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Local Community Participation based Ecotourism Management for Sustainable Development of Marine Protected Areas

Atul Dattatraya Ghate [1*], Jainish Roy [2]

[1*] Professor, Department of Management, Kalinga University, Raipur, India.
E-mail: ku.atuldattatrayaghate@kalingauniversity.ac.in

[2] Assistant Professor, Department of Management, Kalinga University, Naya Raipur, Chhattisgarh, India. E-mail: ku.jainishroy@kalingauniversity.ac.in

Abstract

Successful nature protection initiatives require stakeholder engagement. The intrinsic intricacy of Ecotourism (ET) has made establishing Sustainable Ecotourism (SET) businesses challenging, necessitating more engagement from community stakeholders. The current research examines Local Community Participation (LCP) in Lar National Park (LNP) and the Jajrud Preserved Area (JPA) under the Utilization of National Protected Areas in Iran, assessing its impact on the SET. This research seeks to analyze the influence of LCP on financial, ecological, and sociological sustainability inside Marine Protected Areas (MPAs) via the advancement of ET. The research revealed that in LNP, sustainable ecotourism growth engaging LCP is rising due to their strong affinity and curiosity in this pristine natural area. The interaction between local community engagement and ecotourism viability in the JPA is also crucial. Ecosystems have deteriorated, and sustainability has diminished. To preserve these severely threatened natural regions, leaders must enhance LCP and training to motivate local populations to participate actively in developing sustainable ecotourism.

Keyword:

Local community participation, sustainable development, marine protected areas, ecotourism.

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**Corresponding Author: Atul Dattatraya Ghate, E-mail: ku.atuldattatrayaghate@kalingauniversity.ac.in*

Introduction

The word 'ecotourism (ET)' denotes ethical tourism in natural locales, that has emerged as a universal concern due to the rise in visitor numbers and unsustainable growth practices (Samal & Dash, 2023). The comprehensive objective of ET is to mitigate ecological issues, bolster democratic and autonomous neighborhoods, enhance local economies, optimize the use of resources, and alleviate poorness in impoverished village areas (Mehdizadeh & Ravanshadniya, 2018). Approaches for ecotourism have been presented to save ecological systems and improve the livelihoods of local inhabitants. Numerous natural Protected Areas (PAs) provide tourist services due to their considerable environmental significance (Rodrigues & Cazalis, 2020). PAs offer sanctuary to several species of animals and plants that cannot locate suitable habitats due to human encroachment. It is accurately characterized by community engagement, long-term viability awareness of the environment, and nature protection for the long-term growth of Marine Protected Areas (MPAs) (Meilana et al., 2023).

It enhances the detection of the necessity of saving deteriorated marine ecosystems. Marine preservation must be accomplished by cohesive marine governance and judicious resource exploitation. MPAs serve as effective instruments for safeguarding Marine Ecosystems (MES) and fostering the sustainable utilization of marine assets. They serve the purpose of ocean biological conservation while offering numerous services essential for the life and welfare of coastal populations. Human behavior influences the management outcomes of MPAs. Researchers assert that human elements are critical to the MES's Sustainable Growth (SG) (Roberts et al., 2021). Most human variables influencing the conservation efficacy of MPAs stem from adjacent populations. MPAs and their adjacent populations are interdependent and essential to one another; hence, they are frequently seen as an integrated social-ecological framework for analysis (Duan et al., 2024).

Establishing and administrating MPAs result in disputes with local inhabitants. MES is often rehabilitated by restricting marine areas or regulating catches in MPAs, intensifying conflicts among MPAs and residents on resource utilization (Tranter et al., 2022). The academic study primarily emphasizes resolving the dispute between MPAs and local governments in attaining shared development goals. In the past few years, social participation—also referred to as community responsibility, community commitment, public interaction, or participant engagement—has become a crucial component of ecological decision-making procedures. It is the engagement of individuals impacted by a decision-making process. Active engagement can alleviate disputes and improve MPA administration (Di Franco et al., 2020). It offers an opportunity to address biodiversity challenges and partially alleviate social, financial, and political concerns. In the last twenty years, a worldwide shift occurred in MPA administration from different strategies. Research about community engagement in MPA has risen in recent years. Concerns regarding the impact of community perceptions on preserving marine life and enhancing co-management methods have garnered academic interest (Voorberg & Van Der Veer, 2020).

