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Exploring Participatory Communication Approach in the Conservation of Olive Ridley Turtles: A Case Study of Rushikulya Rookery, Odisha

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Abstract
The Olive Ridley turtle (*Lepidochelys olivacea*) is renowned for its mass nesting phenomenon, known as "arribada," wherein thousands of female turtles come ashore simultaneously to lay eggs. The Rushikulya rookery along Odisha's coastline is one of the world's most significant nesting sites, hosting nearly 50% of the global Olive Ridley population annually. Despite their ecological importance, these turtles face threats such as habitat destruction, bycatch in fisheries, climate change, and pollution, leading to their classification as "Vulnerable" by the International Union for Conservation of Nature (IUCN). Conservation efforts have traditionally relied on enforcement-driven approaches, including legal protections under the Wildlife Protection Act (1972) and site patrolling. However, these methods often lack meaningful community involvement, which is vital for sustainable conservation. This study explores participatory communication as a transformative strategy for Olive Ridley turtle conservation, emphasising collaboration, mutual understanding, and empowerment. By engaging local communities, volunteers, and forest officials through two-way communication and community-driven initiatives, conservation at Rushikulya rookery has witnessed remarkable success. Community-led initiatives, educational programs, and digital communication platforms have facilitated effective monitoring, hatchling guidance, and awareness campaigns, fostering environmental stewardship among stakeholders. The record-breaking mass nesting of over 900,000 turtles in 2025 underscores the significance of these efforts. This research highlights the impact of participatory communication in mobilising and empowering conservation stakeholders, analysing key communication tools and techniques. By integrating indigenous knowledge and fostering a sense of ownership, participatory conservation approaches can enhance ecological outcomes and ensure the survival of Olive Ridley turtles for future generations. The study provides insights into scaling and replicating participatory communication strategies to address broader conservation challenges effectively.
Keywords: Olive Ridley Turtles, Arribada, Rushikulya Rookery, Participatory Communication, Community-Based Conservation, Community Engagement

1. INTRODUCTION

The Olive Ridley turtle (*Lepidochelys olivacea*), one of the smallest and most abundant sea turtle species, is globally recognised for its unique mass nesting phenomenon, known as "arribada." During arribadas, thousands of female turtles simultaneously come ashore to lay eggs, creating a spectacular natural event that attracts global attention (Pandav et al., 1997). The Rushikulya rookery, located along the Odisha coastline in India, is one of the most significant nesting sites for Olive Ridley turtles, alongside Gahirmatha and the Devi River mouth. Despite their ecological importance, Olive Ridley turtles face numerous threats, including habitat destruction, fishing bycatch, climate change, and pollution, which have led to their classification as "Vulnerable" by the International Union for Conservation of Nature (IUCN) (IUCN Red List, 2011; Jensen et al., 2013; Kelez & Velez-Zuazo, 2014).

Nestled along the 480 km coastline of Odisha on India's east coast, the Rushikulya estuary (spanning latitudes 19°22′00″ N to 19°25′17″N and longitudes 85°4′16″ E to 85°6′00″ E) stands as a pivotal mass nesting site.

