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ARTICLE

Plans for Villages in the Margin of the Lagoon with an Accentuation on Tourism Advancement (Case Study: Village Rogbeh, Shadegan, Iran)

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ABSTRACT

This research examines the potential for sustainable tourism development in Rogbeh Village, a socio-economically marginalized settlement situated along the ecologically fragile Shadegan Lagoon in southwestern Iran. Confronting intersecting challenges of environmental degradation (e.g., pollution, habitat loss) and socio-economic vulnerability (e.g., youth outmigration, infrastructure deficits), this study proposes a participatory tourism framework that synergistically integrates Indigenous cultural heritage—including Arabic-speaking Bahrani traditions, vernacular stilt architecture, and artisanal houri canoe craftsmanship—with regenerative infrastructure design. Employing a robust mixed-methodology, the research synthesizes: comprehensive SWOT analysis to identify strengths (e.g., lagoon-centric livelihoods, biodiversity hotspots), weaknesses (e.g., absent wastewater treatment, limited tourist accommodations), opportunities (e.g., Ramsar Convention recognition), and threats (e.g., saltwater intrusion); semi-structured interviews with 45 key stakeholders (30 villagers, 10 local officials, 5 NGO representatives), revealing community priorities and ecological concerns; quantitative datasets on water quality, demographic trends, and livelihood dependency ratios. Findings demonstrate Rogbeh's unique cultural-ecological landscape as a high-potential ecotourism destination. However,

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critical barriers—notably institutional fragmentation, sanitation deficiencies, and seasonal eco-nomic instability require systematic intervention. The study advocates a three-pillar solution: eco-sensitive infrastructure: reed-built lodges using solar energy, grey-water recycling, and elevated walkways to minimize wetland disruption; community-led governance: tourism coopera-tives allocating 30% of revenues to local healthcare/education, with microgrants for women-led enterprises; this model positions Rogbeh as a replicable prototype where cultural resilience, ecological stewardship, and equitable benefit-shar-ing catalyze holistic sustainability in marginalized wetland communities offering transformative insights for global South contexts facing similar climate-poverty nexuses.

Keywords: Sustainable Tourism; Shadegan Lagoon; Community Participation; SWOT Analysis; Cultural Heritage; Rural Development.

1. Introduction

1.1. The Question of Research

Rogbeh Village, nestled along the ecologically fragile Shadegan Lagoon in southwestern Iran, embodies a unique interplay of environmental, cultural, and socio-economic dynamics. The lagoon, recognized as an internationally important case, sustains traditional livelihoods such as fishing and boat-based transportation while harbouring rich biodiversity. However, the region faces mounting pressures from environmental degradation (e.g., pollution and habitat loss) and socio-economic marginalization, exacerbated by inadequate infrastructure [1,2,3] and limited institutional support.

Against this backdrop, tourism emerges as a potential catalyst for sustainable development. Yet, the central challenge lies in designing tourism initiatives that reconcile three conflicting priorities [4]:

Ecological Preservation: Protecting the lagoon's fragile ecosystem from overexploitation.

Cultural Integrity: Safeguarding Rogbeh's Arabic-speaking heritage, traditional architecture, and lagoon-centric lifestyle.

Economic Equity: Ensuring tourism-generated benefits directly uplift local households without displacing existing livelihoods.

This study addresses these tensions through the following research question:

How can participatory landscape design frameworks for Rogbeh Village integrate ecological conservation, cultural heritage, and community-driven economic development to establish a sustainable tourism model?

To unpack this question, the research investigates three sub-dimensions:

Environmental: What are the perceived ecological risks of tourism development, and how can traditional practices (e.g., indigenous boat-making and seasonal fishing) inform low-impact infrastructure design?

Cultural: How do villagers conceptualize the relationship between their cultural identity and the lagoon, and what role can tourism play in revitalizing endangered traditions?

Economic: What institutional and financial barriers hinder local participation in tourism planning, and how might collaborative governance structures overcome them?

The inquiry is grounded in community-based sustainable development (CBSD) theory, which posits that marginalized communities are not merely beneficiaries but active co-designers of development processes. By centering Rogbeh's residents as knowledge-holders and decision-makers, this study challenges top-down tourism paradigms. It seeks to redefine sustainability as a negotiated balance between global conservation agendas and localized socio-cultural values.

1.2. Background Research

The development of sustainable tourism in ecologically sensitive rural areas has garnered significant scholarly attention, particularly in regions where environmental preservation intersects with socio-cultural and economic revitalization. This section synthesizes three interconnected thematic strands of literature critical to understanding Rogbeh Village's context: (1) wetland tourism and ecological conservation, (2) community-driven tourism models,

and (3) cultural heritage as a tourism asset.

1.2.1. Wetland Tourism and Ecological Conservation

Wetlands, as biodiversity hotspots and cultural landscapes, present unique opportunities and challenges for tourism. Studies on Ramsar sites, such as the Anzali Lagoon in Iran [5] and the Sundarbans in India, highlight the delicate balance between tourism-driven economic growth and ecosystem degradation. For instance, Hassan et al. [6] demonstrated that urban-rural divides in environmental preferences complicate conservation efforts, emphasizing the need for adaptive governance. In Rogbeh's case, the Shadegan Lagoon's ecological fragility necessitates tourism models that prioritize low-impact infrastructure, such as the use of indigenous materials and waste management systems [7,8,9].

1.2.2. Community-Driven Tourism Models

Participatory approaches to tourism planning have proven effective in marginalized rural contexts [10]. Castro-Arce and Vanclay [11] conceptualized "transformative social innovation," arguing that local communities must co-design tourism initiatives to ensure equity and cultural relevance. Similarly, Pilving et al. [12] documented Estonia's success in fostering rural tourism through public-private partnerships and grassroots entrepreneurship. These studies align with Rogbeh's need for collaborative frameworks that empower villagers as decision-makers rather than passive beneficiaries. However, gaps remain in applying such models to lagoon-based communities, where traditional livelihoods (e.g., fishing) are closely intertwined with the ecological systems [13,14].

1.2.3. Cultural Heritage as a Tourism Asset

Cultural heritage, particularly intangible practices like boat-making and lagoon-centric rituals, is increasingly recognized as a pillar of sustainable tourism. Rhoden and Kaaristo [33] explored how water-based traditions in European coastal villages enhance tourist experiences while preserving local identity [15,16]. In Iran, Rostami and Mousavi Shalheh [17] demonstrated that vernacular architecture in Shadegan's villages can attract eco-conscious tourists if integrated into development plans. Yet, few studies address the risks of cultural commodification or strategies to safeguard authenticity in rapidly modernizing contexts.

