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Involving the Local Community in Sport Tourism Development: Physical, Mental, and Cognitive Benefits as a Foundation for Sustainable Development

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Abstract

This article examines the importance of involving the local community in the development of sport tourism, with a focus on the multidimensional benefits of sport and physical education. The study investigates how sport activity contributes to the physical, mental, social, and cognitive well-being of local community residents, and how these benefits can serve as a foundation for sustainable sport tourism development. Through a comprehensive literature review, the article presents the close relationship between physical education, public health, and community development. It demonstrates that investment in sport infrastructure and physical education programs serves as a dual lever: both improving residents' quality of life and attracting sports tourists. The article is based on a doctoral study examining the development of a sport tourism village in Ein Qiniyya, located in the Israeli Golan Heights.

Keywords: sport tourism; community involvement; physical education; mental well-being; cognitive abilities; sustainable development; Golan Heights.

1. Introduction

Sport tourism is one of the fastest-growing segments of the tourism industry worldwide, with a growth rate of approximately 15% per year, three times the growth rate of the general tourism industry (Donner, 2011). This trend reflects a fundamental shift in tourist preferences, transitioning from mass tourism focused on relaxation and entertainment to experiential tourism that includes physical activity, personal challenge, and connection with nature (Nordin, 2005; Radicchi, 2013).

However, successful and sustainable sport tourism development cannot exist in a vacuum. It requires the active involvement of the local community in planning, implementing, and enjoying the fruits of development (González-García et al., 2018). This community involvement serves a dual purpose: on one hand, it ensures that tourism development serves the needs of residents and contributes to their quality of life; on the other hand, a healthy, active, and sport-involved local community constitutes in itself a significant tourism asset, as it creates an authentic and inviting atmosphere for tourists.

This article is based on a chapter from a doctoral study examining the development of a sport tourism village in Ein Qiniyya, a Druze village situated at the foot of Mount Hermon in the

Israeli Golan Heights. The study examines the potential of Ein Qiniyya to become an international sport tourism destination while involving the local community in the development process. In this article, we review the multidimensional benefits of sport and physical education and demonstrate how these benefits constitute an essential foundation for sustainable sport tourism development.

2. Sport benefits: A multidimensional perspective

The research literature indicates that sport and physical activity offer a wide range of benefits across the physical, mental, social, and cognitive dimensions of human life (Opstoel et al., 2020). These benefits are not limited to a specific age group or fitness level, but are relevant to the entire population, from children to adults.

In the context of sports tourism, understanding these benefits is essential for two main reasons. First, it provides the theoretical basis for justifying public investment in sport infrastructure and physical education programs, which are necessary preconditions for the development of sport tourism. Second, it enables policymakers to understand how involving the local community in sports activities can serve as a lever to both improve residents' quality of life and strengthen the tourism product.

As Hautbois and Desbordes (2008) note, sport has become, in recent years, a phenomenon of great scale and influence. It constitutes an important resource for the development of local contexts and national economies. Simultaneously, Trudeau and Shephard (2010) and Anderson-Butcher (2014) emphasized the contribution of sport to community well-being at both the individual and collective levels (Hautbois & Desbordes, 2008; Trudeau & Shephard, 2010; Anderson-Butcher, 2014).

3. Physical education: The foundation for building a sporting community

Physical education is a central component of the school curriculum, helping students develop physical skills, knowledge, and positive attitudes toward physical activity (Mitchell & Walton-Fisette, 2021). However, the importance of physical education extends far beyond the school walls, serving as the foundation for a community's sporting culture.

Numerous studies have demonstrated the close relationship between quality physical education and physical health. Davis, Roscoe, and Bull (2005) highlighted the contribution of regular physical activity to chronic disease prevention, improved cardiovascular fitness, and maintenance of healthy body weight. Haskell (2007) published the updated recommendations of the American College of Sports Medicine, emphasizing the need for at least 150 minutes of moderate physical activity per week for adults (Davis, Roscoe & Bull, 2005; Haskell, 2007).