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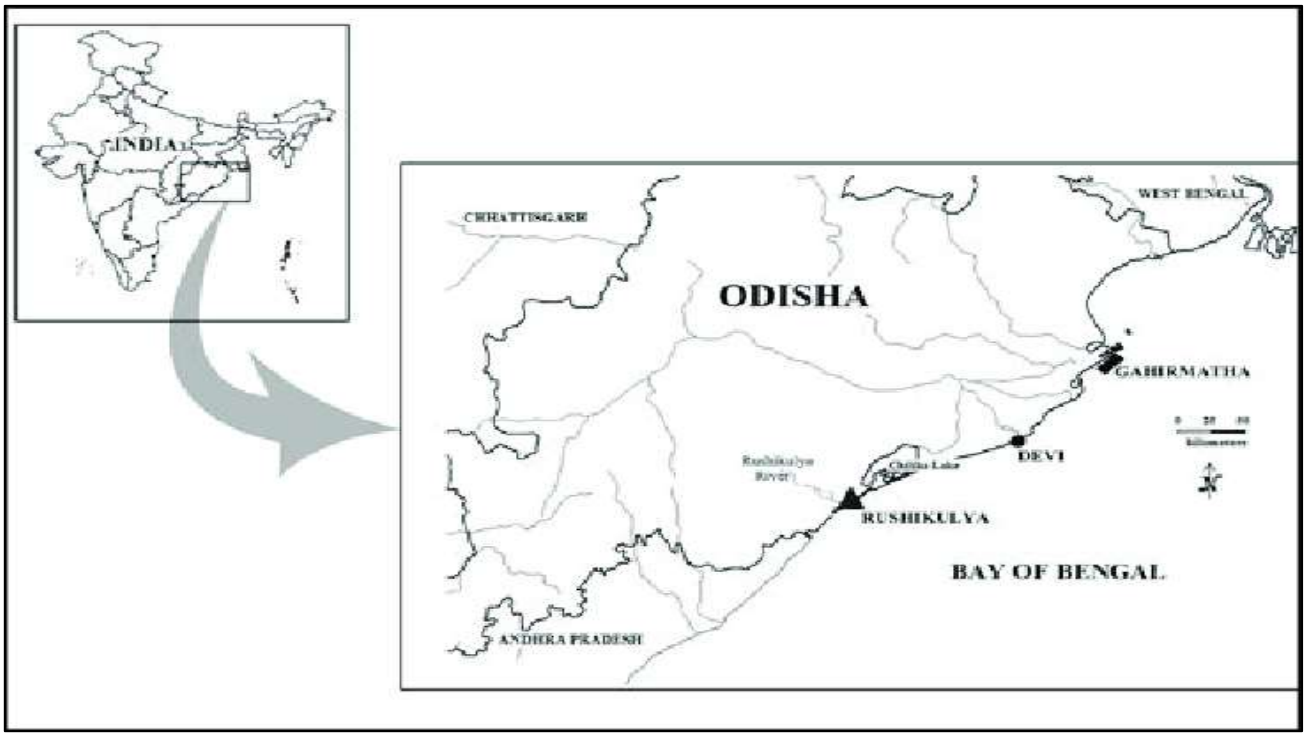

Fig. 1. Rushikulya rookery site

(Map showing the three arribada sites on the Odisha coast. Solid fill triangle = site of observation at Rushikulya Beach, Odisha, India. The coastline between these sites is used by Lepidochelys olivacea for sporadic nesting.)
As highlighted by Pandav et al. (1994), Shanker et al. (2004), and Chattopadhyay et al. (2018), this coastal stretch witnesses the annual arrival of approximately 50% of the world's Olive Ridley Sea turtle population for nesting between October and May. These migratory turtles spend several months in these waters engaging in mating rituals before the female turtles emerge onto the beaches to create their nests and lay their eggs. The number of nests recorded annually in these rookeries fluctuates considerably, ranging from 100,000 to 500,000 (Panigrahi, 2019).

Conservation efforts for Olive Ridley turtles have traditionally focused on enforcement-driven approaches, such as patrolling nesting sites and implementing legal protections under the Wildlife Protection Act (1972) (CMFRI, 1984). While these measures have been effective to some extent, they often lack the active involvement of local communities, whose participation is crucial for sustainable conservation. Participatory communication, which emphasises collaboration, mutual understanding, and empowerment, has emerged as a transformative approach in addressing conservation challenges. This approach involves engaging stakeholders, including local residents, volunteers, and forest officials, in conservation efforts through two-way communication channels and community-driven initiatives (Freire, 1970).

The Rushikulya rookery serves as a model for participatory communication in wildlife conservation. Local communities play a pivotal role in monitoring nesting sites, guiding hatchlings to the sea, and protecting them from predators and artificial lighting. Educational programs and workshops conducted by non-governmental organisations (NGOS) and forest officials have raised awareness about the ecological significance of Olive Ridley turtles and the threats they face. Additionally, social media platforms and mobile apps have been utilised to coordinate volunteer activities, share updates, and document progress, showcasing the potential of digital tools in enhancing participatory communication (Chattopadhyay et al., 2018).

Rushikulya's beaches are among the most active Olive Ridley nesting grounds in the world. According to an NDTV report, this year marked a historic moment as over 900,000 turtles came ashore to nest—a record-breaking number that highlights the importance of ongoing conservation efforts.