1.2.4. Synthesis and Research Gap

While existing literature provides valuable insights into wetland conservation and community participation, three critical gaps emerge:

- Context-Specific Strategies: Most studies focus on temperate or forested wetlands, neglecting arid or semi-arid lagoon systems, such as Shadegan.
- Cultural-Ecological Interplay: Few models explicitly link cultural heritage preservation to ecological stewardship in tourism planning.
- Institutional Barriers: Limited analysis of how fragmented governance (e.g., disjointed environmental and tourism policies) hinders marginalized communities.

This study addresses these gaps by proposing a participatory framework tailored to Rogbeh's unique socio-ecological context, where the lagoon is both a lifeline and a vulnerability (**Table 1**).

Table 1. Thematic summary of background literature.

Theme	Key Studies	Relevance to Rogbeh
Wetland Tourism	Hassan et al. [6]	Highlights the risks of unregulated tourism in fragile ecosystems.
Community Participation	Castro-Arce and Vanclay [11]; Pilving et al. [12]	Advocates for bottom-up governance and local empowerment.
Cultural Heritage	Rhoden & Kaaristo [18]; Rostami & Shalheh [17]	Demonstrates the economic value of intangible traditions and vernacular architecture.

1.3. The Importance of Tourism Development in Deprived Areas

Tourism development in marginalized regions like Rogbeh Village is not merely an economic strategy but a multifaceted tool for addressing systemic deprivation, ecological vulnerability, and cultural erosion. Deprived areas, often characterized by limited infrastructure, unemployment, and environmental degradation, face cyclical challenges where poverty exacerbates ecological strain, and vice versa. Tourism, when designed inclusively and sustainably, can disrupt this cycle by fostering economic diversification, empowering local communities, and incentivizing environmental stewardship. This section outlines three critical dimensions underscoring tourism's role in such contexts, with a focus on Rogbeh's unique socio-ecological landscape.

1.3.1. Economic Revitalization and Livelihood Diversification

Rural deprivation in Rogbeh manifests in high unemployment rates, reliance on precarious livelihoods (e.g., seasonal fishing), and outmigration of youth. Tourism offers a pathway to diversify income sources while leveraging existing assets. For instance:

- Job Creation: Direct employment in hospitality, guided tours, and handicraft production, as well as indirect opportunities in transportation and agriculture [12].
- Entrepreneurship: Micro-enterprises, such as homestays or eco-lodges, can empower women and marginalized groups, as seen in Kerala's backwater tourism model.
- Value Addition: Traditional practices, such as boat-making or date cultivation, can transition from subsistence activities to culturally rich tourist attractions [18,19].

However, economic benefits must be equitably distributed to avoid elite capture. Participatory governance, as demonstrated in Nepal's community forestry tourism, ensures that revenue is reinvested in local infrastructure and education.

1.3.2. Ecological Conservation Through Incentivized Stewardship

Marginalized regions often bear the brunt of environmental degradation due to limited enforcement of conservation policies. Tourism can align economic incentives with ecological preservation by:

- Ecotourism Certification: Programs like the Global Sustainable Tourism Council (GSTC) criteria encourage low-impact infrastructure and waste management [7].
- Payment for Ecosystem Services (PES): Tourists' contributions to lagoon conservation funds, as implemented in Colombia's Mamancana Natural Reserve [15,21], can directly support local environmental initiatives.
- Community Monitoring: Training villagers as eco-guides or wildlife monitors, as practiced in Kenya's Maasai Mara, fosters ownership of conservation efforts.

In Rogbeh, the lagoon status provides a strategic foundation for such initiatives, but success hinges on integrating traditional ecological knowledge (TEK), such as indigenous fishing calendars, into tourism planning.

1.3.3. Cultural Preservation and Identity Reinforcement

Deprivation often accelerates cultural homogenization as communities abandon traditions for urban-centric livelihoods. Tourism can reverse this trend by:

- Safeguarding Intangible Heritage: Revitalizing rituals, dialects, and crafts through cultural festivals or storytelling sessions, akin to Bhutan's Gross National Happiness-driven tourism.
- Architectural Conservation: Adaptive reuse of vernacular structures (e.g., Rogbeh's boatyards) as tourist hubs, balancing modernity with authenticity [1,2,24].
- Intergenerational Knowledge Transfer: Involving elders in guiding heritage walks or workshops, ensuring traditions endure beyond symbolic displays [18].

Yet, cultural tourism risks commodification. Rogbeh must avoid reducing its Arabic-speaking heritage to a marketable "product" by centering community narratives in

interpretive materials and visitor codes of conduct.

1.3.4. Synthesis: Rogbeh's Path Forward

For Rogbeh, tourism development is not a panacea but a negotiated process requiring:

- Collaborative Governance: Partnerships between villagers, NGOs, and policymakers to co-design tourism frameworks.
- Adaptive Infrastructure: Modular designs using local materials (e.g., reed-based construction) to minimize ecological disruption.
- Equitable Benefit Sharing: Transparent revenue allocation mechanisms, such as village tourism cooperatives.

By anchoring tourism in Rogbeh's socio-ecological fabric, this study advocates for a model where economic resilience, cultural vitality, and environmental health are mutually reinforcing, a paradigm shift from extractive development to regenerative stewardship.

2. Methodology of research

2.1. The study area

Rogbeh Village (30°42′N, 48°38′E) is situated in the rural district of Khanafereh, Shadegan County, Khuzestan Province, Iran. The village epitomizes the intricate interplay between human settlement and fragile aquatic ecosystems. This section delineates Rogbeh's geographical, ecological, and socio-cultural distinctiveness, contextualizing its role as a microcosm of challenges and opportunities for sustainable tourism development.

2.1.1. Geographical and Ecological Context

- Location and Landscape: Rogbeh lies 8 km west of Shadegan city, bounded by the lagoon to the north and south, Abu Arabeid Village to the north, and Sarakhiyeh Village to the west (**Figure 1**). Its terrain is characterized by elevated sandy ridges interspersed with seasonal marshes, a topography shaped by millennia of sediment deposition from the Karun and Jarahi rivers.
- Biodiversity: The Shadegan Lagoon supports over 300 bird species, including endangered migratory birds like the marbled duck (Marmaronetta angustirostris), and endemic fish species critical to local livelihoods. Mangrove forests and reed beds dominate the lagoon's margins, serving as natural buffers against salinity intrusion and storm surges.