Citizen science is a burgeoning research tool for advancing the examination of MPA. These initiatives can facilitate community-based tracking and enhance scientists' capacity to gather data. This approach encourages collaboration between scientists and populations. The Kunming–Montreal worldwide Biodiversity Structure emphasizes acknowledging the rights of populations, guaranteeing their comprehensive and practical involvement (Li et al., 2023). The global community identifies the pivotal role of people and their neighbors in preserving environments. Local Community Participation (LCP) enhances the adaptability of MPAs to global warming and is crucial in marine environmental conservation efforts.

The study on community involvement in MPA primarily concentrates on the following elements. The initial approach pertains to LCP engagement in MPA management. Academics assert that several forms of LCP engagement, such as fisheries and traveling, might facilitate coordinated and long-term development between MPAs and diverse industries. Research indicates that LCP in ecotourism has enhanced MPA's economic, ecological, and social viability. Secondly, the perspectives and present participation of community members, mainly fishermen, have been examined through a review of literature and both open and semi-structured conversations. The analysis often entails a particular MPA case study, including interactive fieldwork methodologies to comprehend the LCP opinions and views. The research employed surveys to gather data and elucidate the perspective in MPAs. The findings indicated that the paradigm facilitates communities' sustainable utilization of natural resources and fosters economic and social growth. Scientists have investigated particular strategies for community engagement in MPA administration (Mohammad Abbas et al., 2024). Methods of involvement encompass LCP-based maritime development, LCP-based preservation, and participative assessment and tracking.

Several studies indicate that the advancement of ecotourism necessitates the formulation, planning, and execution of suitable maintenance strategies and the LCP. This is particularly significant given the escalating demands from anthropogenic activity in natural environments. Promoting engagement among local communities and enhancing their understanding of these areas is essential to mitigate the detrimental effects of ecotourism operations in protected areas.

Related Works

Several strategies have been established to administer protected areas globally. Centralized leadership (top-down) and decentralized leadership (bottom-up), often referred to as LCP-based leadership and collaboration (cooperative), are the predominant management techniques identified in contemporary research. These methodologies are particularly prevalent among MPA management organizations in colonial and post-colonial tropical nations.

LCP is crucial for the advancement of ecotourism. Involvement is evaluated to ascertain its efficacy across different governmental systems (Skivington et al., 2021). The intrinsic intricacy of ET has made establishing SET operations challenging, necessitating more engagement from community stakeholders. Stakeholder theory posits that employing ET as a proxy for SG requires the involvement and agreement of its participants to uphold the foundations of equality, interlinking of the environment, and economic viability (Li, 2024).

Engagement at every phase of the ecotourism growth procedure includes assessing and appraisal of enacted policies, functioning of tourist attractions, and environmental education. By engaging stakeholders, decision-makers cultivate trust, enhance effect detection, and increase awareness. Several studies have highlighted the significance of assessing the relationship between responsible ecotourism growth and LCP (Chan et al., 2021). According to Rowlands's theory of power, communities essential to the sustained development of ecotourism across environmental-ecological, social, cultural, and financial facets are seen as tourist activists. This necessitates cooperation and collaboration among many parties.

Numerous studies have investigated healthy ecotourism growth and LCP at the local level. Khaledi Koure et al. investigated the influence of LCP on developing ecotourism (Khaledi Koure et al., 2023). The findings indicated that the LCP in growing ecotourism is contingent upon the leadership approach and their economic status (Forčaković & Dervišević, 2022).

