MEMORANDUM OF UNDERSTANDING ON THE CONSERVATION AND MANAGEMENT OF MARINE TURTLES AND THEIR HABITATS OF THE INDIAN OCEAN AND SOUTH-EAST ASIA

CMS/IOSEA/AC11/Doc.5.3
23 October 2026

11TH MEETING OF THE ADVISORY COMMITTEE
Bonn, Germany, 8-11 December 2026
Agenda Item 5.3

ALTERNATIVE LIVELIHOODS FOR MARINE TURTLE CONSERVATION

(*Prepared by the Secretariat*)

Mandate:

- WP #65: *Compile and assess available knowledge on best practice approaches to produce best practice guidance for alternative livelihood projects.*

Summary:

- The report reviews alternative livelihood approaches that can support marine turtle conservation while improving community well-being
- It examines key approaches such as micro-credit, skills training, alternative income sources, payment schemes, and ecotourism through case studies and SWOT analyses
- It identifies success factors, challenges, and risks affecting implementation and long-term sustainability
- The report includes recommendations and priorities for future conservation programming and research

Action requested:

- Review and revise
- Finalize the report and recommendations
- Advise whether further work is required to fulfil the mandate given in WP #65

ALTERNATIVE LIVELIHOODS FOR MARINE TURTLE CONSERVATION

Executive Summary

Alternative livelihoods are increasingly recognized as an important component of marine turtle conservation by addressing the socio-economic drivers of turtle and egg harvesting while supporting local communities. This review assesses a range of approaches and their enabling mechanisms, including green micro-credits, performance-based payment programmes, eco-tourism, Basic Income for Nature and Climate (BINC), educational initiatives, and the provision of alternative protein or raw material sources. Each approach offers opportunities to reduce dependence on turtle exploitation, but their effectiveness is highly context-specific and dependent on appropriate implementation.

A key finding is that alternative livelihood programmes are more likely to succeed when communities' basic needs are met. When households face food insecurity or financial hardship, immediate survival inevitably takes priority over conservation, increasing the likelihood of unsustainable turtle or egg harvesting. Consequently, conservation interventions should be embedded within broader strategies that strengthen food security, social well-being, and economic resilience.

The review further identifies insufficient financial capital and limited skills as the principal barriers to establishing successful alternative livelihoods. Additional constraints, including inadequate access to raw materials, infrastructure, and markets, often undermine the long-term viability of alternative enterprises. Livelihood interventions must therefore be economically viable, supported by appropriate institutional structures, and capable of generating reliable income if they are to become the preferred alternative to activities associated with turtle exploitation.

Particular caution is warranted for approaches that depend on continuous financial transfers, such as performance-based payment schemes or Basic Income for Nature and Climate (BINC). While these mechanisms can generate important conservation incentives, their long-term success depends on sustained and predictable funding. Securing such funding over extended periods remains a major challenge, as support from governments, donors, or conservation organizations may fluctuate with changing political priorities, economic conditions, or funding cycles. If payments are reduced or discontinued, there is a risk that communities revert to turtle harvesting where alternative income sources remain insufficient. Long-term financial sustainability should therefore be a central consideration when designing payment-based conservation programmes.

Equally important is the active participation of local communities throughout the design, implementation, and management of livelihood initiatives. Strong community engagement, local stewardship, and transparent decision-making increase the likelihood that interventions are culturally appropriate, socially accepted, and sustainable over the long term. Previous failures demonstrate that programmes developed without sufficient consideration of local socio-economic conditions, governance structures, and community priorities can produce unintended negative consequences and erode trust in conservation initiatives.

Overall, there is no single alternative livelihood strategy that is universally applicable. Successful programmes require a thorough understanding of local cultural, ecological, and economic contexts, careful planning, and continuous monitoring and evaluation. Future initiatives should prioritize participatory, context-specific approaches that address underlying livelihood needs, ensure financial sustainability, and generate tangible, long-term incentives for marine turtle conservation.

Outline

Executive Summary 2
1. Introduction – The Need for Alternative Livelihoods 4
2. Methodology 4
3. Classification of Approaches 5
3.1. (Green) Micro-credits 5
3.2. Educational training 7
3.4. Performance Payment Programmes 8
3.5. Eco-tourism 13
4. Research gaps 17
5. Recommendations for Implementing Alternative Livelihoods 18
References 20

1. Introduction – The Need for Alternative Livelihoods

Conservation regulations aim to protect marine turtles. However, as marine turtles can present an important source of income, nutrition and cultural heritage, turtles and their eggs are still frequently taken, traded and consumed across IOSEA regions (Madrigal-Ballestero and Jurado, 2017; Liles et al., 2015; Gomez and Krishnasamy, 2019). Accordingly, conservation regulations can lead to negative social impacts, economic displacement and food insecurity for local communities that depend on turtle use, particularly when bans are implemented without adequate alternative opportunities or support mechanisms (Vieira et al., 2024; Panda et al., 2014). Limited livelihood opportunities and economic factors can contribute to illegal egg harvesting (Madrigal-Ballestero and Jurado, 2017; Fischer et al., 2021), while local communities may view alternative livelihoods as an opportunity to reduce wildlife exploitation and support turtle conservation (Liles et al., 2015; Kaaya and Chapman, 2017).

Alternative livelihood projects (ALPs) aim to reduce pressure on biodiversity by replacing environmentally harmful livelihood activities with lower-impact alternatives that benefit local communities (Roe et al., 2015; Wright et al., 2015). These interventions may involve providing alternative resources, introducing new occupations, income-generating activities, or promoting less harmful resource-use practices (Roe et al., 2015; Donaldson et al., 2024). More broadly, livelihood-focused conservation interventions also include compensation for conservation-related losses and incentives for conservation-related behaviours (Wright et al., 2015).

An important distinction is that introducing alternative livelihood activities does not necessarily result in the replacement of existing livelihoods. Livelihood diversification involves expanding or modifying household livelihood strategies by incorporating additional activities, whereas livelihood substitution implies replacing an existing activity with another (Bennett and Dearden, 2014; Donaldson et al., 2024). This distinction is important because introducing new income-generating activities does not necessarily reduce pressure on the targeted species or resources (Wright et al., 2015).