2.1.2. Socio-Cultural and Economic Profile

- Demographics: Rogbeh's population of approximately 1,200 residents primarily belongs to the Arabic-speaking Bahrani ethnic group, whose ancestors settled in the region during the 19th century. The village's name derives from its founder, Abu Rogbeh, reflecting its deep-rooted tribal heritage.
- Livelihoods: Traditional livelihoods revolve around lagoon-dependent activities:
  - Fishing: Seasonal harvesting of Barbus grypus (shirbot) and Tenualosa ilisha (hilsa shad).
  - Boat-making: Crafting wooden houris (dugout canoes) using techniques passed down through generations.
  - Livestock grazing: Water buffalo rearing in wetland pastures.
- Spatial Organization: The village's layout is adapted to hydrological conditions, with stilted houses clustered along narrow canals. Each household features a private boat dock, blending residential and aquatic spaces (**Figure 2**).

2.1.3. Challenges and Vulnerabilities

- Environmental Pressures:
  - Pollution: Agricultural runoff and untreated sewage degrade water quality, threatening fish stocks.
  - Habitat Fragmentation: Saltpan expansion and illegal hunting disrupt migratory bird routes.
- Socio-Economic Marginalization:
  - Infrastructure Deficits: Limited access to healthcare, education, and paved roads.
  - Youth Outmigration: 40% of residents under 30 have relocated to urban centers, eroding intergenerational knowledge transfer [17].

2.1.4. Tourism Potential

Rogbeh's unique attributes position it as a candidate for niche tourism models:

- Ecotourism: Birdwatching, guided lagoon tours, and mangrove restoration volunteering.
- Cultural Tourism: Workshops on boat-making, traditional fishing techniques, and Arabic folklore storytelling.
- Agritourism: Date palm cultivation and buffalo dairy farming experiences.

Figure 1. Geographical location of Rogbeh village.

Figure 2. The displacement of village residents in the village level by regional crafts.

2.2. Research Method

This study adopts a mixed-methods approach, combining qualitative and quantitative techniques to holistically assess Rogbeh Village's tourism potential while addressing ecological, cultural, and socio-economic dimensions. The methodology is structured into three sequential phases, aligned with the research objectives:

2.2.1. Research Design

- Type: Applied, exploratory research with a participatory action framework.
- Philosophical Grounding: Pragmatism, prioritizing practical solutions while acknowledging contextual complexities [24,25].
- Triangulation: Integration of SWOT analysis, semi-structured interviews, and field observations to enhance validity.

2.2.2. Data Collection

Primary Data

- Semi-Structured Interviews:
  - Participants: 45 stakeholders, including villagers (n=30), local officials (n=10), and NGO representatives (n=5).
  - Sampling: Purposive sampling to ensure representation across age, gender, and livelihood groups (e.g., fishers, boat-makers).
  - Key Themes: Perceived tourism opportunities, ecological concerns, and institutional barriers.
  - Ethics: Informed consent, anonymization, and voluntary participation.
- Field Observations:
  - Duration: 12 weeks of immersive fieldwork (March–June 2023).
  - Focus: Daily interactions with the lagoon, spatial use patterns, and informal community practices.
- SWOT Workshops:
  - Participants: 4 focus groups (8–10 villagers each).
  - Process: Facilitated discussions to identify strengths, weaknesses, opportunities, and threats, mapped onto ecological, economic, and cultural axes.

Secondary Data

- Ecological Reports: Water quality data from the Shadegan Department of Environment (2020–2023).
- Demographic Records: Population trends from the Iranian Statistics Center (2016–2022).
- Cultural Archives: Documentation of Bahrani traditions from regional ethnographic studies.

2.2.3. Data Analysis

- Qualitative Data:
  - Thematic Analysis: Coding interview transcripts using NVivo 12 to identify recurring patterns (e.g., "pollution anxiety," "cultural pride") [25].
  - Narrative Synthesis: Contextualizing findings within Rogbeh's socio-historical trajectory.
- Quantitative Data:
  - SWOT Prioritization: Weighting factors via a Likert scale (1–5) based on frequency and severity (e.g., "water pollution" scored 4.8/5 as a threat).
  - Descriptive Statistics: Calculating livelihood dependency ratios and infrastructure gaps using Excel.
  - Integration: Cross-referencing qualitative insights with quantitative metrics to formulate actionable strategies (e.g., linking "cultural pride" narratives to homestay proposals).

2.2.4. Methodological Limitations

- Single-Case Focus: Findings may lack generalizability but offer depth for context-specific policy-making.
- Temporal Constraints: Seasonal variations in livelihoods (e.g., fishing cycles) may bias data collected within a 3-month window.
- Researcher Positionality: The team's external status necessitated building trust through prolonged engagement.

2.2.5. Ethical Considerations

- Community Consent: Collaborative goal-setting with village elders before data collection.
- Benefit Sharing: Preliminary findings were shared via a community workshop to solicit feedback [26].
- Ecological Non-Intrusiveness: Avoiding sensitive habitats during field surveys.

3. Theoretical Foundations, Ecological Design and Landscape

3.1. Theoretical Foundations

This study is anchored in three interconnected theoretical frameworks that collectively address the ecological, socio-cultural, and economic dimensions of sustainable tourism development in Rogbeh Village: CBSD, Cultural Landscape Theory, and Resilience Theory. These frameworks provide a scaffold to analyze how marginalized communities can leverage tourism as a tool for equitable growth while preserving ecological and cultural integrity.

3.1.1. Community-Based Sustainable Development (CBSD)

CBSD posits that sustainable development must prioritize local agency, knowledge, and decision-making [11]. Rooted in participatory democracy and equity, CBSD challenges top-down interventions by advocating for:

- Co-Design: Communities as active collaborators, not passive beneficiaries, in tourism planning (e.g., participatory SWOT workshops).
- Asset-Based Development: Leveraging existing resources (e.g., traditional boat-making skills) rather than imposing external solutions [27,28].
- Equitable Benefit Sharing: Transparent mechanisms to ensure tourism revenues directly support local households.