The findings suggest that in a culture characterized by fragile economies and constrained access, facilitating community engagement is more complex, hindering the conservation of environmentally sensitive environments. Hughes et al. investigated tourism engagement in Fiji, emphasizing the utilization of tourist empathy for community advancement (Hughes & Scheyvens, 2021). The research concludes that visitors' inclination to give back to areas of interest is more commercialized. However, their capacity to tackle neighborhood growth challenges needs to be improved. This study analyzed ecotourism collaborations as a viable mechanism for attaining equitable growth objectives.

The studies demonstrate that SET initiatives in protected areas necessitate the LCP in the design and decision-making processes (Rahman et al., 2022). This study analyzes sustainability and engagement indicators to elucidate the correlation between LCP and the sustainable growth of ecotourism. It offers superior protection, legal assistance, and heightened ecological awareness. It is subjected to elevated activity levels by people, population expansion, and city growth while experiencing few ecological limitations on commercial operations.

For effective oversight of MPAs, a favorable image of the local people regarding conservation measures and their benefits is vital. Zeng et al., observed that the views and attitudes of residents are essential for the efficiency of MPA administration (Zeng et al., 2022). Roscoe et al. emphasized that the efficacy and quality of leadership and oversight regulations, structures, and procedures are assessed through the perspectives of interested parties and LCP (Roscoe et al., 2020). It is essential to comprehend how communities see the long-term growth of MPAs to enhance their integration into development programs that aim to benefit them. Research regarding stakeholders' perceptions of co-management techniques is scarce to the best of the understanding, especially within the setting. This research seeks to fill the identified research gap and enhance the current body of existing information in this domain.

Materials and Methods

Operationalizing of Constructs

This research examined the significance of LCP in the growth of ET and its effects on the SG of MPAs. The investigation employed the SmartPLS method utilizing Structural Equation Modelling (SEM) to analyze the link among exogenous components. Community engagement serves as the independent factor, whereas the growth of ecotourism acts as a mediator among LCP and financial, interpersonal, and ecological viability. The current research employed a bi-level analytical approach utilizing a Partial Least Squares (PLS) method, whereby the computation modeling was examined through evaluation, and the SEM framework was reviewed for evaluating hypotheses. The measuring elements were designed depending on prior research. Three questions were altered to assess LCP, and three components were adjusted to gauge ecotourism growth.

Eleven factors were altered to assess MPA’s financial, social, and ecological sustainability. The independent factors were analyzed utilizing a five-level Likert rating (1 = highly disapprove, 2 = disapprove, 3 = unbiased, 4 = approve, 5 = highly approve). In contrast, the mediated and dependent factors were evaluated with a seven-level Likert rating (1 = highly disapprove, 2 = disapprove, 3 = slightly disapprove, 4 = neutral, 5 = slightly approve, 6 = approve, 7 = highly approve).

Survey

The investigation domains for the suggested research have been chosen according to the following guidelines. Humans have inhabited these designated coastal regions for generations. Marine areas are threatened by

overpopulation resulting from the unsustainable use of supplies. The socioeconomic conditions of the selected localities could be more adequate (Gürlek & Atay, 2021). Their reliance on marine assets is substantial, potentially jeopardizing these resources imminently.

The ecosystem in the suggested research regions has been significantly compromised due to anthropogenic domestic waste, year-round excessive tourism, oil and petrochemicals discharge from tourist vessels, overfishing, sewage and refuse, excessive detergent usage, aquaculture practices, fisheries tasks, and plastic pollution. These factors have led to elevated ocean temperatures, increased ocean acidification, rising sea levels, coral reef damage, freshwater scarcity, bleaching of corals, diminished turtle nesting sites, reduced fish output, and several other issues on the islands. Overfishing is significantly affecting the increase in ocean temperatures. Excessive extraction of fish from the ocean disrupts the ecological balance, potentially resulting in the degradation of the food chain and the decline of other marine organisms, such as tortoises and corals. Mitigating exploitation will enhance resiliency and optimize long-term food security and income potential.