Programme 4.2 of the Conservation and Management Plan under the IOSEA Marine Turtle MOU foresees the development of "*alternative livelihood opportunities for local communities to encourage their active participation in conservation efforts*". This paper contributes to Measure #65 of the Work Programme 2024-2028, which assigns the following responsibility to the Advisory Committee: "*Compile and assess available knowledge on best practice approaches to produce best practice guidance for alternative livelihood projects."*. This report reviews existing approaches to alternative livelihoods in marine turtle conservation, with the aim of identifying lessons learned and informing the development of best practice guidance.

2. Methodology

To compile information and guidance on alternative livelihoods for turtle conservation, a scoping literature review was conducted. Searches were performed using Web of Science and Google Scholar. Search queries combined the terms "alternative livelihoods" or "livelihoods" with "turtle" or "turtle conservation", alongside additional relevant terms identified during the review process, such as "payments for ecosystem services" or "micro-credit", in order to capture a broad range of approaches and case studies.

In addition, grey literature was included due to its relevance in documenting conservation projects, national planning processes and practical implementation experiences. Grey literature sources were identified through targeted Google searches using the same search terms, as well as through searches of national action plans, management plans, technical reports and conservation programme materials. Where relevant, sources in languages other

than English were also considered to capture locally documented examples. All retrieved sources were screened for relevance and suitability before inclusion in this document.

A SWOT analysis was used to assess the strengths, weaknesses, opportunities, and threats associated with the identified interventions and to support strategic planning for implementation. Strengths and weaknesses refer to internal factors that may influence the success or limitations of an intervention, whereas opportunities and threats describe external factors that may facilitate or hinder implementation of the alternative livelihood approaches presented here (Benzaghta et al., 2021).

3. Classification of Approaches

Livelihood-focused conservation interventions can be divided into three broad and overlapping categories: alternatives, compensation and incentives (Wright et al., 2015). While alternatives aim to replace benefits obtained from natural resource exploitation, compensation addresses losses resulting from conservation measures, and incentives provide benefits to encourage conservation-related behaviours. These approaches may overlap depending on their purpose and implementation. Micro-credit schemes and educational training are considered supporting mechanisms, as they provide financial resources, knowledge and skills to help communities develop alternative livelihood opportunities.

In general, it is important to note that meeting basic needs is an important factor for the success of alternative livelihood projects. Otherwise, meeting these needs becomes the priority over ecological protection, potentially contributing in the unsustainable harvest of eggs or turtle take (Fischer et al., 2021). Furthermore, the overall lack of financial capital and skills have been proven to present the main barriers to implementing alternative livelihoods in communities, while lack of raw materials and market access contribute as well (Vieira et al., 2024; Fischer et al., 2021). This is especially important as alternative livelihoods require structures and economic viability that makes them the preferred option (Gjertsen and Niesten, 2010). Above all, it is important that livelihood options are developed and implemented with local communities through strong participation in decision-making (Liles et al., 2015).

Previous alternative livelihood projects have faced challenges or failed when these factors were not adequately considered.. To name a few, insufficient financial capital, lack of training and institutional support or the inconsideration of community structures negatively influenced the success of alternative livelihood projects (Ferreira, 2015; Chandrana et al., 2017).

Furthermore, alternative livelihood projects may not only fail to achieve their objectives but also create negative impacts on local communities and their environment if the selected strategy does not fit the local context. Therefore, it is essential that the local communities maintain the stewardship of their environment and the project which is to be implemented (Ferreira and dos Prazeres, 2024; Ferreira, 2024). How to best implement alternative livelihood projects and prevent negative outcomes is outlined in Chapter 5, together with additional guidance material.

3.1. (Green) Micro-credits

Micro-credit programmes are commonly directed at low-income households through the provision of low-interest loans, enabling individuals to pursue alternative livelihood strategies by covering initial investment or production costs (Ilesanmi et al., 2024; Kaaya and Chapman, 2017). In some conservation contexts, eligibility for these loans is linked to the abandonment of environmentally harmful activities, such as unsustainable taking of protected wildlife (Kaaya and Chapman, 2017). Beyond supporting individual enterprises, micro-credit schemes can also contribute to broader community development through investments in infrastructure and

thus enable easier market access or availability of other livelihood opportunities (Ilesanmi et al., 2024).

Within wildlife conservation, existing studies have primarily focused on African national parks and the potential of microfinance approaches to directly reduce poaching pressures. These findings can also be relevant to turtle conservation in places where illegal harvesting and trade continue despite international and national bans (Kaaya and Chapman, 2017; Gomez and Krishnasamy, 2019).

More broadly, studies indicate that access to initial financial support can enable communities to diversify their alternative economic activities (Rajabu et al., 2009) and could therefore also present a suitable measure in turtle conservation. Nevertheless, much of the current literature remains centred on agricultural and farming contexts, limiting the availability of practical research in marine conservation settings. In addition, factors such as education levels, household income, and household size significantly influence the likelihood of receiving micro-credit support (Ilesanmi et al., 2024; Sudan, 2007). It was also found that the effectiveness of micro-credit programmes differs considerably between case studies and local contexts (Ilesanmi et al., 2024).

