21% of total households participate. Activities include farming fish, freshwater finfish, and freshwater prawns/shrimp, achieving an average profit of 21.3 million VND/ha/season. Forestry (*Melaleuca*): Still practiced by 1.5% of households; however, profits from Melaleuca trees are low, only reaching 4.3 million VND/ha/year. According to local farmers, this low income is due to a lack of market demand for Melaleuca. Thus, the total income for the 76 households derived from these agricultural farming models is approximately 17,704,000,000 VND.
	5	Income is generated from the harvesting of NTFPs, primarily through beekeeping. Approximately 142 households engage in beekeeping for honey production within sub-zone 34, covering an area of about 1,260 ha. Each household manages around 20 beehives, with each hive capable of producing approximately 10 liters of honey annually. With a selling price of about 500,000 VND per liter for UMT wild forest honey, the total estimated annual income from this activity is 14,200,000,000 VND.
3. Tourist community	5	This valuation is based on the costs associated with psychological conditions such as stress, depression, etc., often resulting from work pressure. Currently, the prevalence of these issues in Vietnam is very high, affecting approximately 14 million people [65]. The primary treatment method for psychological conditions involves consultation with specialists. Depending on the severity, medication or other methods may also be applied. Assuming a mild mental health condition, the consultation alone typically costs between 300,000 and 750,000 VND per session. According to research by Jimenez et al. (2021), ecotourism effectively helps reduce stress and psychological conditions [66]. Thus, the benefit that visitors gain from ecotourism can be considered equivalent to the cost of medical consultation they might otherwise incur.

Buffer Zone Communities

The buffer zone community benefits directly from forest protection efforts through the Payment for Forest Environmental Services (PFES) policy. According to Decree No. 75/2015/ND-CP and Decision No. 24/2012/QD-TTg, the payment rate ranges from 300,000 to 500,000 VND/ha/year. With a total area of 412.19 ha managed by UMT and contracted out to 76 local households, the total annual payment received for forest protection reaches 164,876,000 VND.

Furthermore, ecosystem conservation helps enhance agricultural production efficiency. Among the buffer zone households: 31% grow bananas (averaging 2.2 ha/household) with an income of 28.5 million VND/ha/year; 16% grow rice (averaging 3.7 ha/household) with an average yield of 5.7 tons/ha/season and profits of 13.8 million VND/ha/season; 35% cultivate various other crops (averaging 2.2 ha/household) earning 78.2 million VND/ha/season; 21% practice aquaculture achieving profits of 21.3 million VND/ha/season; and 1.5% still grow forest trees (*Melaleuca*) but with low profits of only 4.3 million VND/ha/year. Thus, the total income from these farming models for the 76 households is estimated at approximately 17.7 billion VND annually. Additionally, the harvesting of NTFPs, mainly from beekeeping for honey, provides significant income. Approximately 142 households participate in beekeeping in sub-zone 34 over an area of 1,260 ha. Each household manages about 20 hives, producing an average of 10 liters of honey per hive per year. At a selling price of 500,000 VND per liter, the total annual income from beekeeping amounts to 14.2 billion VND.

Tourist Community

Ecotourism provides value not only economically but also in terms of mental health. Currently in Vietnam, approximately 14 million people face issues related to psychological conditions, stress, and depression [65]. The consultation cost for a single treatment session typically ranges from 300,000 to 750,000 VND. According to research by Jimenez et al. (2021), ecotourism effectively helps reduce stress and supports psychological well-being [66]. Therefore, the value that ecotourism at UMT provides can be considered equivalent to the potential consultation costs for visitors, highlighting the positive impact of forests on community health. In summary, the economic values derived from protecting and developing the ecosystem at UMTNP not only contribute to revenues from forest environmental services, tourism, and NTFP harvesting, but also provide significant benefits to the buffer zone community through income enhancement and livelihood improvement.

3.4. Impact Calculation

In SROI analysis, four factors - Deadweight, Displacement, Attribution, and Drop-off - are typically assessed to adjust a project's actual impact [13, 67]. However, this study focuses solely on Deadweight, as Displacement was absent (project activities were confined to UMTNP), no external contributions warranted Attribution adjustments, and project outcomes such as afforestation and community awareness improvements were deemed sustainable, making Drop-off irrelevant. Deadweight measures the proportion of outcomes that would have occurred without the project; a higher Deadweight indicates a lower actual contribution from project activities.

Deadweight is the measure of the percentage of outcomes that would have happened even if the project's activities had not taken place [13, 67]. If the deadweight value increases, the actual contribution from the project's activities decreases, and vice versa. The level of impact can vary among stakeholders depending on the project's activities and target audience. In this study, three main stakeholder groups are considered: (1) U Minh Thuong National Park, (2) the buffer zone community, and (3) the tourism community.