Table 1: Mass nesting in the last Five Years (2021-2025) in Rushikulya Rookery

Year	Estimated Number of Nesting Turtles
2025	~900,000
2024	No mass nesting observed.
2023	~637,000
2022	~550,317
2021	No mass nesting observed.

The success of participatory communication strategies at Rushikulya rookery is evident in the record number of hatchlings observed during the recent 2025 nesting season (NDTV,2025). These collaborative efforts have not only improved conservation outcomes but also fostered a sense of ownership and environmental stewardship among local communities. By integrating indigenous knowledge and fostering mutual understanding, participatory communication has transformed conservation from a top-down approach to a collaborative endeavour (TNIE,2025).

Participatory communication in conservation is not a new concept, but its application to marine species like Olive Ridley turtles is relatively novel. Unlike traditional top-down approaches, participatory communication involves engaging local communities, volunteers, and other stakeholders in conservation efforts through two-way communication channels and community-driven initiatives. This approach not only enhances the effectiveness of conservation strategies but also fosters a sense of ownership and environmental stewardship among participants (ORP,2021; Kalpavriksh, 2009).

The novelty of this research lies in its focus on participatory communication as a transformative tool for conservation. While previous studies have documented the ecological and biological aspects of Olive Ridley turtles, there is limited research on the role of communication in mobilising communities and fostering collaboration.

This paper aims to explore the role of participatory communication in the conservation of Olive Ridley turtles at Rushikulya rookery, highlighting its effectiveness, challenges, and opportunities for scaling and replication. By examining community-driven initiatives, volunteer networks, and awareness campaigns, the study seeks to provide insights into how participatory communication can be leveraged to address conservation challenges and ensure the survival of Olive Ridley turtles for future generations.

1.1. Objectives of the study

i. To evaluate the impact of participatory communication strategies on Olive Ridley turtle conservation.
ii. To identify key stakeholders and analyse their roles in conservation efforts.
iii. To explore communication tools and techniques for mobilising and empowering stakeholders.

1.2. Research questions

i. How do participatory communication strategies improve conservation outcomes?
ii. What are the contributions of stakeholders such as local communities, NGOs, and forest officials?
iii. Which communication methods are most effective in mobilising stakeholders?

2. LITERATURE REVIEW

Marine turtles are integral to maintaining ecosystem balance. As opportunistic feeders, Olive Ridley turtles help control jellyfish populations, which can otherwise proliferate and disrupt marine food webs (Hawkes et al., 2021). Furthermore, their nesting process contributes to nutrient cycling on beaches, as unhatched eggs provide nourishment to coastal flora and fauna (Shanker et al., 2021). Rushikulya, along with Gahirmatha and Devi River mouth, is one of the largest nesting sites for Olive Ridley turtles globally, hosting arribada events involving hundreds of thousands of turtles annually (Pandav et al., 1997).

Despite their ecological importance, Olive Ridley turtles face numerous anthropogenic and natural threats. Bycatch mortality remains a leading cause of turtle deaths globally. Along India's coastline, Pandav et al. (1997) identified gillnets and trawl fishing as primary culprits, often resulting in injuries or drowning for adult turtles. In response, targeted interventions such as Turtle Excluder Devices (TEDs) have been introduced, though their adoption remains inconsistent.

The olive ridleys along the Rushikulya coast face numerous threats, both anthropogenic and natural. Although large-scale mechanised fishing is less common in this region compared to other parts of Odisha, incidental catch in shrimp trawls has resulted in significant turtle mortality, with over a hundred thousand turtles dying along the Odisha coast since the 1990s (Shanker and Choudhury, 2006). Natural threats such as predation by jackals, hyenas, feral dogs, and birds like kites and crows also negatively impact sporadic nesting.

Climate change further exacerbates these challenges, especially through its influence on temperature-dependent sex determination (TSD), a process shared by marine turtles. The sex of hatchlings is determined by incubation temperature, which depends on factors such as air temperature, sand grain size, and clutch size. Rising air temperatures could skew sex ratios and increase hatchling mortality, posing a severe risk to turtle populations. Laboratory studies have explored TSD by manipulating incubation temperatures (Bézy et al., 2015), but similar research in natural Indian habitats remains limited.