Table 1: SWOT Analysis of Green Micro-Credits as a Mechanism to Enable Alternative Livelihoods

Strengths	**Weaknesses**
• Supports the establishment of alternative livelihoods • Can increase household income and economic resilience • Can reduce impacts on natural resources • Supports participatory decision-making • May reduce illegal activities • After repayment ideally no need for further funding or support • Supports local economic diversification	• Micro-credits are not equally available to all community members • Depending on the national context, credits may not be provided by government/banks • Long-term impact is uncertain • Requires long-term institutional support • Repayment obligations may create financial pressure
Opportunities	**Threats**
• Potential partnerships with NGOs, governments and conservation organisations • Possibility of combining micro-credits with education and training programmes	• External factors such as market access, lack of skills or trainings/education, infrastructure, social networks influence success of alternative businesses • Turtle take and trade may remain economically attractive

3.2. Educational training

Training and awareness raising have been presented as additional implementations in other alternative livelihood options. However, as they grant important pathways that may influence long-term behavioural change, they are explicitly explored here. In particular, youth trainings, as implemented in the Brazilian TAMAR Programme, may offer important approaches (Pegas et al., 2011, Sardeshpande and Macmillan, 2019). TAMAR initiated a one-year long education programme for local children that revolves around environmental knowledge, especially targeted towards turtle conservation, provides skills training and a monthly stipend as well as meals. Simultaneously, some of the children are able to directly get involved in the eco-tourism business by becoming guides for tourists during their training. In their study, Pegas et al. (2011) indicate that the TAMAR Programme contributed to increased environmental awareness within the community and better opportunities for the children's education and livelihoods.

Table 2: SWOT Analysis of Educational Training as a Supporting Mechanism for Alternative Livelihoods

Strengths	Weaknesses
• Can promote long-term behavioural change and environmental awareness • Strengthens local knowledge • Provides youth with education, practical skills and livelihood opportunities • May improve future educational and socio-economic opportunities	• Outcomes may only become visible over long time periods • Requires continuous funding and organisational support • Access may be limited to some community members • May not eliminate turtle exploitation • Measuring direct conservation impact may be difficult
Opportunities	**Threats**
• Expansion of community-based conservation education programmes • Integration with eco-tourism, research and other alternative livelihood projects • Opportunities for partnerships with NGOs, schools, and governments	• Economic pressures may still encourage poaching • Loss of funding may disrupt programme continuity • Political or institutional instability may weaken programmes

3.3. Providing alternative protein/raw material sources

To address the unsustainable take of turtles and their eggs, providing alternative protein or raw material sources could also present an option. For example, an Indonesian community requested alternative livelihood opportunities and sources of protein to stop hunting turtles. Within the community, turtles have traditionally been consumed during festivities of the whole community. The village received 6 pigs and each family two piglets to raise them for future events. Additionally, the community was equipped with suitable infrastructure to prevent water contamination, create and use of biogas. Overall, this led to a reduction of turtle take by the

village (Gjertsen and Niesten, 2010). Similarly, tortoiseshells can be substituted by coconuts or cattle horn for handicrafts (Hemelikova et al., 2025).

Table 3: SWOT Analysis of Providing Substitutes as an Alternative Livelihood Option

Strengths	Weaknesses
• Can directly reduce dependence on turtle products • Provides culturally relevant alternatives • May improve local food security • Supports broader community development	• Requires initial financial investment • Alternative products may not fully replace cultural or traditional values of turtles • Adoption may vary between households or communities • Alternative livestock production may create new environmental pressures
Opportunities	**Threats**
• Potential support from NGOs, conservation organisations and governments	• Continued cultural demand for turtle products may persist • Economic incentives for illegal turtle take may remain attractive • Disease outbreaks or livestock losses may threaten alternative protein sources • Rising costs of livestock feed may reduce feasibility

3.4. Performance Payment Programmes

Performance-based payment schemes are among the most commonly implemented alternative livelihood approaches in turtle conservation. These programmes can generally be divided into three categories: (1) payment schemes for protecting turtle nests, (2) payment schemes for collecting eggs and transferring them to hatcheries, and (3) payment schemes aimed at reducing turtle bycatch. Furthermore, payment systems can differ in whether compensation is provided in cash or in-kind, and whether payments are directed towards individuals or groups. Overall, these programmes aim to target population groups most directly involved in the unsustainable take and trade of turtles and are often combined with educational trainings or employment in conservation and tourism businesses.

Payment schemes for protecting turtle nests

Payment schemes for protecting turtle nests provide financial incentives to local communities for identifying and protecting nests. Typically, individuals receive a payment for reporting a nest and an additional payment once eggs successfully hatch. The underlying objective is to discourage the collection, sale, or consumption of turtle eggs by making nest protection economically beneficial (Ferraro and Gjertsen, 2009).

One example is the “Tamar-Ibama” project in Brazil, which employed local fishers to patrol nesting beaches and promote awareness of turtle conservation within their communities

(Marcovaldi et al., 2005). Such programmes not only provide direct economic incentives for conservation but may also strengthen local stewardship and community engagement.

Payment schemes for gathering turtle eggs

Payment schemes for gathering turtle eggs operate in a similar manner. Under these programmes, community members collect turtle eggs but, instead of selling them on local markets, they transfer them to hatcheries in exchange for compensation, ideally equivalent or comparable to market prices. The eggs are then incubated under controlled conditions to improve hatching success (Liles et al., 2015). However, the use of hatcheries remains debated within turtle conservation (Martins et al., 2021; Ahles and Milton, 2016; Liles et al., 2019; Mrosovsky, 2006). Capacity building resources, including *Beach Management and Hatchery Practices, Best Practices for Sea Turtle Hatcheries* and *Holding and Headstarting Sea Turtle Hatchlings,* can be found on the IOSEA MOU webpage here.

Payment schemes for reducing bycatch

Payment schemes targeting turtle bycatch represent the least explored form of performance-based conservation programmes (Ferraro and Gjertsen, 2009). In these approaches, fishermen receive compensation for bringing accidentally captured turtles ashore alive rather than discarding or killing them. The rescued turtles can subsequently be released back into the wild (Ferreira, 2024).

In some programmes, these temporarily captured turtles are also tagged before release, contributing to scientific research and monitoring efforts (Ferraro and Gjertsen, 2009). Such approaches therefore combine conservation incentives with data collection opportunities.

Critical perspectives on performance payment schemes

Despite their widespread use, performance-based payment schemes have been subject to significant criticism. Current research provides only limited evidence regarding whether these programmes contribute to long-term behavioural change within communities (Ferreira, 2024; Ferraro and Gjertsen, 2009). In addition, concerns remain about whether financial incentives may unintentionally attract new hunters or egg collectors seeking to benefit from compensation schemes (Madrigal-Ballestero and Jurado, 2017; Zabel and Engel, 2010). There is also uncertainty regarding whether such programmes could incentivize individuals to continue or even increase turtle exploitation once payment schemes end (Ferreira, 2024).