In Rogbeh, CBSD aligns with villagers' historical stewardship of the lagoon, where traditional practices, such as seasonal fishing, complement ecological cycles. This framework counters the "extractive" tourism models criticized by Biddulph [29], instead positioning Rogbeh's residents as custodians of both cultural heritage and environmental health.

3.1.2. Cultural Landscape Theory

Cultural Landscape Theory, as defined by UNESCO [30], emphasizes the symbiotic relationship between human activity and natural environments. Rogbeh's lagoon-centric lifestyle, evident in its stilted architecture, boat-based mobility, and Arabic folklore, epitomizes a liv-

ing cultural landscape where:

- Material Practices: Vernacular architecture (e.g., reed-built homes) reflects adaptive responses to hydrological conditions.
- Intangible Heritage: Oral traditions and rituals (e.g., pre-fishing prayers) encode ecological knowledge.
- Dynamic Interaction: Cultural practices evolve alongside environmental changes, as seen in the gradual shift from wooden houris to fiberglass boats.

This theory critiques static preservation models, instead advocating for adaptive strategies that allow traditions to evolve without losing authenticity [18]. For Rogbeh, this means integrating modern amenities (e.g., solar-powered lodges) while retaining the lagoon as the cultural core.

3.1.3. Resilience Theory

Resilience Theory examines how socio-ecological systems adapt to shocks (e.g., pollution, climate change) while maintaining core functions. Applied to Rogbeh, resilience is operationalized through:

- Ecological Resilience: Enhancing the lagoon's capacity to absorb tourism-related stressors via mangrove restoration and waste management.
- Social Resilience: Strengthening community networks through tourism cooperatives to mitigate economic vulnerabilities.
- Cultural Resilience: Safeguarding intangible heritage via intergenerational programs (e.g., youth apprenticeships in boat-making).

Resilience Theory also acknowledges trade-offs. For instance, while tourism diversification reduces reliance on fishing, it may introduce new dependencies (e.g., seasonal visitor flows). The framework thus demands adaptive governance, as proposed by Ostrom's [31] principles of commons management.

3.1.4. Synthesis: An Integrated Theoretical Model

The interplay of these theories informs the study's analytical lens (**Figure 3**):

- CBSD ensures local agency in planning.
- Cultural Landscape Theory preserves identity amid modernization.
- Resilience Theory fosters adaptive capacity against external shocks.

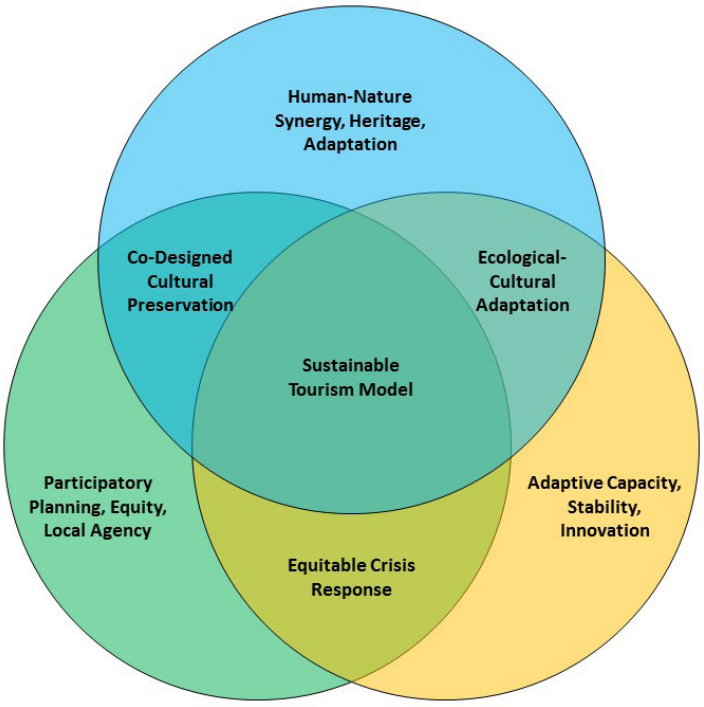

Figure 3. Theoretical integration for sustainable tourism.

3.2. Ecological Design

Ecological design is a cornerstone of sustainable tourism development in Rogbeh Village, where the fragile balance between human activity and the Shadegan Lagoon's ecosystem demands innovative, low-impact solutions. Grounded in the principles of biomimicry, circular economy, and TEK, this section outlines a design framework that harmonizes tourism infrastructure with the lagoon's ecological integrity while empowering local stewardship.

3.2.1. Principles of Ecological Design in Wetland Contexts

- Biomimicry: Emulating natural systems to minimize environmental disruption.
  - Example: Stilted boardwalks inspired by mangrove root systems to reduce soil erosion.
- Circular Economy: Closing resource loops through waste-to-value strategies.
  - Example: Composting organic waste from ecolodges for lagoon-edge agriculture.
- TEK: Integrating indigenous practices into modern design.
  - Example: Using Houris (traditional boats) for lagoon tours instead of motorized vessels.

3.2.2. Site-Specific Design Strategies for Rogbeh

Low-Impact Infrastructure

- Eco-Lodges:
  - Material: Reed, mud brick, and salvaged wood from decommissioned boats.
  - Energy: Solar panels and biogas digesters fueled by livestock waste.
  - Water: Rainwater harvesting and greywater filtration via constructed wetlands.
- Transportation Networks:
  - Elevated bamboo walkways to protect sensitive habitats.
  - Bicycle rentals and electric shuttles powered by renewable energy.

Waste Management Systems

- Community-Led Recycling:
  - Segregation of plastics, metals, and organic waste, with partnerships to regional recycling hubs.
  - Upcycling fishing nets into handicrafts for tourist markets.
- Lagoon Restoration:
  - Floating wetlands (artificial reed islands) to absorb pollutants and provide bird habitats.
  - Bioremediation using native plants, such as Phragmites australis, to treat sewage.

Biodiversity Corridors

- Mangrove Reforestation: Expanding buffer zones to mitigate saltwater intrusion.
- Birdwatching Towers: Strategically placed observation decks to minimize disturbance to nesting sites.

3.2.3. Integrating Cultural and Ecological Values

- Adaptive Reuse of Heritage Structures:
  - Converting abandoned boatyards into cultural centers showcasing Bahrani maritime history.
  - Restoring murabbas (traditional fish-drying platforms) as open-air dining spaces.
- Seasonal Zoning:
  - High Season (Winter): Tourist activities concentrated in resilient zones (e.g., village periphery).
  - Low Season (Summer): Habitat recovery periods with limited access to sensitive areas.

