# A Conceptual Framework for Profiling Stream Anglers in Malaysia

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## ABSTRACT

Recreational fishing is a rapidly growing leisure and economic activity in Malaysia. While previous research has profiled coastal, pond, and general recreational anglers, stream fishing anglers—a group interacting directly with fragile freshwater ecosystems remain significantly understudied. This conceptual paper addresses this gap by proposing a multidimensional framework for profiling stream anglers in Malaysia. Synthesising insights from established theories such as the Theory of Planned Behaviour and the Social Exchange Theory, the framework integrates four key dimensions: (1) socio-demographic profile, (2) motivational drivers, (3) economic engagement, and (4) conservation orientation. The paper advances testable propositions concerning the interrelationships between these dimensions and highlights critical implications for sustainable fisheries management. By providing a theoretically-grounded foundation, this framework is poised to guide future empirical studies and evidence-based policymaking that balances angler recreation with urgent conservation goals in Malaysia's vital stream ecosystems.

**Keywords:** Stream fishing, Angler Profiling, Conceptual Framework, Sustainable Recreation, Malaysia

## INTRODUCTION

Recreational fishing is a globally recognised leisure activity that contributes not only to individual well-being but also to local economies, tourism development, and conservation initiatives. Anglers worldwide engage in fishing for diverse reasons, including relaxation, food provision, sport, and social interaction, with many studies highlighting its cultural and ecological relevance (Arlinghaus et al., 2019). Beyond being a pastime, recreational fishing has increasingly been acknowledged as a form of socio-economic activity, shaping rural livelihoods, influencing tourism strategies, and impacting aquatic ecosystems.

In Malaysia, recreational fishing has gained traction as a significant socio-cultural and economic activity. Fishing tournaments, pay-to-fish ponds, and coastal angling spots attract thousands of participants annually, demonstrating its wide appeal across different social groups (Zaki, 2024). However, while research has examined aspects of recreational fishing in coastal and artificial pond settings, limited attention has been given to stream fishing, despite its ecological and social importance. Streams and rivers are vital freshwater ecosystems, often supporting both biodiversity and local communities. Anglers who frequent these areas represent a unique group whose activities may have distinct motivations, socio-demographic profiles, and conservation implications.

Existing literature in Malaysia provides some insights into recreational anglers, showing patterns such as male dominance, middle-aged participation, and motivations centred on leisure, relaxation, and social bonding (Nagaraj, 2021; Zaki, 2024). Studies have also highlighted the economic value of fishing-related activities and the potential role of anglers in conservation through practices such as catch-and-release (Shaefe, 2020). Nonetheless, these studies tend to be fragmented, often site-specific, and largely overlook the segment of stream anglers. The lack of systematic profiling of this group limits our understanding of their roles, behaviours, and impacts on freshwater ecosystems.

The absence of such knowledge presents significant challenges for policymakers and conservation managers. Without a clear understanding of who stream anglers are, what motivates them, and how they engage with both local economies and conservation, it becomes difficult to formulate effective management strategies. Furthermore, given that streams and rivers are ecologically fragile compared to marine environments, neglecting the study of stream anglers could undermine broader sustainability and conservation efforts.

Moreover, the existing fragmented studies on anglers in Malaysia often lack a strong theoretical foundation, making it difficult to generalise findings or understand the underlying mechanisms driving angler behaviour. A theoretically-informed conceptual framework is therefore necessary not only to consolidate existing knowledge but also to provide a lens for hypothesising how different profiling dimensions such as socio-demographic, motivational, economic, and conservation are interconnected and influence each other.

In response to this gap, this conceptual paper aims to develop a framework for profiling stream fishing anglers in Malaysia. By integrating socio-demographic characteristics, motivational drivers, economic engagement, and conservation orientation, the paper proposes a holistic approach to understanding this group. The framework is intended to guide future empirical studies and inform evidence-based policymaking, ultimately supporting sustainable recreational fishing practices and freshwater ecosystem management in Malaysia.

**Problem Statement**

Recreational fishing has emerged as an increasingly popular leisure and tourism activity in Malaysia, with anglers contributing to economic growth, community identity, and environmental awareness (Zaki, 2024). Beyond leisure, angling plays a significant role in local economies through spending on equipment, travel, and related services, while also intersecting with conservation concerns in sensitive aquatic ecosystems (Shaari, 2024). Despite this importance, research in Malaysia has largely centred on coastal and pay-pond fisheries, leaving stream fishing anglers—who frequently interact with freshwater rivers and streams—relatively understudied.