Another important challenge relates to the economic design of these programmes. Payments must generally remain competitive with the market value of turtle products; otherwise, participants may continue selling eggs or turtle products illegally (Liles et al., 2015; Madrigal-Ballestero and Jurado, 2017; Ferraro and Gjertsen, 2009).

An additional challenge concerns the long-term financial sustainability of payment-based conservation programmes. By their nature, these approaches often require continued funding to maintain conservation incentives, particularly where payments replace income previously derived from turtle exploitation. However, securing reliable funding over the long term remains difficult. Financial support from governments, NGOs, donors, or conservation organizations may fluctuate due to changing political priorities, economic conditions, donor strategies, or electoral cycles. Even government-funded programmes cannot necessarily guarantee continuity over decades. If payments are reduced or discontinued without economically viable alternative livelihood options having become established, there is a risk that communities may return to harvesting turtles or eggs. Consequently, the long-term sustainability and funding strategy of payment schemes should be carefully considered from the outset, with a view to reducing dependence on external financial support wherever possible.

Furthermore, Ferreira (2024) describes failed payment schemes on Príncipe, where programmes did not adequately consider the socio-economic realities of local communities. Complex and poorly understood compensation rules for live turtle releases contributed to local conflicts and increased distrust towards conservation initiatives. Consequently, the success of performance-based payment programmes depends heavily on transparent programme design, fair compensation structures, and meaningful community involvement. This is particularly important given that turtle nesting and hatching seasons are often temporally limited, restricting opportunities for local income generation (Ferraro and Gjertsen, 2009).

Table 4: SWOT Analysis of Performance Payment Schemes as Alternative Livelihood Options

Strengths	**Weaknesses**
• Reducing illegal take and trade • Creates financial incentives for turtle conservation • Involves local communities in conservation activities • Payment systems can be designed based on community needs • Can contribute to scientific monitoring and data collection	• May not lead to long-term behavioural change • Payments may attract new people that have not previously engaged in gathering/hunting • Can incentivise people to gather/ hunt • Depends on available funding • Income opportunities are seasonal • Payments below black market prices may reduce participation
Opportunities	**Threats**
• Rise of Payments for Ecosystem Services (PES) • Integration of eco-tourism and environmental awareness raising • Possible replication in other turtle nesting regions • Opportunities for partnerships with NGOs, governments, local communities and researchers	• Prices have to be adequate for the local context • Hunting/gathering may continue after payment programmes have stopped or they are not adequate • Distrust could arise, should payment schemes be not perceived as fair • Overdependence on incentives may discourage voluntary conservation behaviour

Example: Performance Payment Scheme for Turtle Conservation in Nicaragua

Collecting and selling turtle eggs has been prohibited in Nicaragua since 2005. Nevertheless, egg harvesting continued to be widely practiced by local communities. One notable case concerns a nesting beach near Ostional, known primarily for nesting populations of Olive ridley sea turtles (*Lepidochelys olivacea*), with occasional nesting by Hawksbill turtles (*Eretmochelys imbricata*), Leatherback turtles (*Dermochelys coriacea*), and Green turtles (*Chelonia mydas)*.

Initially, conservation efforts relied heavily on patrols conducted by police and government authorities. However, these enforcement-based approaches increased tensions and conflicts with local communities. At the same time, not all nesting beaches could be effectively monitored, resulting in almost 100% egg harvesting on uncontrolled beaches.

In response, a performance-based payment programme was introduced in collaboration with local villagers and has been managed and funded by the NGO Paso Pacífico since 2008. Within the programme, community members are encouraged to bring collected turtle nests to the conservation project instead of selling them elsewhere. In return, participants receive compensation comparable to black market prices. The collected nests were subsequently relocated to protected beaches, where local women are employed and earn approximately 120 USD over the hatching period.

Initially, payment levels differed depending on turtle species and their conservation status. At the beginning of the programme, compensation was provided through gift cards redeemable for food and goods in local stores. However, over time, this system transitioned to direct cash payments with a fixed compensation rate of 3 USD per nest, regardless of species. Notably, this represented a deliberate reduction below prevailing black market prices, which ranged from approximately 2–5 USD per nest during nesting season and up to 10–18 USD outside the season. The reduced payment structure aimed to emphasise conservation motivations rather than purely financial incentives.

Overall, studies show that the programme contributed to improved turtle conservation outcomes despite various implementation challenges. However, it remains uncertain whether the initiative resulted in sustained long-term behavioural change among local communities.

(Madrigal-Ballestero and Jurado, 2017)

Example: Community-Based Conservation Agreement for Turtle Conservation in Colombia

In Bahía Hondita, located in Alta Guajira on Colombia's Caribbean coast, a conservation agreement was established in 2011 with an Indigenous Wayuu community. The area is ecologically important for marine turtles, serving as a migration route, feeding area and nursery habitat. The species recorded in the project include green turtles (*Chelonia mydas*), Hawksbill turtles (*Eretmochelys imbricata*), Loggerhead turtles (*Caretta caretta*), Olive ridley turtles (*Lepidochelys* sp.) and Leatherback turtles (*Dermochelys coriacea*).

The community involved in the agreement consisted of 89 families, corresponding to approximately 520 people. This community is highly dependent on natural resources, with productive activities mainly linked to fishing, including artisanal fishing, lobster fishing, hook and line, longline and gillnet fishing. At the same time, commercial capture and high consumption of marine turtles were described as cultural-tradition activities and as serious threats to marine turtles in the region.

Under the conservation agreement, community members committed not to hunt, kill, mistreat, consume, commercialise, receive or give away marine turtles or their derived products. They also committed to hand over turtles captured during fishing activities and to participate in community monitoring. 99% of compliance was indicated with the commitments established under the agreement.