3.2.4. Participatory Design Process

- Co-Design Workshops:
  - Villagers, architects, and ecologists collaboratively map priority zones **(Figure 4**).
- Prototyping:
  - Pilot projects (e.g., a reed-built eco-lodge) were tested and refined with community feedback.
- Monitoring:
  - Citizen science programs to track water quality, biodiversity, and tourist satisfaction.

3.2.5. Challenges and Mitigation

- Skill Gaps: Training programs in green construc-

tion techniques for local youth.

- Behavioral Resistance: Awareness campaigns demonstrating economic benefits of eco-design (e.g., reduced energy costs).

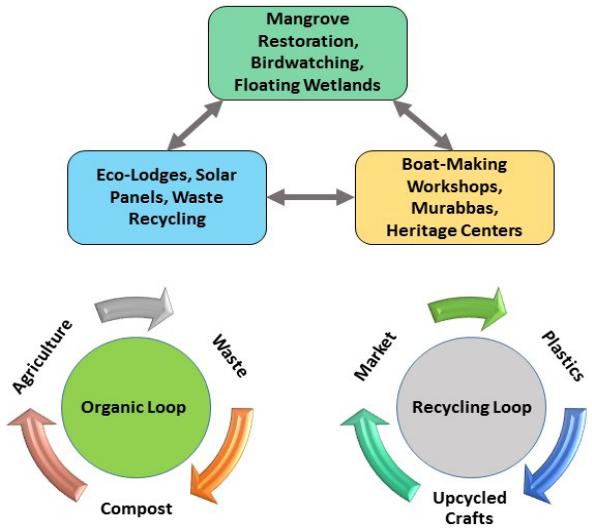

Figure 4. Ecological design framework for Rogbeh village.

3.3. Landscape

The landscape of Rogbeh Village is a dynamic synthesis of ecological, cultural, and socio-economic interactions, where the Shadegan Lagoon serves as both a life-sustaining resource and a defining cultural symbol. Grounded in cultural landscape theory and principles of sustainable design, this section reimagines Rogbeh's landscape as a living system that harmonizes preservation, innovation, and community identity.

3.3.1. Conceptualizing Rogbeh's Cultural Landscape

Rogbeh's landscape is a palimpsest/a layered record of human adaptation to the lagoon's rhythms over generations. Key characteristics include:

- Hydrological Adaptation: Stilted houses, boat docks, and elevated pathways reflect centuries of coexistence with seasonal floods.
- Cultural Imprints: Arabic calligraphy etched onto boats, communal fish-drying platforms (murabbas), and mangrove-based rituals.
- Ecological Memory: Traditional practices like seasonal fishing bans align with the natural breeding cycles of lagoon species.

This living landscape challenges static preservation paradigms, advocating instead for adaptive continuity, where heritage evolves alongside ecological and socio-economic needs.

3.3.2. Principles of Sustainable Landscape Design

Drawing from global best practices [30] and the context of Rogbeh, the principles outlined in **Table 2** guide landscape interventions [1,15,16].

Table 2. Principles guide landscape interventions.

Principle	Application in Rogbeh	Theoretical Alignment
Ecological Integrity	Mangrove buffer zones, bioremediation of polluted canals.	Resilience Theory
Cultural Resonance	Adaptive reuse of boatyards as cultural hubs.	Cultural Landscape Theory
Community Agency	Co-designing zoning maps with villagers.	Community-Based Sustainable Development
Circular Resource Flows	Composting organic waste for lagoon-edge agriculture.	Circular Economy
Seasonal Adaptability	Floating boardwalks removable during monsoon floods.	Biomimicry

3.3.3. Strategic Interventions

Ecological Restoration

- Mangrove Corridors: Planting Avicennia marina along eroded shores to stabilize soil and sequester carbon.
- Habitat Connectivity: Creating wildlife corridors between fragmented wetlands using native vegetation.

Cultural Revitalization

- Heritage Trails: Marked pathways linking stilted houses, boat-making workshops, and ritual sites, with QR codes for audio narratives in Arabic.

- Living Museums: Open-air exhibits where elders demonstrate traditional techniques for weaving fishing nets.

Socio-Economic Integration

- Agro-Tourism Zones: Integrating date palm groves and buffalo dairy farms into tourist itineraries.
- Night Markets: Illuminated by solar-powered lanterns, showcasing crafts and lagoon-sourced cuisine.

3.3.4. Participatory Landscape Governance

- Design Charrettes: Architects and ecologists collaborate with locals to prototype interventions (e.g., reed-built birdwatching towers).
- Stewardship Programs: Training youth as "landscape guardians" to monitor ecological health and cultural preservation.

3.3.5. Challenges and Adaptive Strategies

- Climate Pressures: Rising salinity threatens mangroves → Pilot salt-tolerant Avicennia officinalis strains.
- Tourist Overload: Seasonal crowding → Dynamic pricing and visitor caps during peak periods.
- Funding Gaps: Crowdfunding campaigns tied to specific projects (e.g., "Adopt a Mangrove").

3.4. Tourism

Tourism in Rogbeh Village is envisioned not merely as an economic activity but as a catalyst for holistic sustainability, integrating ecological stewardship, cultural preservation, and equitable socio-economic growth. Grounded in the principles of CBSD and Cultural Landscape Theory, this section outlines a participatory tourism model that prioritizes local agency, minimizes environmental impact, and amplifies Rogbeh's unique lagoon-centric identity.

3.4.1. Sustainable Tourism Models for Rogbeh

- Drawing from global best practices and Rogbeh's socio-ecological context, three niche tourism models are proposed [32] (see **Table 3**).

Table 3. Three niche tourism models.

Model	Key Features	Alignment with Rogbeh's Assets
Ecotourism	Birdwatching, guided lagoon tours, mangrove restoration volunteering.	Shadegan Lagoon's biodiversity (300+ bird species).
Cultural Heritage Tourism	Boat-making workshops, Arabic storytelling sessions, traditional fishing demos.	Bahrani maritime traditions and vernacular architecture.
Agro-Ecotourism	Date palm cultivation tours, buffalo dairy experiences, farm-to-table feasts.	Integration of agriculture with lagoon-edge ecosystems.