- **For UMT National Park:** Conservation of the wetland ecosystem is crucial for ensuring biodiversity and sustainable natural resource management. Without this project, conservation efforts could be severely impacted. For instance, the number of illegal poaching incidents would not decrease (estimated at 92% compared to pre-project levels). The forest area would shrink due to water retention for fire prevention, leading to a decline in the forest (estimated at 34%) and a loss of biodiversity, especially in aquatic resources. This could reduce the park's attractiveness to tourists, thereby causing a loss of revenue. While it's difficult to assess the exact extent of the decline in ecotourism revenue for the park, it can be hypothesized that the number of visitors would not have increased compared to the 2010-2017 period. Thus, instead of doubling the number of visitors with the project, the number would have remained the same, resulting in a 50% loss of revenue for UMT. Additionally, without this project, UMT would lose significant investment from central and local governments as well as from domestic and international organizations. Overall, the project's impact on UMT is estimated to be around 50%.
- **For the buffer zone community:** The project significantly impacts the livelihoods and lives of people in the buffer zone. Without the project, the UMT Management Board would have no mechanism to implement livelihood support activities for the community (other than the forest protection contracts that have existed since 1994). As a result, the project might not affect the current livelihood activities of people on land that was previously allocated but would only impact the exploitation of non-timber forest resources, particularly honey harvesting.
- **For the tourism community:** The project's impact on the tourist experience at UMT is primarily focused on improving service quality and preserving nature. However, from the perspective of stress reduction and psychological recovery, the project's impact is negligible, as the existing wetland resources already meet the needs for a nature experience. Therefore, the project has no significant impact on tourists.

Displacement in SROI analysis measures whether a positive outcome is simply a displacement of another negative outcome elsewhere [67]. In this study, displacement can be understood as the extent to which the project's impact shifts from one affected group to another. However, this project is primarily focused on the UMTNP area and does not cause a displacement of affected groups. This is consistent with some previous studies where displacement is not always considered in SROI calculations [13, 67]. Therefore, this metric is not calculated in this study.

Attribution is an assessment of the extent to which the project's outcomes are created by the contributions of other organizations or individuals and is expressed as a percentage [13]. These could be overlooked stakeholders. Assessing attribution helps reduce the risk of over-claiming the value generated by the project's activities. Non-governmental organizations and universities could potentially contribute to the impact generated by this project. However, these activities have not yet taken place and are only at a potential level, so this analysis is not included, as only this project creates an impact for the stakeholders.

Drop-off represents the decline of a project outcome over time and is calculated by subtracting a fixed percentage from the remaining impact created by the project at the end of each year [13]. For example, an initial outcome of 100 that lasts for three years and declines by 10% each year would be 100 in the first year, 90 in the second year (100 minus 10%), and 80 in the third year (90 minus 10%). In this study, the conservation project activities at UMTNP took place from 2018 to 2023, lasting approximately five years, with the changes created by the project being sustainable and having a stable positive impact. Typically, for afforestation activities, the forest area tends to expand rather than decline, leading to an increasing impact over time instead of a gradual decrease. Similarly, other activities also generate an incrementally increasing impact over time.

3.5. Return on Investment

3.5.1. SROI Value

The SROI evaluation reveals a nuanced picture of UMTNP's conservation investments. While the overall SROI ratio of 1.06 suggests modest returns, the breakdown reveals substantial long-term value across ecosystem services and social outcomes. Carbon sequestration through peatland and *Melaleuca* forest preservation accounted for over 20 billion VND in potential value, though high deadweight factors reduced the net benefit. Ecotourism emerged as a strategic growth area, with tourist arrivals increasing by 16.7% annually pre-COVID and generating nearly 23 billion VND in direct revenue. Community livelihoods improved through honey production and NTFP exploitation with combined income impacts exceeding 14 billion VND. However, illegal exploitation and policy barriers remain key challenges.

Specifically:

- UMTNP's carbon sequestration efforts in peatlands and forest vegetation are valued at over 20 billion VND, but after applying a 66% deadweight, the net impact is approximately 6.83 billion VND. Ecotourism activities contribute an additional 970.6 million VND in net benefits after accounting for 50% deadweight.
- Buffer zone households benefit from ecosystem services valued at 17.7 billion VND, but with 100% deadweight, the net impact is zero. In contrast, NTFP activities like beekeeping generate a net income of 14.2 billion VND, unaffected by deadweight. Forest protection contracts, valued at 164.9 million VND, also have no net impact due to 100% deadweight.
- Tourists benefit from relaxation and stress reduction valued at 22.87 billion VND, but this is excluded from the final SROI due to 100% deadweight, though it highlights the project's positive impact on mental well-being.

Overall, the project not only contributes to environmental protection but also generates distinct economic, social, and mental/spiritual benefits for stakeholders. Table 5 presents the detailed value of change and the impact on stakeholders.

Table 5. Value of change and impact on stakeholders

Stakeholders	Result	Monetary valuation (VND)	Deadweight (%)	Impact calculation (VND)
1. UMTNP	Enhanced capacity to sequester significant quantities of carbon within the peat layer as well as in forest vegetation.	20,093,843,277	66	6,831,906,714
	Attracting more tourists will increase revenue for UMT, thereby increasing income for the Center's staff	1,941,127,685	50	970,563,842
2. Buffer zone community	Households living in the buffer zone benefit greatly from UMT's ecosystem services, which provide significant support for their farming models.	17,704,000,000	100	0
	Income from NTFP harvesting activities, primarily beekeeping	14,200,000,000	0	14,200,000,000
	Improved income through forest protection activities	164,876,000	100	0
3. Tourist community	Experiencing comfort and stress reduction following the visit/tour	22,872,675,000	100	0

Although the project generates significant impact value, this value gradually diminishes over time due to inflation. With an average inflation rate of 3.5% per year in Vietnam, the final adjusted impact value of the project is VND 102,819,287,697. Therefore, the actual SROI ratio after 5 years of investment is 0.99, indicating that the project's return

on investment is below the break-even point (not yet generating a net positive social return). One of the main reasons for this low return is the significant amount of sequestered carbon that remains uncertified, preventing the project from participating in the carbon trading market to generate revenue. Additionally, the Covid-19 pandemic negatively impacted the tourism sector, forcing sightseeing activities to be suspended during the 2021-2023 period. Tourist arrivals dropped significantly to only about 34,000 visitors per year, compared to the previous average of 43,567 visitors per year (which had been growing at an annual rate of approximately 17%). This was a key factor affecting the project's ability to generate positive returns during the evaluation period.