The initiative combined conservation commitments with community benefits and livelihood-related activities. Over five years, the project reported 5,293 hours of beach patrols between 2012 and 2016, 175 rescued turtles, 3,521 hatchlings released and 31 nesting females detected. The project began with 18 custodians and later expanded to 53, including five coordinators. Since 2014, monitors have patrolled two kilometres of beach, recorded nesting females, marked individuals and supported hatchling protection and release.

The agreement also included socio-economic benefits. A total of US$127,223 in community benefits was delivered. Training in monitoring or alternative economic activities was provided to 70% of the community, while 53 local ecoguides were linked to a local tourism project, and 32 women benefited from the commercialisation of "mochilas" (traditional Wayuu woven bags) through the community enterprise Aa'Imajaa. The enterprise participated in Expoartesanías in 2015 and 2016, with sales increasing by 45.7% in the second year. Families also received fishing gear, household appliances, construction materials and other items to improve their homes.

(Conservación Internacional Colombia, Cerrejón Coal Ltda., Corpoguajira, & Fondo Acción, 2017)

3.5. Eco-tourism

Eco-tourism presents another potential approach for combining turtle conservation with income generation for local communities. It can contribute to conservation by generating financial resources, increasing environmental awareness, and supporting research and monitoring activities (Fischer et al., 2021; Chandrana et al., 2017). Within eco-tourism initiatives, local residents may benefit from employment opportunities such as guiding tourists, working in tourism infrastructure including hotels, restaurants, and shops, or providing transport and other tourism-related services. In addition, tourism can stimulate the local economy beyond the tourism sector itself. Increased demand from hotels and visitors may provide new markets for local fishers, farmers, and other producers supplying fresh products and services (Fischer et al., 2021). As a result, eco-tourism can create opportunities for both low- and highly skilled workers (Chandrana et al., 2017).

Several studies highlight positive conservation outcomes associated with turtle eco-tourism. In particular, eco-tourism can increase the non-consumptive use value of turtles while reducing their consumptive value, thereby making living turtles economically more valuable than harvested ones (Martins et al., 2025). Hunt and Vargas (2018) even argue that, if appropriately managed, eco-tourism may contribute to extending the time to extinction for marine turtle populations in some regions.

Furthermore, participation in eco-tourism activities may raise awareness of turtle and environmental conservation among both tourists and local communities (Martins et al., 2025). However, studies also demonstrate that despite local recognition of the negative impacts of hunting on turtle populations, unsustainable take may nevertheless continue due to persistent economic incentives or livelihood needs (Waylen et al., 2009).

At the same time, eco-tourism can also generate considerable environmental and social pressures (Chandrana et al., 2017). Expanding tourism infrastructure may negatively affect ecosystems and local communities through habitat disturbance, increased waste production, rising living costs, displacement, or other social challenges (Chandrana et al., 2017; Valverde Sanchez, 2018; de Vasconcellos Pegas and Stronza, 2010). These issues may become particularly severe when tourism benefits are distributed unequally due to existing power imbalances within communities or external stakeholders (Chandrana et al., 2017). Such vulnerabilities become particularly significant if tourism declines or abruptly stops due to external factors, also potentially encouraging communities to return to turtle take as a source of income (de Vasconcellos Pegas and Stronza, 2010).

Moreover, eco-tourism in turtle conservation is often highly seasonal, depending on nesting or hatching periods as well as climatic conditions. This seasonality may limit the economic viability of tourism-based livelihoods and place additional pressures on communities during off-seasons (Chandrana et al., 2017). Consequently, the long-term success of eco-tourism as an alternative livelihood strategy depends heavily on meaningful local participation, equitable benefit-sharing, and sustainable tourism management practices (Hunt and Vargas, 2018).

It is important to note, that the term eco-tourism is widely used and can take on different forms. Accordingly, not all approaches provide positive impacts, especially in light of neoliberal structures and related debates concerning conservation (Stronza et al., 2019).

Table 5: SWOT Analysis of Eco-Tourism as an Alternative Livelihood Option

Strengths	Weaknesses
• Offers opportunities for a variety of community members • Combines generating income with turtle conservation • Raises environmental awareness among tourists • Can support research and monitoring of marine turtles • Stimulates broader local economic activity • Non-consumptive use value often exceeds market value of turtles	• Tourism is often seasonal • Benefits may be distributed unequally within the community • Tourism infrastructure may negatively affect ecosystems • Requires significant infrastructure, management and investment • May not contribute to long-term behavioural change
Opportunities	**Threats**
• Increased demand of eco-tourism • Potential partnerships with NGOs, governments and conservation organizations • Long-term economic diversification	• External crisis can influence tourism demand (e.g. pandemics, political instability) • Living costs may rise for residents, may even lead to displacement • Unequal power relations may increase social conflict

Example: Nature Tourism as a Complementary Livelihood in Mayto, Mexico

Although marine turtle protection in Mexico began in the 1960s, turtle consumption and illegal trade have remained difficult to eradicate in some coastal communities. In Tehuamixtle, near the Campamento Tortuguero Mayto in Jalisco, marine turtles had historically been treated as an exploitable resource, used for their meat, eggs, skin and oil. This was partly linked to the role of turtle meat as an accessible food source for fishers, as well as limited local surveillance and enforcement capacity. In this context, nature tourism was promoted as a complementary activity to strengthen marine turtle conservation while supporting local community development.

The Campamento Tortuguero Mayto began operating in 2005 under the University of Guadalajara. Its work covers approximately 12 km of beach, where night patrols are carried out to detect and collect nests for protected incubation before hatchlings are released. Conservation work also extends offshore, where turtles caught in fishing nets or longlines, injured turtles, or individuals with limited mobility may be rescued and released. Several marine turtle species are present in the region, including Olive ridley, Leatherback, Hawksbill and Green turtles.

The main economic activity in Tehuamixtle is fishing, and fishers interact directly with turtles in marine areas used for nesting, reproduction and foraging. As visitor numbers to the turtle camp increased, fishing boats began to be used to transport tourists, students, volunteers, researchers and service-learning groups for offshore turtle observation. This activity had been carried out for approximately seven years, with 20–30 groups visiting annually, ranging from 10 to 45 participants. Between one and four boats were hired for tours, with an approximate payment of MXN 600 per boat, excluding guide fees. In this way, tourism provided an additional income opportunity while fishing remained part of the local livelihood system.