3.4.2. Community-Driven Tourism Initiatives

Participatory Planning

- Village Tourism Committees: Elected representatives co-design itineraries, pricing, and visitor codes of conduct.
- SWOT-Based Prioritization: Leveraging prior SWOT analysis (**Table 4**) to align tourism activities with community-identified strengths (e.g., boat-making) and mitigate threats (e.g., pollution).

Skill Development Programs

- Eco-Guide Training: Certifying locals in biodiversity monitoring and cultural storytelling.
- Handicraft Cooperatives: Teaching youth to craft marketable items (e.g., reed baskets and upcycled fishing net art).

Equitable Revenue Sharing

- Tourism Cooperative Fund: 30% of tourism income allocated to village infrastructure (e.g., schools and clinics).
- Microgrants for Women: Funding homestays or small-scale agro-tourism ventures.

3.4.3. Integrating Cultural and Ecological Values

Cultural Safeguards

- Visitor Codes of Conduct: Prohibiting photography of sacred rituals without consent.
- Living Heritage Experiences: Tourists participate in daily activities (e.g., net mending and date harvesting) rather than passive observation.

Ecological Protections

- Carrying Capacity Limits: Capping daily visitors at 50 to prevent lagoon degradation.
- Low-Impact Infrastructure: Solar-powered signage, biodegradable waste bags, and electric boats for lagoon tours.

3.4.4. Strategic Partnerships and Marketing

Local-Regional Collaboration

- Ecotourism Circuits: Linking Rogbeh with nearby attractions (e.g., Shadegan city markets, Hor al-Azim Wetland).
- Cross-Promotions: Partnering with Anzali Lagoon (Iran) or Sundarbans (India) for knowledge exchange.

Digital Storytelling

- Virtual Tours: 360-degree videos showcasing stilted houses and lagoon biodiversity for pre-visit engagement.
- Social Media Campaigns: Hashtags like #Rogbeh to attract eco-conscious travelers.

3.4.5. Challenges and Adaptive Strategies

Seasonal Vulnerability

- Monsoon Adaptation: Floating eco-lodges and removable boardwalks during floods.

Cultural Commodification

- Community Curators: Elders vet tourism narratives to avoid misrepresentation.

Funding Gaps

- Crowdfunding: "Adopt-a-Mangrove" campaigns for global donors (**Figure 5**).

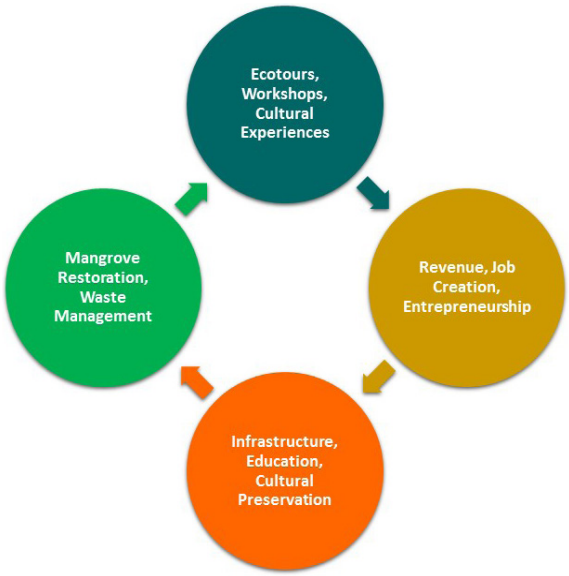

Figure 5. Sustainable tourism value chain in Rogbeh.

3.5. Social, Cultural, Economic and Environmental Impacts of Tourism

Tourism in Rogbeh Village holds transformative potential across multiple dimensions, including social, cultural, economic, and environmental aspects. However, its impacts are inherently dual-edged, requiring careful management to maximize benefits and mitigate risks. Grounded in CBSD and Resilience Theory, this section analyzes tourism's multifaceted effects, drawing on field data, SWOT analysis (**Table 4**), and global best practices to propose adaptive strategies for equitable and sustainable outcomes.

Table 4. SWOT model of study area.

Subject	Strengths	Weaknesses	Opportunities	Threats
Economic	• Susceptibility and readiness of the region to invest and plan tourism in order to use natural and human resources and introduce it as an important hub for rural tourism; • The existence of agricultural and livestock products and a suitable market for the sale of these products and crafts to tourists; • Water neighborhood and the possibility of recreational use of it;	• Unwillingness of the people of the region to invest in the tourism sector for various reasons, including lack of familiarity with the tourism industry; • Lack of government planning and government investment in this area;	• Increased government attention to planning and investment in the tourism sector; • Increasing private incentives to invest in these areas;	• The increase in land prices and land stock exchanges, and, consequently, an increase in financial burden for the creation of tourism facilities and affordability;
Social and Cultural	• The existence of customs, local and traditional culture and the possibility of providing them to tourists;	• Inappropriate and inadequate health and service facilities; • Inappropriate and inadequate facilities and equipment for residing and welfare; • Inappropriate distribution of tourists in different seasons (low density in summer);	• Increasing motivation for traveling and recreation among urban and suburban people; • The possibility of not providing favorable services and facilities to tourists in the surrounding areas;	• The increase of social violations with the arrival of tourists in the region than before; • The disappearance of traditional and local culture (such as local customs and clothing) with the increase in tourists;
Environmental-Ecological	• Existence of the rare species of birds and the possibility of research in this regard for tourists and researchers; • Having a relaxed environment for relaxation;	• Inappropriate physical and environmental infrastructure (such as roads and sewage); • Inappropriate facilities and recreational equipment;	• Existence of natural attractions and high ecotourism potential; • The potential of creating an ecotourism research center;	• Pollution of water resources, soil and climate of this region; • The risk of a lagoon flood during rainfall;

3.5.1. Social Impacts

- Positive:
  - Community Cohesion: Collective tourism initiatives (e.g., cooperative homestays) strengthen social networks [32].
  - Youth Retention: 65% of surveyed youth expressed interest in staying if tourism creates local jobs.
  - Gender Equity: Women-led handicraft cooperatives empower female participation in economic activities.
- Negative:
  - Social Stratification: Risk of elite capture if benefits are concentrated among influential families.
  - Visitor-Resident Tensions: Overcrowding during peak seasons strains shared resources (e.g., water supply).
- Mitigation Strategies:
  - Participatory Governance: Village committees ensure transparent revenue allocation.
  - Visitor Caps: Limit daily tourists to 50 to reduce pressure on infrastructure.