The study's results show that the SROI effectiveness of the UMTNP Conservation Plan is positive, yet it's lower than the mangrove forest conservation program in Indonesia reported by Prasadi et al. (2023), which had an SROI of 8.13 [9]. Similarly, according to Pattison-Williams et al. (2018), who applied the SROI framework to wetland conservation scenarios in the Smith Creek watershed, Canada, over 30 years, the SROI value typically ranged from 0.8 to 3.17 [23]. This indicates that while UMTNP has generated significant social, economic, and environmental value, the return on each unit of investment has not reached the same high level as some other wetland conservation models in the region and globally.

3.5.2. Identification of Sensitive Factors

Based on the SROI ratio calculation results, it is evident that tourists play a crucial role in generating returns for the project, significantly influencing the SROI ratio. When the number of tourists or tourist expenditure levels at UMTNP change, the SROI ratio also fluctuates significantly (Figure 6). Specifically, when the number of tourists visiting UMT or tourist spending levels increase by 20%, 40%, 60%, 80%, and 100% compared to the pre-project average, the SROI ratio shows an increasing trend. Notably, increasing the number of tourists visiting UMT has a greater impact on the SROI ratio than increasing tourist spending levels. Although higher spending levels help increase revenue for UMT, they simultaneously increase the investment (input cost) made by tourists. If tourists derive greater benefits (outcomes) from enjoyable experiences, their net benefit increases, contributing to an improved SROI ratio.

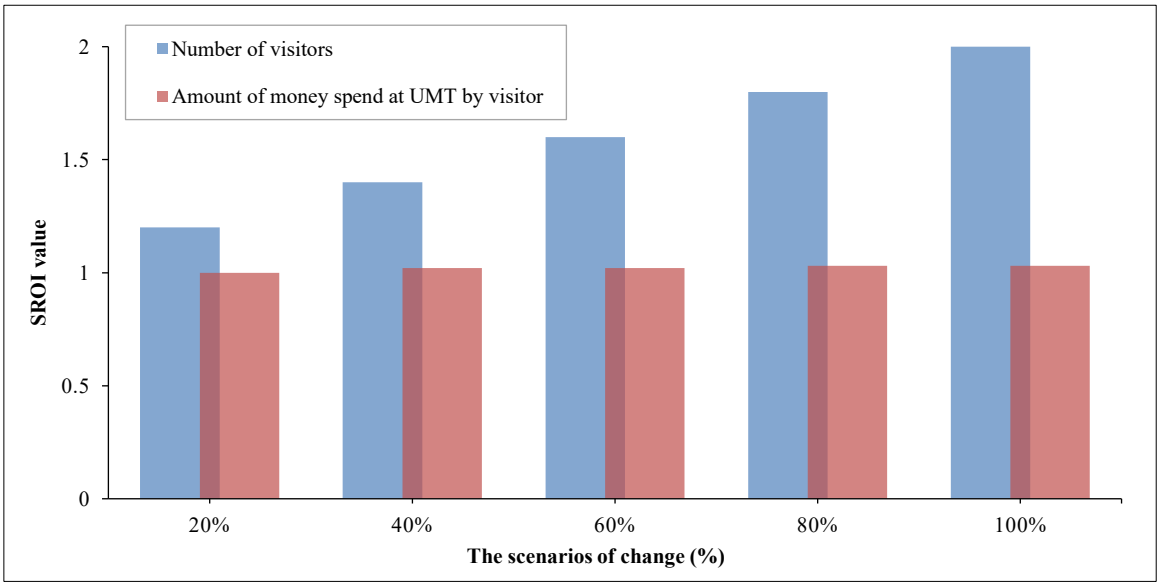

Figure 6. The SROI value increases with scenarios of increasing visitor numbers and visitor spending levels

To improve the project's SROI ratio, UMT should implement the following measures: (1) Attract more tourists through appealing promotional programs, collaboration with domestic and international tourism partners, and extending tourism operating hours; (2) Diversify tourism products and offer additional services aimed at increasing tourist expenditure. Tourism products and services should be tailored to specific target audience segments to optimize both the visitor experience and the value generated. The "high-value, low-impact" (HVLI) ecotourism model can be a good approach for UMTNP. This is a unique approach from the Kingdom of Bhutan, designed to balance economic development, environmental conservation, and the preservation of socio-cultural identity. This model encourages leveraging tourism benefits while focusing on strict control over the number of visitors to minimize pressure on natural resources and local communities [68]. Tourists visiting must pay a high cost for accommodation, travel, food, and other services. This fee not only increases revenue but is also reinvested into sustainable development programs, cultural conservation, and improving community livelihoods.

The number of tourists is limited to avoid mass tourism that can overload infrastructure, cause environmental pollution, and commercialize the local culture. Most tourists must travel with a local tour operator, which ensures good control over tourist numbers and service quality. The HVLI model is built on the foundation of the Gross National Happiness (GNH) index, which prioritizes happiness and sustainability over purely economic growth. In general, this model involves maintaining high fees, limiting mass tourism, and encouraging guided tours. The current study shows that the SROI ratio tends to increase more with the number of tourists rather than with their spending. However, uncontrolled mass tourism can lead to forest degradation, pollution, and disturbance to wildlife [69, 70]. Therefore, the HVLI model could be adapted for UMTNP, but it would need to be adjusted to fit Vietnam's specific conditions. Charge relatively higher fees for tours and services compared to mass tourism, but ensure the quality of services and experiences are worthwhile (e.g., bird watching, forest tours, exploring the floating season). Limit the number of visitors at any given time to avoid overcrowding and the risk of forest fires. Require local guides to accompany groups for guidance and control. Encourage guided tours and the development of community homestays in the buffer zone instead of building large hotels that put pressure on the environment.