In the context of children and adolescents, research emphasizes the importance of physical education as a lever for long-term health. Dwyer (1983) found that daily physical activity among primary school students contributes to their overall health. Kirk (2005) emphasized the importance of early learning experiences in physical education for lifelong participation in sport, arguing that positive attitudes formed at a young age form the foundation for sustained sporting involvement (Dwyer, 1983; Kirk, 2005).

Norton (2003) added an important dimension to this research by emphasizing the role of parents in shaping their children's physical activity patterns. This finding reinforces the argument that developing a community sporting culture requires a comprehensive approach that involves all age groups and community institutions (Norton, 2003).

Jansen and colleagues (2008) presented a model of school-based intervention to reduce overweight and inactivity among children aged 6-12, demonstrating that structured

physical education programs can be an effective tool for improving public health. These findings are particularly relevant for rural communities such as Ein Qiniyya, where access to health services and sports facilities may be limited.

Pickup, Haydn-Davies, and Jess (2007) emphasized the importance of physical education in primary school as a critical stage in the development of physical literacy. Constantinides, Mantalvo, and Silverman (2013) found that physical education taught by specialist teachers yields better outcomes than that taught by generalist teachers, highlighting the need to invest in professional physical education teachers as part of the community development strategy (Pickup, Haydn-Davies & Jess, 2007).

4. Mental and social well-being: The benefits of sport beyond the body

Beyond the physical benefits, the research literature points to a significant contribution of sport and physical activity to mental and social well-being. Stewart-Brown (2012) demonstrated that sport can improve mental and social well-being through stress reduction, increased self-esteem, and greater social interaction.

This aspect of sport is particularly important in the context of sport tourism, as it indicates that sport is not merely a physical activity, but a complete social and emotional experience. When local community residents enjoy the mental and social benefits of sport, they become authentic ambassadors of the sport tourism destination, conveying to tourists a sense of belonging and a healthy lifestyle.

4.1 *Personal and social development*

Opstoel (2020) conducted a comprehensive literature review on personal and social development in physical education and sport, finding that participation in sport activity contributes to the development of social skills, personal responsibility, and self-confidence. These findings are consistent with the research of Gordon (2010) and Li (2008), who examined the model of personal and social responsibility in physical education (Gordon, 2010; Li, 2008; Opstoel, 2020).

Baena-Extremuera, Granero-Gallegos, and Ortiz-Camacho (2012) examined the effect of an adventure education program on classroom satisfaction, physical self-concept, and social goals, finding significant positive effects across all domains. Driska and colleagues (2017) investigated psychological changes among adolescent wrestlers during an intensive training camp and demonstrated that organized sport contributes to the development of mental resilience and social skills. (Baena-Extremuera, Granero-Gallegos, Ortiz-Camacho, 2012; Driska, 2017; Petkova, Galily & Pilyavsky, 2024).

4.2 *Community involvement and citizenship*

Pancer and colleagues (2007) investigated the relationship between community and political involvement among adolescents, finding that participation in community sports is a significant predictor of civic involvement in adulthood. This finding is particularly important for understanding the potential of sport tourism as a catalyst for comprehensive community development.

Manzano-Sánchez (2021) examined the relationships among school climate, responsibility, and prosocial and antisocial behavior, finding that physical education programs that emphasize personal and social responsibility reduce violent behavior and promote prosocial

behavior. Fernández-Rio and Suarez (2016) demonstrated that innovative sport activities, such as parkour, can serve as tools for developing social skills and cooperation among primary school students (Manzano-Sánchez, 2021; Fernández-Rio & Suarez, 2016).

Sport, therefore, constitutes a powerful mechanism for building social capital within a community. When a local community develops a rich sporting culture, it creates strong social networks, a sense of belonging, and mutual responsibility, conditions that are essential for successful sport tourism development. As González-García (2018) noted, involving the local community in sport tourism development is essential to ensuring the industry's sustainability (González-García, 2018).

5. Cognitive and learning benefits of sport

One of the most surprising findings in research on sport and physical education concerns their contribution to cognitive development and learning. Hardman (2014) found that sport can improve cognitive and learning abilities by enhancing concentration, memory, and problem-solving skills (Hardman, 2014).