Available studies provide partial insights into Malaysian recreational anglers, showing that participants are predominantly male, working-age adults, and motivated by leisure, relaxation, socialisation, and, in some cases, food provision (Nagaraj, 2021; Zaki, 2024). Other research highlights the economic contributions of anglers and their conservation practices, such as catch-and-release, though these behaviours vary widely (Shaefe, 2020). However, the current literature is fragmented, often site-specific, and rarely distinguishes between stream anglers and other angler types. This lack of stream-focused data makes it difficult to understand the characteristics and behaviours of this unique group.

The absence of a systematic profile of stream anglers poses challenges for policymakers, managers, and conservation practitioners. Without reliable knowledge of who these anglers are, what motivates them, how much they spend, and their orientation toward conservation, it is difficult to design effective regulations, licensing frameworks, or educational interventions. Moreover, ignoring the distinctiveness of stream anglers risks overlooking the ecological pressures on freshwater systems, many of which are more fragile than marine environments (Adams et al., 2024).

Given these gaps, there is a pressing need for a conceptual framework that integrates socio-demographic, motivational, economic, and conservation dimensions in profiling stream fishing anglers in Malaysia. Such a framework would not only provide a theoretical basis for future empirical studies but also support evidence-based policymaking. By addressing this gap, Malaysia can better balance recreational fishing as a social and economic activity with the need to conserve freshwater ecosystems for long-term sustainability.

Despite this importance, research in Malaysia has largely centred on coastal and pay-pond fisheries, leaving stream fishing anglers relatively understudied. Available studies are fragmented and often descriptive, lacking a unifying theoretical framework to explain the relationships between anglers' characteristics, motivations, spending, and conservation behaviours. This lack of a consolidated profile, grounded in theory, impedes the development of effective regulations, licensing frameworks, and targeted conservation outreach. Consequently, managing the ecological impact of stream fishing and leveraging its socio-economic benefits remain challenging.

This paper argues that a conceptual framework, synthesising key profiling dimensions and their theoretical linkages, is a critical prerequisite for advancing research and policy concerning stream anglers in Malaysia.

**Research Objectives**

The objectives of this study are to:

1. To propose key dimensions namely, socio-demographic profile, motivational drivers, economic engagement, and conservation orientation for profiling stream fishing anglers in Malaysia.
2. To develop a conceptual framework that illustrates the interrelationships between these dimensions, underpinned by relevant behavioural theories.
3. To highlight the theoretical, practical, and policy implications of the proposed framework for sustainable stream fisheries management in Malaysia.

**Significance of the Study**

This study offers significant contributions by moving beyond the current fragmented understanding of stream anglers in Malaysia.

1. Theoretically, it introduces a novel, theory-grounded framework (integrating TPB and SET) that provides a holistic lens for analysing the interconnectedness of angler characteristics and behaviours, offering a robust foundation for future empirical studies.
2. Practically, the framework equips fishery managers and tourism planners with a structured checklist of critical factors to consider when developing licensing systems, conservation campaigns, and community-based tourism products tailored specifically to the stream angler segment.
3. Policy-wise, by positioning stream anglers as potential partners in conservation, the framework informs the creation of evidence-based policies that can effectively balance the socio-economic benefits of recreational fishing with the imperative of preserving Malaysia's threatened freshwater biodiversity.

**Significance of the Study**

This study is significant because it addresses a critical knowledge gap in the profiling of stream fishing anglers in Malaysia. While recreational fishing has been examined in various contexts such as coastal fisheries and pay-to-fish ponds, stream anglers remain underrepresented in the literature despite their interactions with fragile freshwater ecosystems. By developing a conceptual framework that integrates socio-demographic, motivational, economic, and conservation dimensions, this paper lays the foundation for a more systematic understanding of this group of anglers.

From a theoretical perspective, this study contributes to the growing body of literature on recreational fishing by extending discussions to freshwater stream environments in Malaysia. The proposed framework offers a holistic lens through which future researchers can examine the multifaceted nature of angler behaviour, moving beyond fragmented or site-specific studies. This conceptualisation is expected to enrich the discourse on recreational fishing, leisure studies, and environmental behaviour by providing a structured model for empirical investigation.