In addition to tourism, another key factor significantly impacting the project's return on investment is the value of UMT's ecosystem services, particularly the carbon sequestration capacity of forest biomass and the peat layer. Currently, there are two payment mechanisms for this service: PFES and carbon credit trading on the market. Although UMT has received revenue from users of PFES, this amount remains modest. Meanwhile, the carbon credit market holds the potential to generate significant revenue. In 2024, Vietnam successfully sold over 10.3 million carbon credits to the World Bank, earning over VND 1,200 billion, indicating that UMT's potential for carbon credit exploitation is considerable. According to Thai et al., through effective management of peat resources, UMT has limited CO_2 emissions from peat to 18,796 tons of CO_2 per year [40]. Furthermore, the *Melaleuca* forests at UMT can absorb approximately 157,915 tons of CO_2 per year. If this entire amount of sequestered carbon were sold on the market, the potential revenue could reach up to VND 22.5 billion per year. If we were to sell at the EU price, which ranges from 80-90 EUR per credit, the SROI ratio would certainly increase significantly. Specifically, selling approximately 176,711 tons of CO_2 from UMTNP at a price of 80 EUR per credit would yield 43,434,033,608 VND. After accounting for the deadweight (66%), this would result in 147,675,713,427 VND, which is 21.6 times higher than the current value. (This is calculated by dividing the data from Table 5 by the total CO_2 from Table 4).

According to Decree 06/2022/ND-CP on mitigating greenhouse gas emissions and protecting the ozone layer, Vietnam plans to pilot its carbon trading market in 2025 and launch official operations in 2028. To seize this opportunity, UMT needs appropriate preparation, including: (1) Re-assessing the current state of forest quality concerning carbon sequestration capacity, and subsequently developing optimal management plans to enhance carbon credit quality; (2) Strengthening forest management and protection, particularly safeguarding the peat layer to limit carbon emissions due to oxidation. On the flip side, there are 04 main barriers to the development and operation of the carbon credit market in Vietnam [71]. The legal framework is incomplete, overlapping, and lacks transparency in regulations concerning carbon rights and benefit-sharing. Technical and data shortages are the challenges in measurement, reporting, and verification activity. The lack of specific guidelines for forestry and blue carbon projects makes it difficult to quantify carbon credits. The price of carbon credits in the voluntary market is low, which is not attractive enough to encourage participation. There are limitations in capital and benefit-sharing mechanisms; 62.5% of surveyed coastal provinces reported that a lack of finance is a major barrier. There is also a lack of a national carbon registry platform to manage transactions, prevent double-counting, ensure transaction transparency, and connect with international markets. The general public, businesses, and even local authorities have a limited understanding of the carbon market. In fact, 50% of the provinces surveyed have no carbon projects currently underway.

Furthermore, we also need to strengthen incentive and benefit-sharing mechanisms. According to Vo et al. (2024), all households with forest protection contracts want to continue these contracts long-term and participate in livelihood activities like fishing, aquaculture, and forestry to increase their income [72]. The community-based forest environmental service payment (PFES) policy is also a mechanism that motivates and encourages people to participate in collective forest protection activities [73]. When people involved in forest protection receive payments based on conservation results, such as maintaining forest cover, reducing fires, and protecting water sources, they are more motivated. Additionally, when payments are distributed through household or community groups, members tend to cooperate more closely to ensure they all benefit. Income from PFES helps reduce dependence on illegal forest resource exploitation while strengthening a sense of responsibility for forest protection. The direct involvement of the community in monitoring, managing, and distributing the benefits from PFES enhances transparency, reduces conflict, and links conservation benefits with livelihoods.

Under a best-case scenario, the SROI ratio could reach 2, potentially shortening the investment payback period to 27 months. Specifically, the total annual impact value would reach approximately VND 45,845,709,399, while the total investment capital is VND 103,619,640,000. From there, sensitivity analysis underscored the potential for scaling value through improved marketing, sustainable tourism, and carbon financing mechanisms. These findings affirm the utility of SROI in identifying leverage points and guiding evidence-based wetland management under climate stress and economic transition. Beyond UMTNP, the SROI can also be applied to mangrove and seagrass conservation areas, as these are very suitable ecosystems that provide significant ecological, social, and economic value.