G-Power edition 3.1 was utilized to determine a suitable sample quantity. With an effect magnitude of 0.15, G-Power software recommends a population number of 160 to evaluate the suggested study framework comprising six components. This survey successfully gathered data from 320 participants, surpassing the minimum specified number of participants. Information was collected using an online survey conducted in the research region. The research administered the survey to the respondents via direct interaction and elucidated the primary purpose of the information gathering. The survey was segmented into three components. The initial segment includes questions designed to gather the socioeconomic attributes of the participants. The second segment includes many items to assess LCP. At the same time, the third piece has various questions aimed at evaluating the mediation impacts of ecotourism on financial, social, and environmental stability.

This study identified two protected areas in Tehran province, Iran's most populated province: Lar National Park (LNP), recognized for its pure natural environment, and the Jajrud Preserved Area (JPA), the oldest maintained area. Additional factors for selecting these regions encompass the plentiful natural, past, and cultural assets, significant tourist activity, and elevated visiting rates. LNP is situated in the northern region of Tehran province, encompassing 35k hectares, and is distinguished by its elevated highlands and rich aquatic habitats. A total of 160 animal species have been documented in this region, predominantly consisting of animals. The most uncommon aquatic plant inhabits this region and is present in the Tehran region; it is regarded as a symbol of conservation. The JPA is approximately 745k hectares and contains rich animal and flora variety.

Data

The research performed a comprehensive literature analysis to compile the parameters for assessing ecotourism sustainability and the extent of LCP. The study found 100 sustainability indicators across three categories: The environmental-physical component has 38 metrics, the social-demographic component consists of 35 metrics, and the financial-institutional component contains 32 measures. Sixteen variables were analyzed to evaluate the extent of local community engagement. The survey was administered in person, and the primary purpose of gathering information was elucidated to the participants. The research currently provides comprehensive listings of factors and markers that serve as a foundation for evaluating MPAs, followed by a study of features that necessitate modifications to these listings.

Results

Demographic Details

The study interviewed 350 participants for LNP and 380 participants for JPA-designated regions, as seen in Figure 1. Most poll panelists in LNP and JPA were male responders aged between 40 and 50. The majority of respondents have associate's levels. The majority had resided locally for 25 years or longer.