Practically, the findings of this paper hold importance for policymakers, conservation managers, and local communities. Understanding the socio-demographic profile of stream anglers can help in designing targeted policies, licensing schemes, and community-based education programs that are both inclusive and effective. Similarly, insights into their economic engagement highlight the potential of stream fishing to support rural development, small businesses, and tourism. By exploring conservation orientations, the framework also provides pathways for fostering sustainable fishing practices that align with Malaysia’s broader environmental policies.

Finally, this study carries policy relevance by informing national and state-level strategies for freshwater ecosystem management. As Malaysia strives to balance socio-economic development with environmental conservation, the integration of angler profiles into decision-making processes becomes increasingly essential. By bridging theory and practice, this paper positions stream anglers not just as resource users but as potential

stakeholders in achieving sustainable fisheries management.

# LITERATURE REVIEW

### Sociodemographic Profile of Anglers

The sociodemographic profile of anglers provides critical insights into who participates in recreational fishing and how their characteristics shape fishing behaviour. Studies in Malaysia and other regions suggest that anglers are predominantly male, middle-aged, and employed, with varying levels of education and income (Zaki, 2024; Beardmore et al., 2015). Such attributes often determine not only participation rates but also fishing intensity, site selection, and expenditure patterns. In the Malaysian context, research on coastal and pay-pond anglers has highlighted similar demographic patterns, but there is a lack of systematic profiling of stream anglers. Given that stream fishing typically requires greater mobility, skill, and familiarity with natural environments, understanding the demographic attributes of this group is essential for both policy design and conservation management.

### Motivational Drivers of Stream Anglers

Motivations are a central component of recreational fishing research, as they explain why individuals choose to engage in this activity. Across global literature, motivations include relaxation, escape from routine, social bonding, skill development, and the challenge of catching fish (Arlinghaus et al., 2019). In Malaysia, studies indicate that leisure and family bonding are among the most prominent drivers (Nagaraj, 2021). For stream anglers, however, motivations may extend beyond leisure, incorporating cultural traditions, environmental appreciation, and personal fulfilment. Without systematic studies, the motivational landscape of stream anglers remains poorly understood, limiting the ability to align recreational opportunities with participant needs while safeguarding environmental sustainability.

### Economic Engagement of Anglers

Recreational fishing also contributes significantly to local and national economies. Expenditures on equipment, travel, permits, and ancillary services generate substantial income for small businesses, tourism providers, and rural communities (Steinbeck., 1999). In Malaysia, Zaki (2024) highlighted the economic contributions of recreational fishing, particularly through angling events and related tourism. However, these studies rarely distinguish between different angler groups. Stream anglers, who often travel to rural or less-developed regions, may generate unique patterns of spending that have not been captured in prior research. Profiling their economic contributions is thus vital for informing rural development strategies and positioning stream fishing as a sustainable tourism product.

### Conservation Orientation of Anglers

Finally, anglers' attitudes toward conservation are critical for understanding their role in sustainable fisheries management. Conservation orientation encompasses awareness of ecological issues, support for sustainable practices, and behaviours such as catch-and-release (Arlinghaus et al., 2007). While some Malaysian studies suggest that anglers engage in conservation-oriented practices, such behaviours are inconsistent and often dependent on situational or cultural contexts (Shaefe, 2020). Stream anglers, by virtue of interacting with freshwater ecosystems, may play an especially important role in maintaining ecological balance. Yet, their conservation attitudes remain underexplored in academic research. Incorporating this dimension into a conceptual framework enables a more comprehensive view of how anglers can serve as partners in conservation rather than solely as resource users.

### Theoretical Underpinning for The Conceptual Framework

### Theoretical Underpinning

A robust profiling framework requires a theoretical foundation to explain the proposed relationships between dimensions. This paper draws upon two established theories to ground the conceptual framework: the Theory of

Planned Behaviour (TPB) and the Social Exchange Theory (SET).

The Theory of Planned Behaviour (Ajzen, 1991) posits that an individual's behaviour is determined by their intention, which is influenced by their attitudes, subjective norms, and perceived behavioural control. In the context of stream anglers:

1. Attitudes towards fishing (e.g., is it for relaxation, sport, or food) align with the motivational drivers dimension.

2. Subjective Norms (e.g., social pressure from fellow anglers or community) can be influenced by socio-demographic factors and cultural background.