Reported outcomes included nest protection, protected incubation, hatchling release, offshore turtle observation, interpretive trails, environmental education workshops and participation by students, schools and teachers. Between 2005 and 2010, 4,137 nests were collected, 393,248 eggs were incubated and 283,761 hatchlings were released, with an average hatching percentage of 79%. Although illegal turtle capture and consumption were not fully eliminated, the initiative contributed to awareness-raising and created complementary income opportunities linked to turtle conservation and nature tourism.

(Orozco-Bravo et al., 2019)

Example: Community Empowerment and Livelihood Benefits in Papua, Indonesia

Large-scale egg harvesting between the 1970s and 1990s contributed, together with other pressures, to the decline of marine turtles at Jeen Yessa and Jeen Syuab, two nesting beaches within Jeen Womom Coastal Park. The park was established in 2017 to protect these beaches, where approximately 3,500 marine turtle nests are recorded annually. Leatherback turtles account for most nests, while Olive ridley, Green and Hawksbill turtles are also present.

Community empowerment was integrated into the conservation strategy because local communities living near and within the park face high levels of poverty. Within this framework, the State University of Papua (UNIPA), which leads marine turtle research and conservation in the region, deployed community workers who stay in four villages for most of the year and are directly responsible for implementing local activities. These include providing educational support through the House of Learning, where they assist local students with reading, writing, mathematics, basic English and computer skills. Livelihood training is also provided to help community members produce higher-value coconut oil from locally available coconuts, while other locally made products, such as *noken* - traditional knit bags, are supported through marketing assistance.

Between 2019 and 2021, more than 100 students attended the House of Learning each year, and at least 53% showed improvement in reading, writing and basic mathematics. Financial benefits were also generated through employment as local beach patrollers and through services such as relocating threatened nests, building hatcheries and transporting logistics by boat. On average, 97 community members received a total of USD 47,086 per year through UNIPA's nesting beach and community empowerment programmes, equivalent to an additional USD 1.33 per person per day. Overall, more than 200 community members benefited annually, representing approximately 24% of the population living near Jeen Yessa and Jeen Syuab beaches.

(Lontoh and Pakiding, n.d.)

4. Research gaps

In recent decades, research on turtle conservation and alternative livelihood approaches has expanded considerably. However, significant gaps in the literature remain. In particular, studies on incentive payments for sea turtle conservation have largely focused on egg and nest protection, while fewer documented examples address the capture of adult turtles or fisheries bycatch (Gjertsen and Niesten, 2010; Ferreira, 2024).

In addition, although some conservation projects have established long-term ecological monitoring programmes and assessed specific socio-economic outcomes, comprehensive evaluations of alternative livelihood interventions remain limited (Vieira et al., 2024; van de Geer et al., 2024). . Consequently, there is limited evidence on whether improvements in livelihoods lead to lasting changes in resource-use behaviour and measurable conservation benefits (Roe et al., 2015; Madrigal-Ballestero and Jurado, 2017). This limits our understanding of the long-term effectiveness of these interventions and the socio-economic and environmental factors that influence their outcomes.

Furthermore, project experiences, particularly unsuccessful interventions and unintended consequences, are often insufficiently documented or shared, limiting opportunities to learn from previous efforts (Ferreira, 2024; Roe et al., 2015). Greater attention to evaluating and reporting both conservation and livelihood outcomes, including social impacts and the conditions influencing project success or failure, would help strengthen the evidence base and inform future alternative livelihood initiatives (Vieira et al., 2024; Wright et al., 2016).

5. Recommendations for Implementing Alternative Livelihoods

I. **Conduct a baseline assessment** to understand the local culture and socio-economic context, community needs and existing livelihood strategies, and to determine suitable alternative livelihoods opportunities (Roe et al., 2015; Ferreira and dos Prazeres, 2024; Gjertsen and Niesten, 2010).

- Gather information on:
  - Demographics and social structure
  - Cultural values and traditions
  - Existing livelihoods and income sources
  - Resource use patterns
  - Local governance arrangements
  - Infrastructure and services
  - Previous development projects
  - Environmental and conservation issues

- The assessment should also consider who is involved in activities that threaten marine turtles, whether proposed alternatives are likely to replace or complement existing livelihoods, and how they are expected to contribute to conservation.

- Guidance Material:
  - Ethnographic research (e.g. Kirner and Mills, 2023)
  - Sustainable Livelihoods Framework (DFID, 1999)
  - *Specific for Eco-tourism approaches*: Framework for analysis of ecotourism (Stronza et al., 2019)

II. **Assess the feasibility and design of the proposed alternative livelihood strategy**. This needs to be done in close collaboration with the local community and according to their needs and aspirations. Throughout the process communities need to maintain the stewardship over their environment and should be able to actively participate in decision-making processes. The selection of an appropriate strategy should consider its economic viability, available resources, access to markets and community acceptance and potential environmental impacts.
During project planning:

a) **Develop a Theory of Change** explaining how the proposed intervention is expected to improve livelihoods and reduce threats to marine turtles. Identify the main assumptions that need to hold for those outcomes to occur.
b) **Define the expected outcomes and develop a monitoring and evaluation plan**, including baseline information, measurable indicators and regular assessments of progress.
c) **Develop a risk assessment** to identify possible negative social, economic and environmental consequences, including the risk that alternative livelihood activities create new environmental pressures.