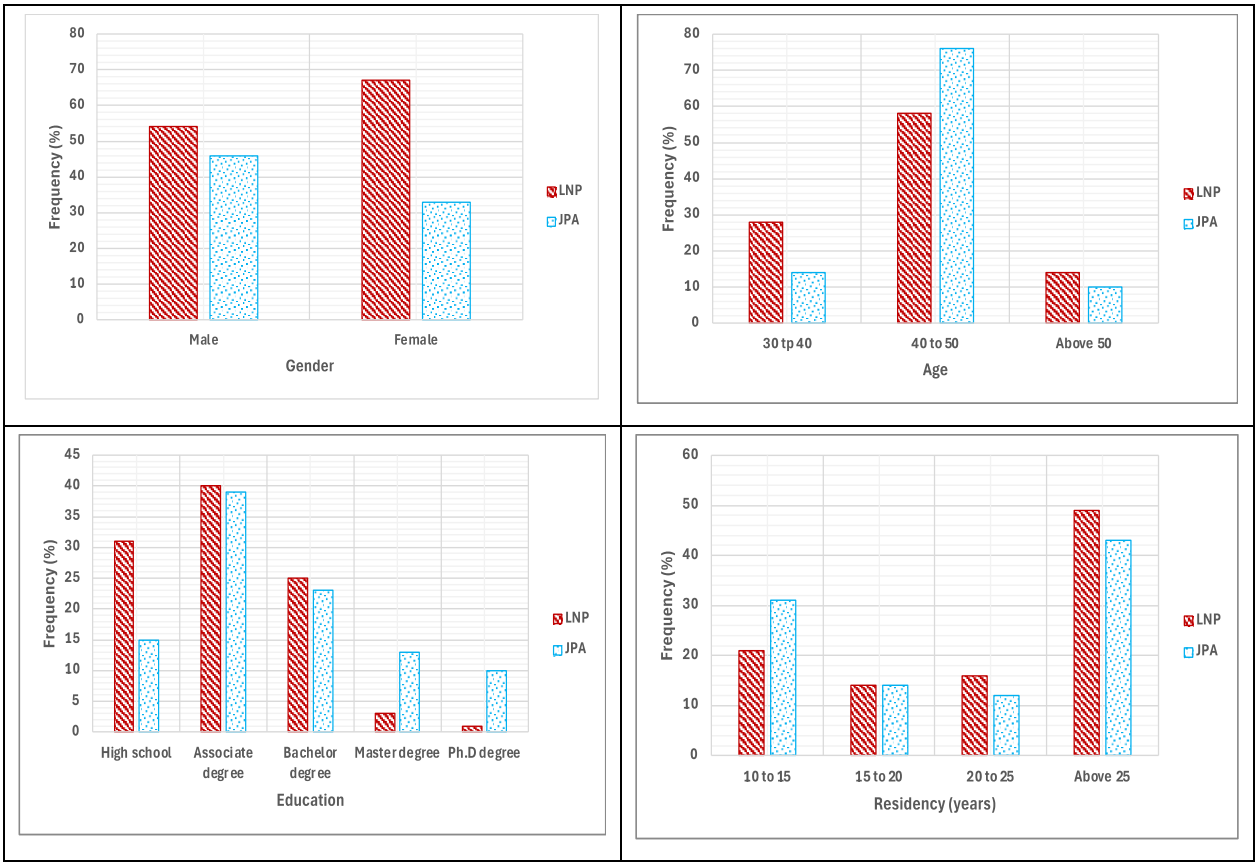

Figure 1. Demographic data analysis

Environmental Sustainable Level

The findings indicated that LNP had the most significant perceived sustainability levels throughout the ecological-physical and social-demographic categories, with means of 3.69 and 3.82. JPA was perceived to possess the highest financial-educational-environmental responsibility, with an average rating of 3.79.

Local Community Participation

The highest reported degree of regional community engagement was recorded for LNP, with an average of 3.53. At the same time, involvement for the JPA was significantly smaller, with an average of 2.81, as shown in Figure 2.