Indirect threats to olive ridley turtles include the loss of nesting beaches due to natural erosion and sand mining for construction activities. Pollution of both beaches and marine habitats is evident from marine debris like plastic bags, tar balls, thermocouple pieces, and raw plastic pellets. Additionally, high levels of artificial illumination disorient adult turtles and hatchlings, further endangering their survival (Chattopadhyay et al., 2018).

Conservation efforts at Rushikulya are characterised by their participatory nature, emphasising community involvement as a cornerstone of success. Dakshin Foundation (2017) highlighted the pivotal role of local fisherfolk, women's groups, and youth in monitoring nesting sites, protecting hatchlings, and conducting awareness campaigns. This approach not only reduces human-wildlife conflict but also fosters a sense of stewardship among residents. It also highlights that Ecotourism and Educational programs have emerged as significant contributors to conservation efforts at Rushikulya.

Scientific advancements have significantly enhanced conservation efforts at Rushikulya. Tagging and GPS tracking studies have provided valuable insights into the migratory patterns, habitat preferences, and nesting behaviours of Olive Ridley turtles (Tripathy & Shanker, 2008). This data helps conservationists design targeted interventions and assess the effectiveness of existing strategies.

Global initiatives, such as the Convention on Migratory Species (CMS) and the Indian Ocean-South-East Asian Marine Turtle Memorandum of Understanding (IOSEA), have provided frameworks for international collaboration in turtle conservation.

2.1. Theoretical framework

The theoretical framework of this research is grounded in participatory communication theories, which emphasise collaboration, mutual understanding, and inclusive participation to achieve shared goals. These principles are

particularly relevant in the context of conservation, where active engagement of stakeholders, including local communities, non-governmental organisations (NGOs), and government authorities, is essential for success. The key theories underpinning this study include:

2.1.1. Participatory communication for development

Freire's (1970) critical pedagogy forms the foundation of participatory communication, emphasising the importance of dialogue and collaboration in empowering communities. Freire argued that traditional, top-down communication approaches often alienate communities and fail to achieve meaningful engagement. Instead, he proposed a two-way communication model, where all stakeholders actively contribute and share knowledge. In the context of Olive Ridley turtle conservation, this theory supports the involvement of local communities in decision-making, monitoring, and protection activities, thereby fostering a sense of ownership and responsibility.

3. Research Methodology

3.1. Study site

The Rushikulya rookery, located in the Ganjam district of Odisha, is one of the most significant mass nesting sites for Olive Ridley turtles along the east coast of India. The area plays a crucial role in the conservation of this vulnerable species, with thousands of turtles arriving annually for nesting. The rookery is an ecologically rich site, characterised by a high density of nesting turtles and a delicate coastal ecosystem that supports their reproduction and survival. This rookery in Odisha's Ganjam district has witnessed an extraordinary mass nesting event this year, making it a crucial site for conservation studies. The event follows a record-breaking nesting season, where nearly 9 lakh female turtles laid eggs in two phases along the 5 km stretch from Podampeta to Bateswara. In the first phase, 6,98,698 turtles nested between Feb 16 and 23, followed by over 2.05 lakh turtles in the second phase from 22 to 27, surpassing previous records (TTOI,2025). This surge in nesting activity highlights the ecological significance of the rookery and reinforces its role as one of the most important breeding grounds for this vulnerable species.

Fig. 2. Map showing the study area Rushikulya Rookery, Credit: Esri|Sentinel Land Cover Explorer) https://livingatlas.arcgis.com/landcoverexplorer/#mapCenter=85.09346%2C19.38064%2C14.376020764329931&mode=swipe&timeExtent=2019%2C2024

3.2. Importance of the site for participatory communication

Rushikulya rookery is particularly relevant for studying participatory communication in conservation efforts due to its unique blend of environmental significance and human interaction. The site is closely linked to local fishing

communities whose participation is essential for successful conservation. Over the years, collaboration between local stakeholders, NGOs, and the Forest Department has fostered engagement and shared responsibility in protecting the turtles. This ongoing cooperation provides a rich foundation for analysing participatory communication strategies—how information is exchanged, how local involvement influences conservation outcomes, and how different actors work together to ensure the long-term protection of Olive Ridleys.