4. Conclusion

This study applied the SROI method to evaluate the UMTNP Conservation Plan for the 2019-2023 period, providing a multidimensional assessment of its economic, environmental, and social returns. Although the SROI ratio was only 0.99, indicating the project did not yet yield a net positive return, the analysis shows it brought significant benefits to key stakeholder groups. Conservation measures helped the UMTNP in expanding the Melaleuca forest area, improving ecosystem services, and enhancing carbon sequestration capacity. The buffer zone community has been supported in income generation through the exploitation of non-timber forest products, especially honey production, and diversified livelihood models, which improved resilience to climate change. Ecotourism provided significant benefits for mental well-being and education while raising environmental awareness. Sensitivity and scenario analyses further showed that tourist numbers, tourist spending, and carbon sequestration capacity were the most influential factors on investment outcomes. Notably, increasing the number of tourists had a greater positive impact on the SROI value than increasing per capita tourist spending, suggesting that strategies focused on expanding visitor numbers - along with improved service quality - can significantly enhance conservation funding. Furthermore, these findings highlight the untapped potential of the carbon market. If UMTNP's carbon sequestration services were effectively certified and commercialized, the SROI ratio could double, significantly reducing the investment payback period. Overall, this research underscores the importance of integrating stakeholder engagement, sustainable ecotourism development, and innovative financial mechanisms like carbon credits into wetland management. By doing so, UMTNP can balance ecological conservation with livelihood enhancement, contributing to long-term sustainability under the pressure of climate change. Future studies should focus on establishing robust methodologies for valuing non-market ecosystem services, exploring policy pathways for carbon credit certification, and evaluating community-based ecotourism models to further improve conservation effectiveness and investment efficiency.

5. Declarations

5.1. Author Contributions

Conceptualization, L.V.L. and P.T.; methodology, P.K. and S.W.; validation, P.K. and S.W.; formal analysis, L.V.L.; investigation, L.V.L.; resources, L.V.L.; data curation, L.V.L.; writing—original draft preparation, P.T.; writing—review and editing, P.T. All authors have read and agreed to the published version of the manuscript.

5.2. Data Availability Statement

The data presented in this study are available in the article.

5.3. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

5.4. Acknowledgments

We appreciate the U Minh Thuong National Park management board for their cooperation in supplying essential data. We are also thankful to the Mekong WET Program, administered by IUCN Asia for providing us with their survey data on Wetland ecosystem management in U Minh Thuong National Park.

5.5. Institutional Review Board Statement

Not applicable.

5.6. Informed Consent Statement

Not applicable.

5.7. Declaration of Competing Interest

The authors declare that there are no conflicts of interest concerning the publication of this manuscript. Furthermore, all ethical considerations, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

6. References

[1] WWF. (2016). U Minh Thuong becomes the world's 2228th Ramsar Site. Worldwide Fund for Nature (WWF), Hanoi, Vietnam. Available online: https://vietnam.panda.org/?262111/U-Minh-Thuong-tro-thanh-khu-ramsar-thu-2228-cua-the-gioi (accessed on February 2026). (In Vietnamese).

[2] Tran, V. V., Nguyen, T. T., & Le, H. T. (2020). Livelihood situation of the community in the buffer zone of U Minh Thuong National Park, Kien Giang province. Can Tho University Journal of Science, Part B: Agriculture, Aquaculture and Biotechnology, 56(3B), 143-152.

[3] U Minh Thuong National Park (2024). Biodiversity. U Minh Thuong National Park, Kien Giang Province, Vietnam. Available online: https://vqgumt.kiengiang.gov.vn/ (accessed on February 2026).

[4] Panthi, J., Aryal, S., Dahal, P., Bhandari, P., Krakauer, N. Y., & Pandey, V. P. (2016). Livelihood vulnerability approach to assessing climate change impacts on mixed agro-livestock smallholders around the Gandaki River Basin in Nepal. Regional Environmental Change, 16(4), 1121–1132. doi:10.1007/s10113-015-0833-y.

[5] Tran, V. T., An-Vo, D. A., Cockfield, G., & Mushtaq, S. (2021). Assessing livelihood vulnerability of minority ethnic groups to climate change: A case study from the northwest mountainous regions of vietnam. Sustainability (Switzerland), 13(13), 7106. doi:10.3390/su13137106.

[6] Smajgl, A., Toan, T. Q., Nhan, D. K., Ward, J., Trung, N. H., Trí, L. Q., ... & Vu, P. T. (2015). Responding to rising sea levels in the Mekong Delta. Nature Climate Change, 5(2), 167-174. doi:10.1038/nclimate2469.

[7] Dang, T. D., Cochrane, T. A., Arias, M. E., & Tri, V. P. D. (2018). Future hydrological alterations in the Mekong Delta under the impact of water resources development, land subsidence and sea level rise. Journal of Hydrology: Regional Studies, 15, 119-133. doi:10.1016/j.ejrh.2017.12.002.

[8] Naklungka, K., Caichompoonoppakul, S., Teersuwan, S., Boonnak, C., & Napatalung, S. (2023). Social Return on Investment of the Biodiversity Offset Action Plan of Khung Bangkachao, Thailand. Asian Political Science Review, 7(1), 18-27. doi:10.2139/ssrn.4546494.

[9] Prasadi, O., Kurniawan, H., Rudi Saputra, R., Putri Lestari, S., & Gunawan, A. (2023). Impact Performance Measurement Using the SROI Method (Social Return on Investment) in the Jagapati Mangrove Conservation Program (SIMANJA) PT. Pertamina Patra Niaga Integrated Terminal Cilacap, Indonesia. Journal of Economics, Finance and Management Studies, 06(09), 4593–4598. doi:10.47191/jefms/v6-i9-51.

[10] Nurhadi, A., Andilolo, H., Hamdani, A., Hasyir, D. A., Ramadhani, M. A., Luthfan, M., Kurniawan, R. R., Agustian, R., Ramadhani, A. A., & Arisanty, D. (2025). Social Return on Investment (SROI) analysis of the Kampung ASRI Community Empowerment Program by PT Adaro Indonesia in Tabalong Regency (2019-2025). River Studies, 3(1), 22-39.