- Guidance Material:
  - Toolkit – Theory of Change
  - The Center for Theory of Change
  - Sustainable Livelihoods Framework (DFID, 1999)
  - IUCN Environmental and Social Management System
  - IFC's Performance Standards on Environmental and Social Sustainability

III. **Monitor and evaluate the project. Additionally, document and** (*ideally*) **publish the experience and outcomes**

Monitoring should assess progress towards the project's objectives, considering both socio-economic and conservation results. Depending on the intervention, relevant indicators may include:

a) **Livelihood outcomes:** income, food security, access to markets, community acceptance and continuity of alternative livelihood activities.
b) **Behavioural outcomes:** changes in turtle harvesting, egg collection or other environmentally harmful resource-use practices.
c) **Conservation outcomes:** changes in threats to marine turtles, nest protection or other relevant ecological indicators.
d) **Long-term sustainability:** continuation of livelihood benefits, availability of funding and the project's ability to operate over time.

Guidance Material:

- Conservation Standards – Conservation Measures Partnership
- Evaluating the impacts of conservation interventions on human wellbeing: Guidance for practitioners

References

Ahles, N. and Milton, S.L., 2015. Mid-incubation relocation and embryonic survival in loggerhead sea turtle eggs. In: *The Journal of Wildlife Management,* 80(3), pp. 430 – 437.

Bennett, N. J., & Dearden, P. 2014. From measuring outcomes to providing inputs: Governance, management, and local development for more effective marine protected areas. *Marine Policy*, *50*, 96-110.

Benzaghta, M.A., Elwalda, A., and Mousa, M.M., 2021. SWOT analysis applications: An integrative literature review. In: *Journal of Global Business Insights,* 6(1), pp. 55-73.

Chandrana, R., Manoharakrishnan, M., and Shanker, K., 2017. *Long-term Monitoring and Community-based Conservation of olive Ridley Turtles in Odisha.* CMPA Technical Series No. 7. Indo-German Biodiversity Programme, GIZ-India, New Delhi.

Conservation International Colombia, Cerrejón Coal Ltda., Corpoguajira, and Fondo Acción. (2017). Reporte de impacto 2017: Acuerdo de conservación tortugas marinas. Conservation International Colombia.

de Vasconcellos Pegas, F., and Stronza, A., 2010. Ecotourism and Sea Turtle Harvesting in a Fishing Village of Bahia, Brazil. In: *Conservation and Society,* 8(1), pp. 15-25.

DFID, 1999. Sustainable Livelihoods Guidance Sheets. Department for International Development (DFID). London.

Donaldson, J., Moscuzza, A., and Bierbaum, R. 2024. Alternative Livelihoods: A STAP Background Note. Scientific and Technical Advisory Panel to the Global Environment Facility. Washington, DC. https://www.stapgef.org/index.php/resources/background-note/alternative-livelihoods

Ferraro, P.J., and Gjertsen, H., 2009. A Global Review of Incentive Payments for Sea Turtle Conservation. In: *Chelonian Conservation and Biology,* 8(1), pp. 48-56.

Ferreira, R. L., 2015. Sea turtle artisans of São Tomé and Príncipe. African Sea Turtle Newsletter, 3(3), 25-33.

Ferreira, R. L., 2024. Paying for sea turtles as incentive for conservation in São Tomé and Príncipe. In: *Aquatic Conservation: Marine and Freshwater Ecosystems,* 34(4), e4151

Ferreira, R.L., and dos Prazeres, I.A., 2024. Sea turtle conservation in São Tomé and Príncipe: Policies, practices, and insights from a community-based initiative. In: *Conservation Science and practice,* 6, e13150.

Fischer, C., Trono, R. B., and Salinas, R.A.F., 2021. Addressing gaps in socio-economic and natural assets to halt marine turtle egg poaching: a livelihood feasibility study in the Turtle Islands Wildlife Sanctuary, Philippines. In: *Global Ecology and Conservation,* 32, e01913.

Fletcher, R., Buchholz, G., de Lange, E., Felandro, I., Hotz, H., Kelman, A., Khanyari, M., Mcloughlin, L., Mumbunan, S., Neumärker, B., Saif, O., Simonneau, M., Stinson, J., Sze, J., and West, B., 2025: *Towards Transformative Justice in Conservation Finance: The Case for Basic Income For Nature And Climate (BINC).* Available at: https://www.fribis.uni-freiburg.de/wp-content/uploads/2025/06/BINC-policy-brief_web.pdf [last access: 26.05.2026].

FRIBIS, n.d. *Basic Income for Nature & Climate.* Available at: https://www.fribis.uni-freiburg.de/en/project/binc/ [last access: 21.05.2026].

Gjertsen, H., and Niesten, E., 2010. Incentive-based Approaches in Marine Conservation: Applications for Sea Turtles. In: *Conservation and Society,* 8(1), pp. 5-14.

Gomez, L., and Krishnasamy, K., 2019. *A Rapid Assessment on the Trade in Marine Turtles in Indonesia, Malaysia and Viet Nam.* TRAFFIC, Petaling Jaya, Malaysia.

Hemelikova, A., Chajma, P., Ferasyi, T.R., Awaluddin, Fadli, N., Sari, W., Madden, C., Riskas, K., and Vojar, J., 2025. Exploring sociodemographic and cultural characteristics of sea turtle take and use to support effective conservation strategies in Indonesia. In: *People and Nature,* pp. 1-14.

Hunt, C.A., and Vargas, E., 2018. Turtles, Ticos, and Tourists: Protected Areas and Marine Turtle Conservation in Costa Rica. In: *Journal of Park and Recreation Administration,* 36, pp. 101-114.

Ilesanmi, J.O., Bello, T.O., Oladoyin, O.P., and Akinbola, A.E., 2024. Evaluating the Effect of Microcredit on Rural Livelihoods: A Case Study of Farming Households in Southwest Nigeria. In: *International Journal of Economic, Finance and Business Statistics,* 2(5), pp. 289-302.

Kaaya, E., and Chapman, M., 2017. Micro-Credit and Community Wildlife Management: Complementary Strategies to Improve Conservation Outcomes in Serengeti National Park, Tanzania. In: *Environmental Management,* 60, pp. 464-475.

Karmakar, K.G., Mehta, G.S., Ghosh, S.K., and Selvaraj, P., 2009. *Review of the development of microfinance services for coastal small scale fisheries and aquaculture for South Asia*

countries (including India, Bangladesh & Sri Lanka) with special attention to women. Mumbai, India.