The Rushikulya rookery serves as a real-world model for participatory conservation, making it an invaluable case study for understanding the role of communication in bridging ecological preservation with community participation.

The unprecedented nesting numbers provide a unique opportunity to examine participatory conservation efforts. Local fishing communities, NGOs, and the Forest Department have been actively involved in protecting the eggs from predators and ensuring safe hatching. The collaboration between these stakeholders demonstrates how participatory communication strategies can enhance conservation outcomes, making Rushikulya an ideal case study for understanding the impact of community engagement in wildlife protection.

Fig. 3. Rushikulya mass nesting site
Source: Self-clicked photograph by Ratikanta Behera, 2025

This year's record-breaking arribada (mass nesting) not only underscores the rookery's ecological importance but also strengthens the argument for sustained participatory conservation efforts to safeguard Olive Ridley turtles for future generations.

3.3. Research design

This study adopts an exploratory qualitative approach to examine participatory communication strategies in the conservation of Olive Ridley turtles at Rushikulya rookery, employing a case study design to focus on communication efforts by local communities, NGOS, State Forest Department officials, and Volunteers. The case study method (Priya, 2020) enables an in-depth understanding of communication practices employed by various stakeholders, including local communities, NGOs, State Forest Department officials, and volunteers engaged in the conservation process.

Data collected through semi-structured interviews with key informants such as local villagers (especially fishermen), frontline forest staff (Forester), and Active Conservation Volunteers. A purposive sampling technique was employed to ensure the inclusion of diverse perspectives and experiences relevant to the conservation activities at the site.

To enhance the credibility and depth of the analysis, secondary sources such as published research articles, government and NGO reports, and media coverage were also examined. These documents helped to contextualise the field findings and identify recurring themes and patterns in participatory conservation communication strategies.

The combination of primary qualitative data and secondary literature review allowed for a comprehensive exploration of how communication is employed as a tool for mobilisation, awareness, and collective action in protecting the Olive Ridley turtles in this ecologically significant nesting site.

4. FINDINGS

4.1.1. Interview analysis

The interviews with Active Conservation Volunteer Rabindranath Sahu, Forester Girish Chandra Ray, and Local fishermen at the Rushikulya rookery highlight the pivotal role of participatory communication and a community-based conservation approach in protecting Olive Ridley turtles. These narratives reveal how culturally resonant dialogue, inclusive engagement, and grassroots action foster a collective commitment to conservation, while navigating livelihood challenges and aspiring toward sustainable alternatives like eco-tourism.

4.1.2. Participatory communication as the heart of conservation

Participatory communication emerges as the cornerstone of conservation efforts, creating a two-way dialogue that empowers communities and instills a sense of ownership. By embedding conservation messages in cultural narratives, Rabindranath Sahu ensures that ecological goals resonate deeply with villagers, transforming abstract science into a shared mission. He further leverages technology to amplify participation:

"*Through mobile apps and social media platforms, villagers are encouraged to report turtle sightings and threats. It empowers them. They feel like they're part of something larger, and that's crucial.*" This statement underscores how participatory communication democratises conservation, enabling villagers to actively contribute to monitoring and protection efforts.

Forester Girish Chandra Ray reinforces this through structured, inclusive communication strategies. He notes, "*These visual mediums make a significant impact, especially in remote areas where literacy levels may be a barrier,*" referring to LED screens displaying educational videos about turtle ecology and sustainable fishing. Ray's community-based meetings at village, circle, and division levels further exemplify participatory dialogue: "*These discussions have been instrumental in fostering a collaborative environment.*"

This highlights how participatory communication bridges literacy and accessibility gaps, creating a platform where villagers, authorities, and volunteers co-create solutions, fostering trust and shared responsibility.

4.1.3. Community-based conservation and cultural connection

Community-based conservation thrives on the cultural reverence for Olive Ridley turtles, which villagers view as an integral part of their heritage. A fisherman's sentiment, *"They are like family to us, and we feel proud to protect them,"* reflects a deep emotional bond that fuels grassroots action.