[11] Ariza-Montes, A., Sianes, A., Fernández-Rodríguez, V., López-Martín, C., Ruíz-Lozano, M., & Tirado-Valencia, P. (2021). Social Return on Investment (SROI) to Assess the Impacts of Tourism: A Case Study. Sage Open, 11(1), 2158244020988733. doi:10.1177/2158244020988733.

[12] Davies, L., Jiménez, A., Nieto, I., Mayo, X., & Reece, L. (2025). Understanding the social return on investment of physical activity and sport: developing an international consensus. Exercise, Sport and Movement, 3(1S), 33. doi:10.1249/esm.0000000000000033.

[13] Nicholls, J., Lawlor, E., Neitzert, E., & Goodspeed, T. (2012). A guide to social return on investment. The SROI Network, Liverpool, United Kingdom.

[14] Kadel, R., Stielke, A., Ashton, K., Masters, R., & Dyakova, M. (2022). Social Return on Investment (SROI) of mental health related interventions—A scoping review. Frontiers in Public Health, 10, 965148. doi:10.3389/fpubh.2022.965148.

[15] Pinelli, M., Manetti, S., & Lettieri, E. (2023). Assessing the Social and Environmental Impact of Healthcare Technologies: Towards an Extended Social Return on Investment. International Journal of Environmental Research and Public Health, 20(6), 5224. doi:10.3390/ijerph20065224.

[16] Crane, E., Noyes, J., Bianchim, M. S., Mclaughlin, L., Cahill, A., Roberts, G., & Stringer, C. (2025). A social return on investment analysis of patient-reported outcome measures in value-based healthcare. Journal of Patient-Reported Outcomes, 9(1), 22. doi:10.1186/s41687-025-00853-w.

[17] Davies, L. E., Taylor, P., Ramchandani, G., & Christy, E. (2019). Social return on investment (SROI) in sport: a model for measuring the value of participation in England. International Journal of Sport Policy and Politics, 11(4), 585–605. doi:10.1080/19406940.2019.1596967.

[18] Gosselin, V., Boccanfuso, D., & Laberge, S. (2020). Social return on investment (SROI) method to evaluate physical activity and sport interventions: A systematic review. International Journal of Behavioral Nutrition and Physical Activity, 17(1), 26. doi:10.1186/s12966-020-00931-w.

[19] Courtney, P., & Powell, J. (2020). Evaluating innovation in European rural development programmes: Application of the social return on investment (SROI) method. Sustainability (Switzerland), 12(7), 2657. doi:10.3390/su12072657.

[20] Basset, F. (2023). The Evaluation of Social Farming through Social Return on Investment: A Review. Sustainability (Switzerland), 15(4), 3854. doi:10.3390/su15043854.

[21] Hasan, A., & Ginting, H. (2025). Assessing the Success of CSR Using the Social Return on Investment (SROI) Approach: A Case Study of PT. Borneo Indobara's Fishermen Community Empowerment Program in Angsana Trans Nelayan Village. Jurnal Syntax Transformation, 6(6), 191–203. doi:10.46799/jst.v6i6.1079.

[22] Vázquez, J. P. A., Tirado-Valencia, P., & Ruiz-Lozano, M. (2021). The impact and value of a tourism product: A hybrid sustainability model. Sustainability (Switzerland), 13(4), 1–14. doi:10.3390/su13042327.

[23] Pattison-Williams, J. K., Pomeroy, J. W., Badiou, P., & Gabor, S. (2018). Wetlands, Flood Control and Ecosystem Services in the Smith Creek Drainage Basin: A Case Study in Saskatchewan, Canada. Ecological Economics, 147, 36–47. doi:10.1016/j.ecolecon.2017.12.026.

[24] Corvo, L., Pastore, L., Mastrodascio, M., & Cepiku, D. (2022). The social return on investment model: a systematic literature review. Meditari Accountancy Research, 30(7), 49–86. doi:10.1108/MEDAR-05-2021-1307.

[25] Maldonado, M., & Corbey, M. (2016). Social Return on Investment (SROI): a review of the technique. Maandblad Voor Accountancy En Bedrijfseconomie, 90(3), 79–86. doi:10.5117/mab.90.31266.

[26] Maier, F., Schober, C., Simsa, R., & Millner, R. (2015). SROI as a Method for Evaluation Research: Understanding Merits and Limitations. Voluntas, 26(5), 1805–1830. doi:10.1007/s11266-014-9490-x.

[27] Klemelä, J. (2025). License to operate. Social Enterprise Journal, 12(3), 387–408. doi:10.1108/SEJ-02-2015-0004.

[28] Khairunnisa, K., Pribadi, A. B., & Prabowo, F. S. A. (2019). Analysis of Social Return On Investment (SROI) to Measure the Social, Environment, and Economics Impact on the National Fattening Sheep Program (Studi at Pesantren Al-Ittifaq). Jurnal Ilmu Sosial Politik Dan Humaniora, 2(2), 33–42. doi:10.36624/jisora.v2i2.44.

[29] Lee, S. T., & Jung, S. M. (2025). Social return on investment as a tool for environmental impact and strategic assessments: Evidence from South Korea. Environmental Impact Assessment Review, 112, 107765. doi:10.1016/j.eiar.2024.107765.

[30] Žižlavský, O. (2014). Net Present Value Approach: Method for Economic Assessment of Innovation Projects. Procedia - Social and Behavioral Sciences, 156, 506–512. doi:10.1016/j.sbspro.2014.11.230.

[31] Resolution Number 112/NQ-HDND. (2017). Resolution on local budget allocation in 2018. Kien Giang Provincial People's Council, Rạch Giá City, Vietnam. (In Vietnamese).