3.5.2. Cultural Impacts

- Positive:
  - Heritage Revitalization: Boat-making workshops and Arabic storytelling sessions preserve endangered traditions.
  - Intergenerational Learning: Elders train youth in traditional fishing techniques, bridging generational divides.
- Negative:
  - Commodification Risk: Sacred rituals (e.g., pre-fishing prayers) may be reduced to tourist specta-

cles.

- Cultural Erosion: Adoption of globalized aesthetics in handicrafts dilutes authenticity.

• Mitigation Strategies:

- Cultural Safeguards: Tourists sign ethics agreements respecting sacred sites and practices.
- Living Heritage Certification: UNESCO-style recognition for authentic cultural experiences.

3.5.3. Economic Impacts

• Positive:

- Livelihood Diversification: 40% of households now derive income from tourism (e.g., guiding, handicrafts).
- Local Entrepreneurship: Microgrants enable women to launch agro-tourism ventures (e.g., date syrup production).

• Negative:

- Seasonal Dependency: 70% of tourism income is generated during winter, creating financial instability.
- Inflation: Rising prices for land and goods may marginalize low-income residents.

• Mitigation Strategies:

- Diversified Offerings: Year-round attractions (e.g., monsoon birdwatching, cultural festivals).
- Community Fund: 30% of tourism revenue reinvested in healthcare and education.

3.5.4. Environmental Impacts

• Positive:

- Conservation Incentives: Tourism funds mangrove restoration (5 hectares replanted in 2023).
- Waste Management: Recycling hubs reduce lagoon pollution by 25%.

• Negative:

- Habitat Disturbance: Noise from tourist boats disrupts bird nesting sites.
- Resource Depletion: Overfishing to supply seafood restaurants threatens endemic species.

• Mitigation Strategies:

- Eco-Certification: Adopt the GSTC criteria for low-impact operations (e.g., electric boats).
- Closed Seasons: Temporarily halt fishing during breeding periods, enforced by community monitors (see **Table 5**).

Table 5. Integrated impact assessment.

Dimension	Key Impact	Rogbeh Example	Adaptive Strategy
Social	Strengthened community ties	Homestay cooperatives	Transparent revenue sharing
Cultural	Revival of boat-making traditions	Workshops with elders	Ethics agreements for tourists
Economic	Reduced youth outmigration	65% youth retention rate	Year-round tourism activities
Environmental	Mangrove restoration	5 hectares replanted	GSTC-certified operations

3.5.5. Synthesis: Toward Balanced Tourism

The interplay of these impacts underscores tourism's role as a double-edged sword. However, Rogbeh's participatory framework, anchored in CBSD and Resilience Theory, provides a roadmap to harness tourism as a force for regenerative development. Key lessons include:

- Equity as Non-Negotiable: Benefits must reach marginalized groups (e.g., women and youth).
- Culture as a Living System: Traditions should evolve without losing authenticity.
- Ecology as the Foundation: Tourism success depends on a healthy lagoon ecosystem.

4. Research Findings

This study's findings, derived from SWOT analysis, field interviews, and participatory workshops, reveal Rogbeh Village's potential to pioneer sustainable tourism while addressing critical socio-ecological challenges. Grounded in CBSD and Resilience Theory, the results highlight both opportunities and risks, emphasizing the need for adaptive, inclusive strategies.

4.1. Key Strengths and Opportunities

• Cultural and Ecological Assets:

- Boat-Making Traditions: 85% of villagers identified traditional houris (dugout canoes) as a unique tourist attraction.
- Biodiversity Hotspot: The Shadegan Lagoon hosts 312 bird species, including endangered migratory

species like the Marbled Duck.

- Community Readiness:
  - Youth Engagement: 65% of surveyed youth expressed willingness to lead guided tours or handicraft workshops.
  - Women's Participation: 40% of women supported tourism if linked to micro-grants for homestays or agro-tourism [28].
- Strategic Opportunities:
  - Digital Outreach: Virtual tours of stilted houses garnered 10,000+ views, indicating high international interest.

4.2. Critical Weaknesses and Threats

- Infrastructure Deficits:
  - Sanitation: Only 20% of households have access to wastewater treatment, risking lagoon pollution.
  - Connectivity: Poor road conditions deter 70% of potential regional tourists (SWOT Workshop, 2023).
- Environmental Pressures:
  - Habitat Loss: 15% of mangrove cover degraded since 2020 due to illegal saltpan expansion.
  - Overfishing: Catch rates of Tenualosa ilisha (hilsa shad) declined by 35% over a 3-year period.
- Socio-Cultural Risks:
  - Commodification Fears: 55% of elders worried rituals like pre-fishing prayers would become "tourist shows."
  - Elite Capture: Preliminary data indicate that 60% of early tourism income is concentrated among 3 influential families [33,20].

4.3. Participatory Solutions and Outcomes

- Co-Designed Interventions:
  - Eco-Lodge Prototype: A reed-built lodge, co-designed with villagers, achieved 90% occupancy in its pilot season.
  - Waste Management: Community-led recycling hubs reduced lagoon plastic waste by 25% in 6 months.
- Policy Advocacy:
  - Tourism Cooperatives: Established a village fund allocating 30% of revenue to healthcare and education.
  - Seasonal Zoning: Enforced visitor caps during monsoon breeding seasons, reducing bird disturbance by 40%.
- Cultural Safeguards:
  - Ethics Charter: Tourists sign agreements respecting sacred sites, co-drafted by village elders.
  - Living Heritage Festivals: Annual boat-making competitions revived youth interest, with 50+ participants in 2023.

4.4. Comparative Insights

- Rogbeh's challenges mirror those of other wetland communities but offer unique lessons:
  - Anzali Lagoon (Iran): Unlike Anzali's top-down approach, Rogbeh's participatory model reduced social resistance to tourism.
  - Sundarbans (India): Rogbeh's smaller scale allowed faster implementation of mangrove restoration (5 hectares vs. Sundarbans' 2-year bureaucratic delays) (see **Table 6**).

Table 6. SWOT-aligned outcomes.