This cultural connection is harnessed by Sahu, who asserts, "*Conservation is not a one-man job. It is about bringing people together to understand their role in this shared responsibility.*" The community's active involvement—evident in beach clean-ups and hatchling rescues—demonstrates the efficacy of community-based conservation.

A young villager recounts, "*I found a baby turtle stuck in a fishing net last season. I released it into the sea myself. It felt good to help.*" This shows the tangible contributions of villagers, who serve as stewards of the rookery, driven by pride and duty.

The success of these efforts is reflected in Sahu's celebration of outcomes: "*Over the years, we have seen an increase in hatchlings making it to the sea. That is the ultimate reward.*" This achievement underscores the power of community-based conservation, where local knowledge and action amplify ecological outcomes.

By positioning villagers as partners rather than passive recipients, the Rushikulya model fosters a collective identity centered on turtle protection.

4.1.4. Navigating livelihood challenges through dialogue

The fishing ban during nesting and hatching seasons poses significant livelihood challenges, yet participatory communication serves as a critical tool to address these tensions.

A villager articulates the struggle: *"When we are not allowed to fish, we have no other way to feed our families. We don't oppose the ban, but we need support to get through those months."*

Sahu recognises the complexity, emphasising communication's role: "*It's not easy to balance conservation with people's livelihoods. That's where communication becomes key. We have to show them the long-term benefits.*"

Through workshops and open dialogue, Sahu fosters understanding of the ecological necessity of bans, mitigating resentment by highlighting shared goals.

Ray complements this by integrating communication with practical support, such as government compensation: "*We work with authorities to ensure fair compensation for fishing families during the banned period.*"

Awareness programs, including rallies and education on sustainable fishing practices, further engage the community: "*We encourage the use of traditional fishing methods, which are safer for turtles and also sustainable for marine ecosystems.*"

This illustrates how participatory communication transforms potential conflicts into opportunities for collaboration, ensuring that conservation aligns with community needs through transparent dialogue and tangible support.

4.1.5. Empowering communities for sustainable practices

Community-based conservation at Rushikulya empowers villagers to adopt sustainable practices, particularly in reducing bycatch. Ray's focus on educating fishermen about the dangers of ring nets and gill nets is a key example: "*We encourage the use of traditional fishing methods, which are safer for turtles and also sustainable for marine ecosystems.*"

This initiative, delivered through participatory workshops, equips villagers with the knowledge and tools to protect turtles while maintaining their livelihoods. The community's responsiveness is evident in their contributions to in-situ conservation efforts, such as nesting site protection and patrolling, which complement ex-situ measures like egg relocation to hatcheries.

Rabindranath Sahu added that use of technology further empowers villagers as active monitors: "*Through mobile apps and social media platforms, villagers are encouraged to report turtle sightings and threats.*"

This participatory mechanism not only enhances surveillance but also reinforces the community's role as co-guardians of the rookery. The resulting increase in hatchling survival rates is a measure of the success of empowering communities to drive conservation outcomes.

4.1.6. Eco-Tourism as a community-driven aspiration

Participatory communication has also sparked community-driven aspirations for eco-tourism, viewed as a sustainable alternative to fishing. A shop owner envisions, *"Tourists come to watch the turtles, which will improve our earnings,"* highlighting the potential for conservation to generate economic benefits.

This optimism is tempered by a call for support, as another villager notes, *"We are willing to try new things, but we need guidance."*

This reflects the community's proactive engagement with conservation's broader implications, facilitated by dialogue that encourages them to envision new roles as tourism ambassadors.

The emphasis on eco-tourism aligns with community-based conservation principles, positioning villagers as stakeholders in both ecological and economic outcomes. By fostering these aspirations through participatory communication, Sahu and Ray empower the community to shape a future where conservation and livelihoods coexist harmoniously.

4.1.7. Challenges and the path forward

While participatory communication and community-based conservation have driven significant successes, challenges remain.

A villager's concern— "*It's difficult to balance our respect for nature with our need to earn a living*"—underscores the ongoing tension between conservation mandates and economic realities.

However, the collaborative framework established through communication offers a path forward. Ray's multi-level meetings and Sahu's culturally grounded workshops demonstrate how inclusive dialogue can address grievances and build consensus.