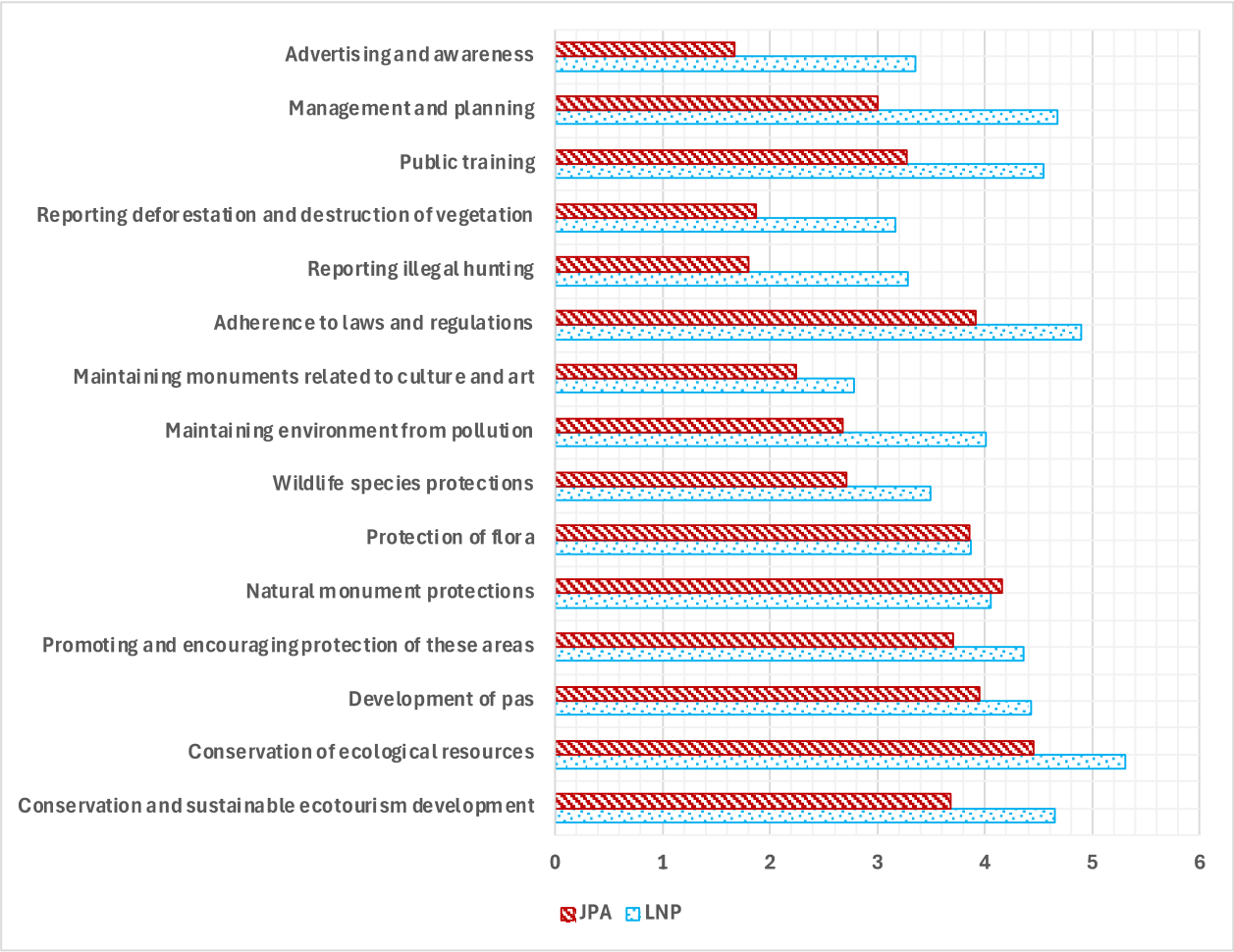

Figure 2. Local community participation analysis

Participation and SET Growth

The findings demonstrate that the threshold is below 0.05. A substantial correlation exists between LCP and the sustainability of ecotourism, as shown in Figure 3. This indicates that heightened LCP in these regions correspondingly elevated the degree of sustainable growth in ecotourism.