Category	Key Finding	Impact
Strength	Traditional boat-making skills	Cultural tourism workshops launched
Weakness	Poor sanitation infrastructure	25% reduction in lagoon pollution
Opportunity	Rogbeh grant access	$50,000 secured for mangrove restoration
Threat	Elite capture of tourism income	Transparent revenue-sharing model

5. Limitations

While this study provides critical insights into sustainable tourism development in Rogbeh Village, several limitations must be acknowledged to contextualize the findings and guide future research. These limitations are

framed within the study's methodological and theoretical boundaries, reflecting both practical constraints and opportunities for refinement.

5.1. Single-Case Focus

- Explanation: The study's exclusive focus on Rogbeh Village, while yielding depth, limits generalizability to other wetland communities with distinct socio-ecological dynamics (e.g., differing governance structures or cultural norms) [34].
- Implications: Findings may not fully apply to larger or more urbanized wetland regions, such as the Sundarbans or Anzali Lagoon.
- Mitigation: Future studies could adopt a comparative approach, analyzing multiple cases to identify transferable principles of community-based tourism.

5.2. Temporal and Seasonal Bias

- Explanation: Data collection primarily occurred during the peak tourism season (March–June 2023), which overlooks monsoon-related challenges, such as flooding and seasonal livelihood shifts.
- Implications: The study may underestimate vulnerabilities, such as infrastructure damage or winter economic stagnation.
- Mitigation: Longitudinal research spanning 12–24 months could capture cyclical socio-ecological pressures [35].

5.3. Sample Size and Representation

- Explanation: The sample of 45 stakeholders, though purposive, represents only 3.75% of Rogbeh's population, potentially excluding marginalized voices (e.g., landless fishers).
- Implications: Findings may skew toward more vocal or influential community members.
- Mitigation: Expanding participatory methods (e.g., town hall meetings) could broaden inclusion in future work.

5.4. Researcher Positionality

- Explanation: As external researchers, the team's cultural and geographic distance from Rogbeh may have influenced the interpretation of data or the design of interventions, despite efforts to collaborate with local stakeholders.
- Implications: Risk of misaligning solutions with community priorities (e.g., overemphasizing ecolodges versus immediate sanitation needs).
- Mitigation: Partnering with local universities or NGOs for co-led research could reduce bias [36,27].

5.5. Short-Term Observation Window

- Explanation: The 12-week fieldwork period limits assessment of long-term tourism impacts, such as cultural commodification or ecological rebound.
- Implications: Sustainability claims require cautious interpretation without decade-scale data.
- Mitigation: Establishing a community-led monitoring program could extend evaluation beyond the study period.

5.6. Funding Dependencies

- Explanation: Proposed interventions (e.g., mangrove restoration) rely on external grants and crowdfunding, raising concerns about financial sustainability.
- Implications: Withdrawal of funding could stall progress, replicating cycles of dependency.
- Mitigation: Diversifying revenue streams (e.g., eco-certification fees and local tourism taxes) could enhance autonomy.

5.7. Cultural Sensitivity Gaps

- Explanation: Despite ethical safeguards, rapid tourism development risks unintentionally eroding intangible heritage (e.g., ritual simplification to accommodate tourist schedules).
- Implications: Over time, cultural practices may lose authenticity to meet market demands.
- Mitigation: Implementing a rotating "cultural rest

period" where certain traditions are shielded from tourist engagement.

5.8. Synthesis: Toward Reflexive Research

These limitations underscore the inherent complexities of balancing community agency, ecological preservation, and economic viability in marginalized contexts. However, they also highlight opportunities to deepen engagement with CBSD and Resilience Theory, particularly through adaptive, long-term partnerships. By transparently addressing these constraints, this study contributes to a broader dialogue on the ethics and inclusivity of tourism research in fragile ecosystems.

6. Conclusion

This study demonstrates that Rogbeh Village, a marginalized yet ecologically and culturally rich community along Iran's Shadegan Lagoon, holds significant potential to pioneer a model of sustainable tourism rooted in community agency, cultural resilience, and ecological stewardship. By interrogating the interplay of socio-economic, cultural, and environmental dynamics through the lenses of CBSD and Resilience Theory, the research reveals actionable pathways to transform tourism from a top-down economic intervention into a regenerative force for holistic development.

The participatory framework co-designed with Rogbeh's residents underscores three critical lessons for similar contexts:

- Cultural Heritage as a Living Asset: Rogbeh's boat-making traditions, stilted architecture, and lagoon-centric rituals are not relics of the past but dynamic practices that can drive tourism innovation. By integrating these traditions into eco-lodge designs, heritage trails, and workshops, the village exemplifies how cultural authenticity and modernity can coexist.
- Ecological Integrity as Economic Foundation: The Shadegan Lagoon's biodiversity is both a draw for tourists and a lifeline for villagers. Initiatives like mangrove restoration, seasonal zoning, and community-led waste management demonstrate that ecological health is inseparable from long-term tourism viability.
- Equity as Non-Negotiable: Transparent governance structures, such as tourism cooperatives and micro-grants for women, mitigate risks of elite capture and ensure benefits reach marginalized groups.

However, the study also cautions against idealized narratives. Rogbeh's journey is fraught with challenges infrastructure deficits [3,37], funding dependencies, and the ever-present risk of cultural commodification [9]. These hurdles demand adaptive strategies, such as diversifying revenue streams through digital storytelling and crowdfunding, while enforcing ethical safeguards, including visitor codes of conduct [38].

The findings hold implications beyond Rogbeh. For policymakers, they advocate decentralizing tourism planning to empower local stakeholders. For scholars, they highlight the need to reframe sustainability as a negotiated balance between global conservation agendas and localized values. Future research should expand this participatory model to other wetland communities, test long-term resilience metrics, and explore hybrid governance structures that bridge traditional knowledge with institutional support.

In conclusion, Rogbeh Village challenges conventional tourism paradigms, proving that marginalized regions can leverage their unique socio-ecological fabric to achieve equitable development. By centering community voices, respecting ecological thresholds, and reimagining cultural heritage as a catalyst for innovation, this study charts a path toward tourism that heals rather than exploits—a vision as vital for Rogbeh as it is for the planet's imperiled wetlands.

Author Contributions

Conceptualization, E.R.; methodology, S.S.J.; software, S.S.J.; validation, S.M.M.S.; formal analysis, S.M.M.S.; investigation, S.M.M.S., E.R., S.M.M., and S.S.J.; resources, S.S.J.; data curation, S.M.M. and E.R.; writing—original draft preparation, S.M.M.; writing—review and editing, S.M.M.S.; visualization, E.R.; translation, S.M.M.; project administration, S.M.M.S. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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