Kirner, K., and Mills, J., 2023. *Introduction to Ethnographic Research: A Guide for Anthropology.* SAGE Publications, Thousand Oaks.

Liles, M.J., Peterson, T.R., Seminoff, J.A., Gaos, A.R., Altamirano, E., Henríquez, A.V., Gadea, V., Chavarría, S., Urteaga, J., Wallace, B. P., and Peterson, M.J., 2019. Potential limitations of behavioral plasticity and the role of egg relocation in climate change mitigation for a thermally sensitive endangered species. In: *Ecology and Evolution,* 9(4), pp. 1603 – 1622.

Lontoh, D., & Pakiding, F. (n.d.). *Benefits of a marine turtle conservation project to local communities in an impoverished region in Papua, Indonesia*. IOSEA Marine Turtles.

Madrigal-Ballestero, R., and Jurado, D., 2017. Economic Incentives, Perceptions and Compliance with Marine Turtle Egg Harvesting Regulation in Nicaragua. In: *Conservation & Society,* 15(1), pp. 74-86.

Marcovaldi, M.A., Patiri, V., and Thomé, J.C., 2005. Twenty-five Years Protecting Brazilian Sea Turtles Through a Community-Based Conservation Programme. In: *MAST*, 392), pp. 39-62.

Martins, S., Ferreira-Veiga, N., Rodrigues, Z., Querido, A., de Santos Loureiro, N., Freire, K., Abella, E., Oujo, C., and Marco, A., 2021. Hatchery efficiency as a conservation tool in threatened sea turtle rookeries with high embryonic mortality. In: *Ocean and Coastal Management,* 212.

Martins, S., Marco, A., and Clarke, L.J., 2025. Conservation and ecotourism increase natural capital asset value: an economic assessment of sea turtles on Boa Vista Island, Cabo Verde. In: *Ocean and Coastal Management,* 268.

Mrosovsky, N., 2006. Distorting Gene Pools by Conservation: Assessing the case of Doomed Turtle Eggs. In: *Environmental Management,* 38, pp. 523-531.

Orozco-Bravo, M., Contreras Cueva, A. B., Orozco-Alvarado, J., & Orozco-Zepeda, Q. (2019). Tourism of nature and sustainable development and in the Campamento Tortuguero “Mayto “; as complementary activities to the protection of marine turtle. *InterSedes*, *20*(41), 51-75.

Panda, N., Mohanty, U.L., Rath, D.P., De, H.K., and Mahapatra, A.S., 2014. Socio-economic impact of fishing ban for conservation of Olive Ridley Turtles in Coastal Odisha. In: *Fishing Chimes,* 34(1), pp. 50-52.

Pegas, F., Coghlan, A., and Rocha, V., 2011. An exploration of a mini-guide programme: Training local children in sea turtle conservation and ecotourism in Brazil. In: *Journal of Ecotourism,* pp. 1-8.

Rajabu, K., Kashaigili, J., and Masolwa, P., 2009. Freshwater conservation and climate change adaptation – a case study of the Great Ruaha River Catchment in Tanzania. In: *IOP Conf. Series: Earth and Environmental Science,* 6.

Roe, D., booker, F., Day, M., Zhou, W., Allebone-Webb, S., Hill, N.A.O., Kumpel, N., Petrokofsky, G., Redford, K., Russell, D., Shepherd, G., Wright, J., and Sunderland, T.C.H., 2015. Are alternative livelihood projects effective at reducing local threats to specified elements of biodiversity and/or improving or maintaining the conservation status of those elements? In: *Environmental Evidence*, 4(22).

Sardeshpande, M., and MacMillan, D., 2019. Sea turtles support sustainable livelihoods at Ostional, Costa Rica. In: *Oryx,* 53(1), pp. 81-91.

Stronza, A.L., Hunt, C.A., and Fitzgerald, L.A., 2019. Ecotourism for Conservation? In: *Annual Review of Environment and Resources,* 44, pp. 229-253.

Sudan, F.K., 2007. Livelihood Diversification and Women Empowerment Through Self-Help Micro Credit Programme: Evidence from Jammu and Kashmir. In: *Indus Journal of Management & Social Sciences,* 1(2), pp. 90-106.

Thilepan, M., and Thiruchelvam, S., 2011. Microfinance and Livelihood Development in Poor Coastal Communities in Eastern Sri Lanka. In: *Tropical Agricultural Research,* 22(3), pp. 330-336.

Valverde Sanchez, R., 2018. Conservation Strategies, Protected Areas, and Ecotourism in Costa Rica. In: *Journal of Park and recreation Administration,* 36, pp. 115-128.

Van De Geer, C. H., Broderick, A. C., Carter, M. I., Irei, A. A., Kiponda, F. K., Kiptum, J., ... & Godley, B. J. 2024. Two decades of community-based conservation yield valuable insights into marine turtle nesting ecology. *Oryx*, *58*(3), 310-322.

Vieira, S., Jiménez, V., Ferreira-Airaud, B., Pina, A., Soares, V., Tiwari, M., Teodósio, M.A., Castilho, R., and Nuno, A., 2024. Perceived social benefits and drawbacks of sea turtle conservation efforts in globally important sea turtle rookery. In: *Biodiversity and Conservation,* 33, pp. 1185 – 1205.

Waylen, K.A., McGowan, P.J.K., Pawi Study Group and Milner-Gulland, E.J., 2009. Ecotourism positively affects awareness and attitudes but not conservation behaviours: a case study at Grande Riviere, Trinidad. In: *Oryx,* 43(3), pp. 343-351.

Wright, J.H., Hill, N.A.O., Roe, D., Rowcliffe, M., Kümpel, N.F., Day, M., Booker, F., and Milner-Gulland, E.J., 2015. Reframing the concept of alternative livelihoods. In: *Conservation Biology,* 30(1), pp. 7-13.

Zabel, A., and Engel, S., 2010. Performance payments: A new strategy to conserve large carnivores in the tropics? In: *Proceedings of the German Development Economics Conference,* No. 19.