The collective pride in increased hatchling survival rates, as Sahu celebrates, *"Over the years, we've seen an increase in hatchlings making it to the sea. That's the ultimate reward*," reflects the enduring impact of community-based conservation rooted in participatory communication.

The Rushikulya rookery exemplifies the transformative potential of participatory communication and community-based conservation. Interviews from Sahu, Ray, and villagers reveal a dynamic ecosystem of dialogue, cultural connection, and grassroots action that empowers communities to protect Olive Ridley turtles. By weaving conservation into the fabric of community identity—through traditional knowledge, technology, and inclusive platforms—stakeholders have created a model where villagers are not just participants but co-creators of ecological success. Despite livelihood challenges, the community's contributions and aspirations for eco-tourism signal a resilient, collaborative future, demonstrating that participatory communication is not merely a tool but the heartbeat of sustainable conservation.

5. DISCUSSION

5.1. Community involvement in conservation

Olive Ridley rescue volunteer Rabindranath Sahu and the villagers emphasised the value of community participation in conservation activities. Efforts ranged from conducting awareness campaigns to hands-on involvement in beach clean-ups and hatchling rescues. They highlighted how storytelling and local traditions were utilised to make conservation relatable to the community and ensure their active participation. Studies consistently underscore participatory communication as a cornerstone of successful conservation efforts. Grassroots involvement fosters sustainable outcomes by instilling a sense of ownership and responsibility among locals (Bucyensenge et al., 2017). However, research also points to challenges such as inconsistent participation due to socioeconomic pressures, which can hinder the effectiveness of conservation initiatives (Rodríguez-Izquierdo et al., 2010).

5.1.1. Livelihood challenges

Villagers expressed concerns regarding conservation measures, such as fishing bans during the nesting season, which negatively impact their income. They shared hopes for alternative livelihood options, including eco-tourism initiatives, to mitigate these economic challenges. A forest officer acknowledged the economic burden but defended the necessity of restrictions for the turtles' protection. Research corroborates the economic impact of conservation measures on fishing communities, while also exploring solutions such as sustainable aquaculture and eco-tourism initiatives. Evidence from similar programs globally demonstrates that introducing alternative livelihoods can effectively reduce economic hardships while supporting conservation efforts (Eriksson et al., 2019; Nakamura, 2024).

5.1.2. In-situ and ex-situ conservation efforts

The forest officer elaborated on specific in situ measures, including regular patrols, barriers to protect nesting sites, and community engagement initiatives. Ex-situ strategies, such as artificial hatcheries and rescue centers, were also highlighted as complementary approaches to increase the survival rates of turtles. Research supports the dual strategy of combining in situ and ex-situ conservation efforts. Artificial hatcheries and rehabilitation centers enhance survival rates of hatchlings, whereas in situ measures ensure long-term protection of natural habitats (Zegeye, 2017).

5.1.3. Role of technology

Both Rabindranath Sahu and the forest officer highlighted the importance of technology in wildlife conservation. Tools like drones, GPS tracking devices, and mobile reporting apps were noted as essential for efficient monitoring and responding to threats to Olive Ridley turtles.Research extensively discusses the integration of technology in conservation efforts, emphasising its effectiveness in surveillance and data collection. However, studies also acknowledge challenges such as the high cost and limited accessibility of technology in rural and underfunded areas (Lahoz-Monfort & Magrath, 2021; Ullah et al., 2024).

5.2. Emerging themes and interpretation

The findings of this research bring to light critical insights into the dynamics of participatory communication in Olive Ridley turtle conservation at the Rushikulya rookery. By combining interview data with content analysis of existing research, several key themes have been identified, offering a nuanced understanding of both the successes and challenges in conservation efforts.

5.3. The power of participatory communication

Participatory communication is a cornerstone of effective community engagement in conservation efforts. Interviews with stakeholders like Rabindranath Sahu and the villagers highlight the success of culturally embedded methods, such as storytelling and interactive workshops, in fostering community involvement. These approaches resonate with research findings that emphasise the importance of tailoring communication to local contexts to build trust and ownership, which are essential for long-term sustainability (Bucyensenge et al., 2017, & Kharwar, 2024)

However, limitations in participatory communication must be addressed. While many villagers actively engage in conservation activities, others feel marginalised or underrepresented, pointing to gaps in outreach and inclusivity. This aligns with studies that identify barriers to equitable participation, such as socioeconomic pressures and lack of access to information (Bucyensenge et al., 2017). Conservation programs must prioritise inclusivity to ensure equitable participation across all sections of the community, strengthening relationships between conservation authorities and local stakeholders.