[32] Resolution Number 179/2018/NQ-HDND. (2018). Resolution on public investment plan for 2019 in Kien Giang province. Kien Giang Provincial People's Council, Rạch Giá City, Vietnam. (In Vietnamese).

[33] Resolution Number 272/2019/NQ-HDND. (2019). Resolution on public investment plan for 2020 in Kien Giang province. Kien Giang Provincial People's Council, Rạch Giá City, Vietnam. (In Vietnamese).

[34] Resolution Number 507/NQ-HDND. (2020). Resolution on local budget allocation in 2021. Kien Giang Provincial People's Council, Rạch Giá City, Vietnam. (In Vietnamese).

[35] Resolution Number 49/NQ-HDND. (2021). Resolution on local budget allocation in 2022. Kien Giang Provincial People's Council, Rạch Giá City, Vietnam. (In Vietnamese).

[36] Ngcamu, B. S. (2023). Climate change effects on vulnerable populations in the Global South: a systematic review. Natural Hazards, 118(2), 977–991. doi:10.1007/s11069-023-06070-2.

[37] Ngoc, N. V, Dat, K. T., Cao, T. T., Dai, D. P., Thong, N. T., & Khai, T. Q. (2024). Evaluation of investment efficiency in planting forest at U Minh Ha region, Ca Mau province. Journal of Forestry Science, 111–120.

[38] Danh, L. N., Hoang, T. M., Triet, H. K., Nam, L. H., & Nguyen, T. P. (2022). The analysis of factors affecting tourists's satisfaction with service quality in U Minh Thuong National Park, Kien Giang province. VNU Journal of Economics and Business, 20, 43-51.

[39] Dan, T. H., Tat, L. H., & Tho, B. T. (2014). Evaluation of carbon accumulation of Melaleuca forest biomass on clay soil at U Minh Thuong Melaleuca Root Garden. Can Tho University Journal of Science, 31, 125-135. (In Vietrnamese).

[40] Thai, L. T., Tran, T. Van, Le, K. V., & Flörke Staats, M. (2024). Peatmass Change and Water Level Influencing Regenerated Melaleuca Forest after a Fire in U Minh Thuong National Park, Vietnam. Sustainability (Switzerland), 16(2), 620. doi:10.3390/su16020620.

[41] Anh, L. N. T., Ly, N. T. H., Nguyen, H., & Phuong, N. T. (2025). Characterizing soil properties and carbon storage potential across diverse wetlands in the Vietnamese Mekong Delta. Journal of Ecological Engineering, 26(4), 111–122. doi:10.12911/22998993/199817.

[42] Tran, T. (2001). Vegetation of U Minh Thuong Nature Reserve, Kien Giang province, Vietnam. U Minh Thuong Conservation and Community Development Project. CARE International in Vietnam, Hanoi, Vietnam. (In Vietnamese).

[43] Szabo, J. K., & Mundkur, T. (2017). Conserving Wetlands for Migratory Waterbirds in South Asia. Wetland Science, Springer, New Delhi, India. doi:10.1007/978-81-322-3715-0_6.

[44] Nguyen, X. C., & Ha, S. L. (2016). An analysis and assessment of the potential for exploiting inland wetland ecosystem services in Quang Ninh province. Vietnam National University Hanoi Journal of Science: Earth and Environmental Sciences, 1S(32), 59–64.

[45] Rao, M., Htun, S., Zaw, T., & Myint, T. (2010). Hunting, livelihoods and declining wildlife in the Hponkanrazi wildlife sanctuary, North Myanmar. Environmental Management, 46(2), 143–153. doi:10.1007/s00267-010-9519-x.

[46] Bennett, E. L., & Robinson, J. G. (2000). Hunting of Wildlife in Tropical Forests: Implications for Biodiversity and Forest Peoples. Environment Department Papers, The World Bank, Washington, United States. doi:10.1596/18297.

[47] U Minh Thuong National Park. (2023). Explanation of the Sustainable Forest Management Plan for the Period 2021-2030 of U Minh Thuong National Park. People's Committee of Kien Giang Province, U Minh Thuong National Park, Ho Chi Minh City, Vietnam.

[48] Belsoy, J., Korir, J., & Yego, J. (2012). Environmental impacts of tourism in protected areas. Journal of Environment and Earth Science, 2(10), 64-73.

[49] Buckley, R. (2004). Environmental impacts of ecotourism. CABI Publishing, Wallingford, United Kingdom. doi:10.1079/9780851998107.0000.

[50] Honey, M. (2008). Ecotourism and sustainable development: Who owns paradise? Island Press, Washington, United States.

[51] Stronza, A., & Gordillo, J. (2008). Community views of ecotourism. Annals of Tourism Research, 35(2), 448–468. doi:10.1016/j.annals.2008.01.002.

[52] Nizamani, M. M., Zhang, Q., Muhae-Ud-Din, G., Awais, M., Qayyum, M., Farhan, M., Jabran, M., & Wang, Y. (2023). Application of GIS and Remote-Sensing Technology in Ecosystem Services and Biodiversity Conservation. Deep Learning for Multimedia Processing Applications, 284–321, CRC Press, Baoca Raton, United States. doi:10.1201/9781032646268-12.

[53] Jacobson, S. K., McDuff, M. D., & Monroe, M. C. (2007). Conservation Education and Outreach Techniques. Oxford University Press, Oxford, United Kingdom. doi:10.1093/acprof:oso/9780198567714.001.0001.