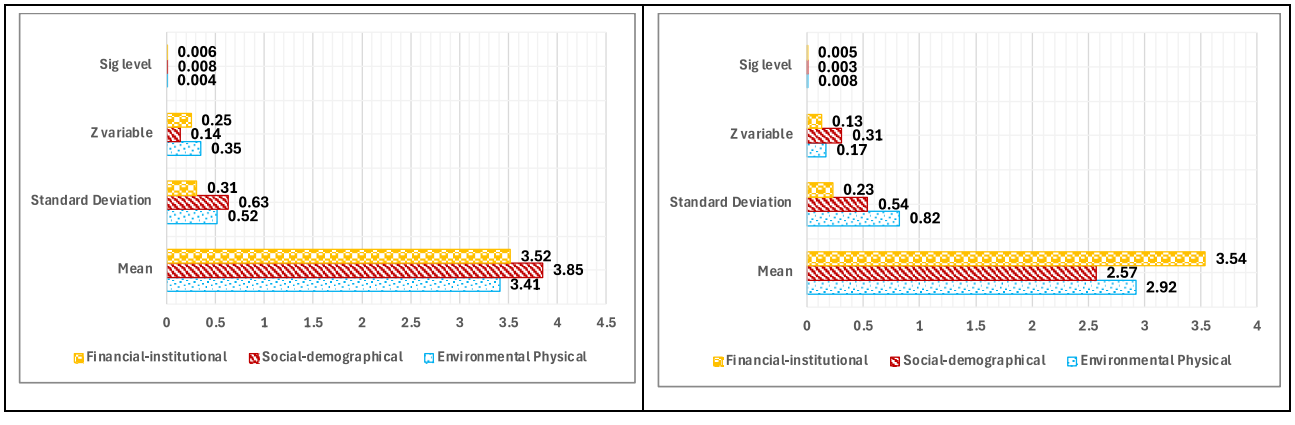

Figure 3. Ecotourism sustainability analysis (a). LNP and (b). JPA

In the multivariate regression approach, involvement criteria included distinct variables, whereas ecotourism viability was classified as a dependent factor. The findings indicate that the association variable between SET factors and LNP involvement is 0.75. The findings demonstrate that a linear amalgamation of involvement markers elucidates the modified factor of 69.2% since these alterations are statistically significant at the 0.009 threshold. In JPA, the Pearson correlation ratio among ecotourism viability and involvement measures is 0.68, with a confidence value 0.05, signifying a statistically meaningful association, as shown in Figure 4.