3. Perceived Behavioural Control (e.g., access to equipment, skills, fishing sites) is directly linked to socio-demographic (income, experience) and economic engagement (equipment investment).

4. Ultimately, these factors shape the intention to perform specific behaviours, including conservation-oriented practices like catch-and-release.

Complementarily, Social Exchange Theory (Homans, 1958) suggests that human behaviour is a result of an exchange process aimed at maximising benefits and minimising costs. Anglers' continued participation can be viewed as an exchange where:

1. The benefits (e.g., relaxation, social bonding, catch) are captured in the motivational drivers.

2. The costs (e.g., financial expenditure, time, effort) are reflected in the economic engagement and socio-demographic constraints.

3. The perception of fair exchange, including the quality of the fishing experience and the health of the ecosystem, influences their conservation orientation and support for management rules.

By integrating TPB and SET, the proposed framework moves beyond a descriptive profile to one that can hypothesise how and why different factors interact to shape stream angler behaviour.

**Conceptual Framework**

The conceptual framework for this study, illustrated in Figure 1, is built upon four key dimensions identified in the literature and grounded in the Theory of Planned Behaviour and Social Exchange Theory. These dimensions are: sociodemographic profile, motivational drivers, economic engagement, and conservation orientation.

The sociodemographic profile (e.g., age, income, experience) forms the foundational background, influencing an angler's perceived behavioural control (TPB) and the resources available for the exchange (SET). This profile shapes motivational drivers (attitudes in TPB, benefits in SET) and enables economic engagement (costs in SET).

The motivational drivers and economic engagement are not isolated; they interact dynamically. Motivations drive expenditure, while financial investment can enable the fulfilment of deeper motivations (e.g., skill mastery). Collectively, these dimensions influence the angler's conservation orientation—their attitudes, subjective norms, and intentions (TPB) regarding sustainable practices. A positive exchange (SET), where benefits outweigh costs, including the intangible cost of ecosystem degradation, is likely to foster a stronger conservation orientation.

This framework proposes that these dimensions are interrelated, forming a complex system that determines angler behaviour. It provides a testable model for future research to investigate, for instance, how higher economic engagement coupled with nature-appreciation motivations might predict stronger support for catch-and-release regulations.

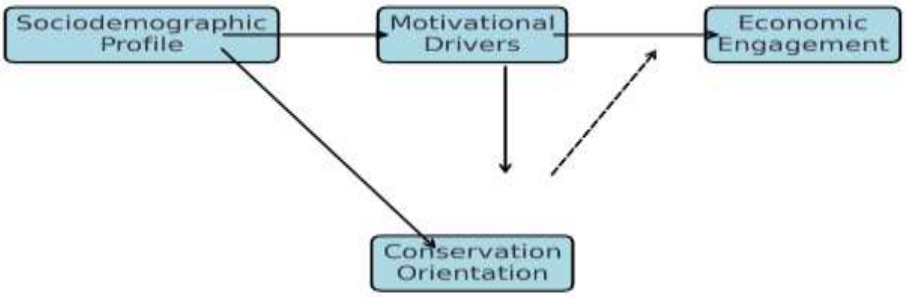


Fig. 1 A Multidimensional Conceptual Framework for Profiling Stream Fishing Anglers in Malaysia (Grounded in Theory of Planned Behaviour and Social Exchange Theory)

## METHODOLOGY

Given the conceptual nature of this paper and the identified gap in profiling data, this section proposes a methodology for the constructive and empirical validation of the framework. A mixed method approach of combining qualitative via interview and quantitative cross-sectional survey design is recommended for future research to operationalise and test the proposed framework. The target population would be stream anglers across various river systems in Malaysia. A mixed-mode sampling strategy, combining on-site intercepts at popular fishing spots i.e.: streams and fishing ponds and online surveys through angler forums and social media groups, can be employed to reach this often hard-to-reach population. The survey instrument would be developed to measure all four dimensions of the framework:

1. Socio-demographics: Standard metrics (age, gender, income, education, fishing experience).

2. Motivational Drivers: Adapting scales from recreational literature (e.g., importance of relaxation, challenge, nature appreciation).