[54] Shackleton, C., Delang, C.O., Shackleton, S., Shanley, P. (2011). Non-timber Forest Products: Concept and Definitions. Non-Timber Forest Products in the Global Context. Tropical Forestry, 7, Springer, Berlin, Germany. doi:10.1007/978-3-642-17983-9_1.

[55] Adams, W. M., Aveling, R., Brockington, D., Dickson, B., Elliott, J., Hutton, J., Roe, D., Vira, B., & Wolmer, W. (2004). Biodiversity conservation and the eradication of poverty. Science, 306(5699), 1146–1149. doi:10.1126/science.1097920.

[56] Hoq, M. S., Uddin, M. T., Raha, S. K., & Hossain, M. I. (2022). Determinants of households' livelihood diversification strategies to adapt to natural hazards: evidence from ecologically vulnerable haor region of Bangladesh. Natural Hazards, 114(3), 3255–3291. doi:10.1007/s11069-022-05514-5.

[57] Mahedi, M., Shaili, S. J., & Shihab, A. R. (2024). Livelihood Diversification as a Reduce to Rural Vulnerability in Bangladesh: A Review. Development Research, 4(1), 32-43.

[58] Robinson, J. G., & Redford, K. H. (2010). Neotropical wildlife use and conservation. University of Chicago Press, Chicago, United States.

[59] Bennett, N. J., Blythe, J., Cisneros-Montemayor, A. M., Singh, G. G., & Sumaila, U. R. (2019). Just transformations to sustainability. Sustainability (Switzerland), 11(14), 3881. doi:10.3390/su11143881.

[60] Brooks, J. S., Waylen, K. A., & Borgerhoff Mulder, M. (2012). How national context, project design, and local community characteristics influence success in community-based conservation projects. Proceedings of the National Academy of Sciences, 109(52), 21265–21270. doi:10.1073/pnas.1207141110.

[61] Gascon, M., Mas, M. T., Martínez, D., Dadvand, P., Forns, J., Plasència, A., & Nieuwenhuijsen, M. J. (2015). Mental health benefits of long-term exposure to residential green and blue spaces: A systematic review. International Journal of Environmental Research and Public Health, 12(4), 4354–4379. doi:10.3390/ijerph120404354.

[62] Wang, P., Meng, Y. Y., Lam, V., & Ponce, N. (2019). Green space and serious psychological distress among adults and teens: A population-based study in California. Health & Place, 56, 184–190. doi:10.1016/j.healthplace.2019.02.002.

[63] Sthapit, E., Björk, P., & Coudounaris, D. N. (2023). Memorable nature-based tourism experience, place attachment and tourists' environmentally responsible behaviour. Journal of Ecotourism, 22(4), 542–565. doi:10.1080/14724049.2022.2091581.

[64] Mitsch, W. J., Bernal, B., Nahlik, A. M., Mander, Ü., Zhang, L., Anderson, C. J., Jørgensen, S. E., & Brix, H. (2012). Wetlands, carbon, and climate change. Landscape Ecology, 28(4), 583–597. doi:10.1007/s10980-012-9758-8.

[65] Ministry of Health. (2023). Vietnam has about 14 million people with mental disorders. Ministry of Health, Ha Noi City, Vietnam. Available online: https://moh.gov.vn/tin-tong-hop/-/asset_publisher/k206Q9qkZOqn/content/viet-nam-co-khoang-14-trieu-nguoi-roi-loan-tam-than?inheritRedirect=false (accessed on February 2026). (In Vietnamese)

[66] Jimenez, M. P., Deville, N. V., Elliott, E. G., Schiff, J. E., Wilt, G. E., Hart, J. E., & James, P. (2021). Associations between nature exposure and health: A review of the evidence. International Journal of Environmental Research and Public Health, 18(9), 4790. doi:10.3390/ijerph18094790.

[67] Watson, K. J., & Whitley, T. (2017). Applying Social Return on Investment (SROI) to the built environment. Building Research & Information, 45(8), 875–891. doi:10.1080/09613218.2016.1223486.

[68] Beal, B. (2025). Ecotourism in a Sustainable World: A Case Study of Bhutan and its Tourism Industry's Global Applicability. PhD Thesis, University of Texas at Austin, Austin, United States. doi:10.26153/tsw/60570.

[69] Widawski, K., & Jary, Z. (2019). Mass tourism in protected areas - Underestimated threat? Polish National Parks case study. Open Geosciences, 11(1), 1046–1060. doi:10.1515/geo-2019-0081.

[70] Chandel, S. P. K. (2022). Impacts of tourism on environment. Central Asian Journal of Innovations on Tourism Management and Finance, 3(10), 90-98. doi:10.51699/cajitmf.v3i10.327.

[71] Vu, T. P., Pham, T. T., Tran, N. M. H., Nguyen, T. T. A., Nguyen, T. V. A., & Tang, T. K. H. (2023). The blue carbon market in Vietnam: Future development, potential and challenges. Occasional Paper 8, Center for International Forestry Research (CIFOR), Bogor, Indonesia, World Agroforestry (ICRAF), Nairobi, Kenya.

[72] Kuenzer, C., & Tuan, V. Q. (2013). Assessing the ecosystem services value of Can Gio Mangrove Biosphere Reserve: Combining earth-observation-and household-survey-based analyses. Applied Geography, 45, 167-184. doi:10.1016/j.apgeog.2013.08.012.

[73] Nguyen, D. M., Do, D. T., & Do, H. T. T. (2021). Community-based payment for forest environmental services: A study in Muong Cha district, Dien Bien province. Journal of Economics & Development, 291(2), 45-55.