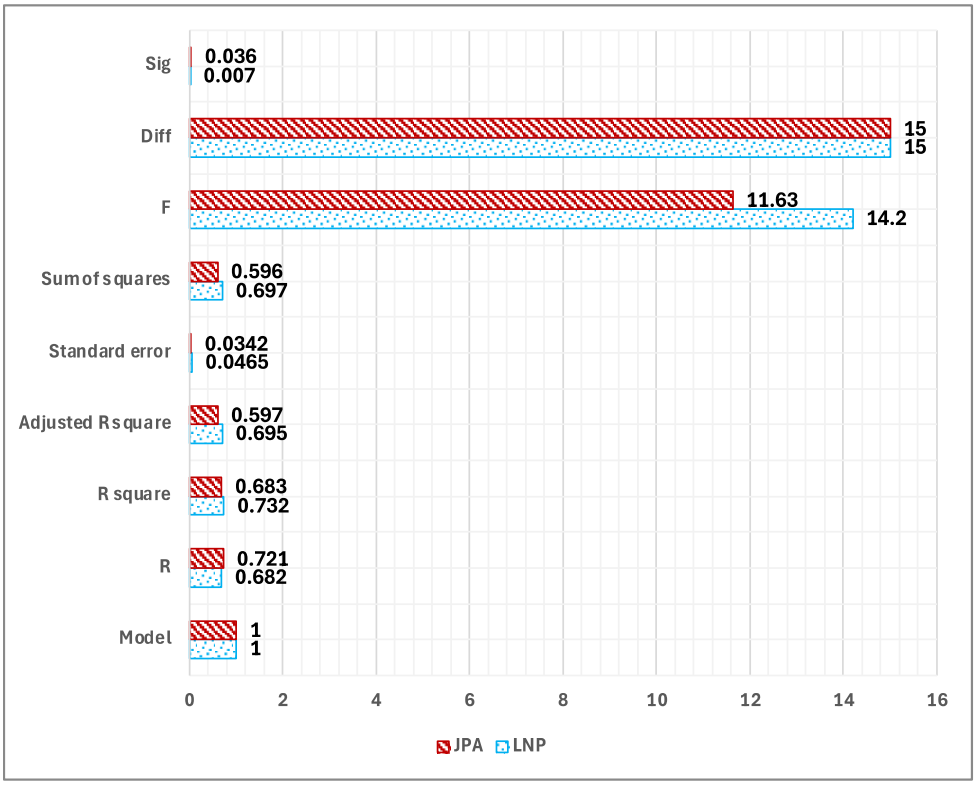

Figure 4. Multivariable regression analysis

The final evaluation of the influence of the factors was conducted utilizing the normalized values. The findings demonstrate that in LNP, the ecological-physical and financial-educational characteristics substantially influence the long-term sustainability of ecotourism. At the same time, the demographic-social components show no statistically meaningful effects. The ecological-physical component had the most excellent beta (B) value at 0.62, while the social-demographic component displayed the minor B factor at -0.23. In the JPA, the ecological-physical and financial-institutional components exert considerable favorable effects, but the social-demographic effects were unimportant and leaned towards the negative. The results reveal that the most significant B variable (0.56) was identified in the financial-institutional dimensions, when the most minor B variable (-0.35) was seen in the social-personal component.

Factors Influencing LCP

To accommodate the article within a restricted page count, cycles 1 and 2 of the Delphi approach relocated to the supplemental documents, and the outcomes of cycle three are as given below. According to expert opinions, 16 elements were identified in the initial round of the Delphi method. In the subsequent round, 14 factors were chosen. Neighborhoods' financial status and schooling levels were excluded from the inquiries in the initial cycle of Delphi. Similarly, in the subsequent cycle, the criterion of a "significant proportion of individuals

within small populations" is eliminated from the inquiries, according to specialist opinion. Thirteen criteria were identified after the specialists' replies in the third phase of the Delphi approach. The requirements represent the definitive selection believed to affect the amount of LCP in the research regions, with varying effects contingent upon the features of each area.

The most characteristics facilitating LCP were associated with LNP, yielding a mean of 3.23. A strong affinity and interest in unspoiled nature received a notably excellent rating of 4.61. The component deemed least significant was the presence of conventional wisdom, which received a 1.81. In the JPA, the most crucial average value of 4.21 was attributed to the "lower score of protective significance" amongst residents. In contrast, the minor average rating of 1.43 was ascribed to a "high influx of visitors." The primary factors influencing LCP levels varied per research region due to differences in consciousness, qualifications, and the perceived significance of area conservation among local people.

Conclusion

The current research has assessed the LCP and the SET growth in two categories of protected areas in Iran: LNP and JPA. LCP is favorably connected with creating ecotourism in these locations. In recent years, unsustainability and habitat loss in MPA have significantly escalated, partly due to insufficient stakeholder involvement. The establishment of ecologically sound nature-based ecotourism initiatives necessitates LCP. Engagement should ideally result in conservation results, both short- and long-term advantages for residents (enhancing livelihoods and generating employment possibilities), improved educational and research illnesses, heightened accountability and sustainable utilization of the region, integrated leadership, strategic planning, growth in small-scale viable ecotourism, enhancements in rules, and sufficient tracking.

The MPA directors need to facilitate the social-economic advancement of hosting communities. To do this, government officials and other partners must promote involvement and provide educational resources extensively throughout the local neighborhoods. Residents will be incentivized to deliver high-quality services to visitors, safeguard these regions, and rehabilitate biodiversity. The present research sought to investigate the correlation between community engagement and the advancement of ecotourism for the identification of MPAs. The objective was to examine the intermediate function of ecotourism growth in the connection among LCP and financial, interpersonal, and environmental viability for the long-term growth of MPAs. The findings indicated that community involvement significantly enhances ecotourism development for MPAs sustainability.

Future research expansion suggestions encompass the utilization of planning algorithms and making choices, investigating the correlation among ET effects and participation of stakeholders, assessing the efficacy of LCP-based ET in MPA, and determining the involvement of both agencies in advancing environmentally conscious ET initiatives. The primary restriction is the need for more expertise in information. This intentionally furnishes research benefactors with straightforward analyses to enhance sustainable ecotourism growth comprehension. It is crucial to consider some variables not addressed in the present research, such as the life span of a tourism site.

Author Contributions

All Authors contributed equally.

Conflict of Interest

The authors declared that no conflict of interest.

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