3. Economic Engagement: Capturing data on expenditure (gear, travel, licenses) and frequency of trips.

4. Conservation Orientation: Measuring attitudes towards regulations, self-reported catch-and-release behaviour, and awareness of ecological issues.

5. Data analysis would involve both descriptive profiling (addressing Objective 1) and advanced multivariate techniques, such as Structural Equation Modelling (SEM), to test the hypothetical relationships between the dimensions as proposed in the conceptual framework.

## DISCUSSION AND IMPLICATIONS

The conceptual framework developed in this paper offers a comprehensive lens for understanding the profiles of stream fishing anglers in Malaysia. By integrating four interrelated dimensions—sociodemographic profile, motivational drivers, economic engagement, and conservation orientation—the framework moves beyond fragmented studies and provides a structured model for future research. This multidimensional approach reflects the complexity of recreational fishing, where individual characteristics, personal motivations, financial contributions, and ecological behaviours intersect.

From a theoretical perspective, this framework advances the body of literature on recreational fishing and leisure studies by situating stream anglers within a holistic conceptual model. Existing studies have often examined anglers through isolated lenses, such as motivation or economic impact (Arlinghaus et al., 2019; Abdullah et al., 2018). The present framework synthesises these strands, creating a more integrative foundation for future empirical work. It also extends scholarship in environmental behaviour and human–nature interaction by highlighting how socio-demographic and motivational factors can influence conservation orientation.

The practical implications of this framework are equally significant. For managers and policymakers, profiling stream anglers can provide essential data for designing licensing systems, monitoring fishing pressure, and developing targeted conservation programs. Understanding anglers' motivations allows stakeholders to design recreational opportunities that meet user expectations while minimising ecological harm. Similarly, insights into economic engagement can help local communities and tourism operators tap into the potential of stream fishing as a sustainable rural development activity.

In terms of policy relevance, the framework highlights the need to integrate recreational fishing into broader freshwater conservation and management strategies. Malaysia's rivers and streams are ecologically fragile, and unregulated recreational fishing may exacerbate pressures on biodiversity. By incorporating angler profiling into policy, authorities can design evidence-based interventions, such as conservation education campaigns, community engagement programs, and catch-and-release regulations. This positions anglers not merely as resource users but as potential partners in conservation.

Overall, the conceptual framework serves as a bridge between theory and practice, offering insights for scholars, practitioners, and policymakers. For researchers, it provides a roadmap for empirical studies on stream anglers. For practitioners and policymakers, it offers a foundation for designing sustainable management interventions that balance recreational, economic, and ecological needs. In doing so, the framework underscores the role of stream anglers in supporting both community livelihoods and freshwater ecosystem sustainability in Malaysia.

## CONCLUSION

This conceptual paper set out to address the gap in understanding stream fishing anglers in Malaysia by developing a framework that integrates sociodemographic profile, motivational drivers, economic engagement, and conservation orientation. While recreational fishing is a growing leisure and economic activity in Malaysia, studies have remained fragmented and concentrated on coastal or pay-pond fisheries. Stream anglers, who interact directly with fragile freshwater ecosystems, have received limited academic attention, creating challenges for effective policy and management.

The proposed framework provides a holistic lens for profiling stream anglers, demonstrating how sociodemographic attributes shape motivations and economic activities, which in turn influence conservation orientations. By synthesising insights from the literature, the framework contributes to the theoretical discourse on recreational fishing and human–environment interactions while also offering practical pathways for sustainable fisheries management.

The study carries significant implications. For researchers, it offers a structured model that can be empirically tested and refined in future studies. For policymakers and managers, it highlights the importance of incorporating angler profiling into freshwater ecosystem governance, ensuring that interventions are targeted and effective. For communities and practitioners, it underscores the potential of stream fishing as a sustainable tourism and livelihood activity, provided it is managed responsibly.

Future research should empirically validate this framework through surveys, interviews, and case studies of stream anglers across Malaysia. Comparative studies between stream anglers and other angler groups may also deepen understanding of recreational fishing diversity in the country. By grounding recreational fishing management in evidence, Malaysia can achieve a balance between ecological conservation and socio-economic development.

In conclusion, this paper provides both a theoretical foundation and a practical guide for profiling stream fishing

anglers in Malaysia. By positioning anglers as key stakeholders, the framework highlights their potential role not only as participants in recreation but also as contributors to sustainable freshwater conservation.

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