5.4. Livelihood trade-offs and the promise of alternatives

Economic strain caused by fishing bans during the nesting season is a significant challenge for local communities. Interviews reveal that these restrictions lead to severe income loss, making it difficult for villagers to fully commit to

conservation efforts. While the forest officer and research papers justify the bans as necessary for turtle protection, the villagers' perspectives highlight the human cost of these measures (Patil,2024).

Eco-tourism emerges as a promising solution, offering dual benefits of promoting conservation awareness and providing alternative livelihoods. Case studies demonstrate the success of eco-tourism in similar settings. However, researchers caution that unregulated eco-tourism could lead to habitat degradation and exploitation (Leow, 2020). To strike a balance, eco-tourism initiatives must be community-led, environmentally sustainable, and economically viable. Additionally, alternative livelihood options, such as sustainable aquaculture and skill-based training programs, could reduce dependence on fishing and mitigate economic pressures (Thomas, 2022).

5.5. Balancing in-situ and ex-situ approaches

The dual strategy of in-situ and ex-situ conservation is widely supported in research. In-situ methods, such as patrolling and community engagement, directly protect turtles in their natural habitat, while ex-situ measures, like artificial hatcheries, serve as a safety net for vulnerable populations (Zegeye, 2017). This synergy has been demonstrated to increase hatchling survival rates (Phillott,2018).

However, according to the Central Zoo Authority (CZA), over-reliance on ex-situ efforts at the expense of habitat restoration poses risks. Coastal erosion and pollution in areas like Rushikulya threaten nesting sites, emphasising the need for a balanced approach that prioritises habitat conservation while leveraging ex-situ measures as supplementary strategies.

5.6. Bridging grassroots and academic perspectives

The comparison between grassroots perspectives and academic research reveals both alignments and discrepancies. Interviews provide a detailed understanding of local challenges and successes, including the emotional and cultural connection villagers have with turtles. Academic studies, on the other hand, offer empirical evidence and tested frameworks that can guide practical solutions (Farwing, 2017).

Bridging these perspectives requires ongoing collaboration between researchers, conservation authorities, and local communities. Grassroots knowledge must inform academic research, while scientific insights should be made accessible to stakeholders at the ground level. This collaborative approach can enhance the effectiveness and sustainability of conservation efforts (Sabo et al., 2024).

6. CONCLUSION

The conservation of Olive Ridley turtles at the Rushikulya rookery exemplifies how participatory communication can bridge ecological preservation with community involvement. By fostering collaborative efforts through culturally relevant and inclusive methods, conservation stakeholders have succeeded in engaging local communities as active participants. This approach not only enhances the protection of nesting sites but also empowers communities with a sense of ownership and pride in protecting these vulnerable marine creatures.

However, the research highlights the socioeconomic challenges faced by local communities, particularly during fishing bans. These restrictions, while essential for safeguarding the turtles, pose a significant livelihood disruption for fishermen and other resource-dependent villagers. Eco-tourism and alternative livelihood initiatives emerge as promising solutions, offering a sustainable pathway to balance conservation goals with economic stability. The optimism expressed by the villagers and the forest officer underscores the potential for these measures to create a harmonious coexistence between humans and nature.

The study also underscores the need for an integrated approach that balances in situ conservation, such as habitat protection and community engagement, with ex-situ measures like artificial hatcheries and rescue efforts. While technology has been an invaluable tool in monitoring and responding to threats, long-term success depends on restoring habitats and building resilient conservation programs.

In conclusion, the protection of Olive Ridley turtles at Rushikulya is evidence of the power of participatory communication and collaborative efforts. By addressing livelihood challenges and promoting sustainable practices, conservation stakeholders can pave the way for a future where communities and ecosystems thrive together. The findings provide actionable insights for enhancing conservation strategies and serve as a blueprint for similar initiatives worldwide.

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