Trudeau and Shephard (2010) conducted a comprehensive review of the relationship between physical activity and brain health, as well as academic achievement, among students. Their findings showed that regular physical activity improves cognitive functions, including working memory, attention, and cognitive flexibility. Shephard (1997) added important findings on the relationship between physical activity in the curriculum and academic performance (Trudeau & Shephard, 2010; Shephard, 1997).

5.1 *The neurological basis*

Diamond (1998) provided the neurological basis for understanding the relationship between physical activity and cognitive function, emphasizing how an enriched environment, including physical activity, affects brain anatomy. Jensen (1998) developed a brain-compatible teaching approach that emphasizes the importance of movement in learning. Hannaford (1995) added that movement is integral to the learning process and that learning does not occur solely in the head (Diamond, 1998; Jensen, 1998; Hannaford, 1995).

Barr and Lewin (1994) examined the integration of the kinesthetic sense with cognitive skills, finding that learning through movement improves understanding and memory. These findings reinforce the argument that physical education is not merely an addition to the curriculum but an essential component of the overall learning process (Barr & Lewin, 1994).

5.2 *Physical education and academic achievement*

Tremarche, Robinson, and Graham (2007) found a positive relationship between physical education and test results in primary school. Tremblay, Inman, and Willms (2000) investigated the relationship between physical activity, self-esteem, and academic achievement among 12-year-old children, finding significant positive correlations. Lindner (2002) examined the relationship between physical activity participation and academic performance, reinforcing earlier findings (Tremarche, Robinson & Graham, 2007; Tremblay, Inman & Willms, 2000).

A particularly important finding emerges from the research of Hervet (1952) conducted in Vanves, France, and of Caifas and Taylor (1994), who showed that expanding physical education hours in school, even at the expense of academic instruction hours, does not impair students' academic achievement. On the contrary, when no decline in achievement was

documented, this means that students learned more per unit of study, thanks to the positive effect of physical education on concentration and learning abilities. This argument strengthens the justification for increasing physical education hours in schools as part of the community development strategy (Hervet, 1952; Caifas & Taylor, 1994).

Melnick, Sabo, and Vanfossen (1992) examined the educational effects of participation in interscholastic sport among youth, finding positive effects on motivation, school belonging, and academic achievement. These findings reinforce the argument that investment in sport and physical education constitutes an investment in the community's human capital (Melnick, Sabo & Vanfossen, 1992).

6. Implications for community-based sport tourism development

The findings presented above indicate that sport and physical education constitute powerful tools for comprehensive community development. In the context of sport tourism, several important practical implications can be identified.

6.1 *Building a local sporting culture*

Sustainable sport tourism development requires, first and foremost, the building of a strong local sporting culture. This means investing in high-quality physical education programs in schools, establishing sports facilities accessible to the entire community, and developing community sports events. As Kirk (2005) and Keegan (2013) emphasized, positive sporting experiences at a young age are key to lifelong participation in sport (Kirk, 2005; Keegan, 2013).

6.2 *Improving quality of life as a tourism asset*

When the local community enjoys the physical, mental, and cognitive benefits of sport, this is reflected in the settlement's overall quality of life and atmosphere. Sports tourists seek authentic destinations where sport is part of the local lifestyle rather than merely an artificial attraction. A healthy, active, and vibrant community is itself a unique tourism product.

6.3 *Developing local human capital*

The cognitive and learning benefits of sport contribute to the development of the community's human capital. Residents with higher cognitive and learning abilities are better able to function in the tourism industry, which requires high-level communication skills, problem-solving, and customer service.

6.4 *Strengthening social cohesion*

The social benefits of sport, as described in this article, help strengthen social cohesion within communities. Strong social cohesion is a necessary condition for successful sport tourism development, as it ensures cooperation among various stakeholders and public support for the development process.

7. Case study: Ein Qiniyya as a sport tourism destination

Ein Qiniyya, a Druze village of approximately 2,100 residents situated at the foot of Mount Hermon, provides an interesting case study for applying the principles presented in this article. The village is located in an area of immense tourism potential, with breathtaking landscapes, proximity to major tourist sites, and a rich cultural tradition (EQLC, 2022; IAA, 2019).

The Ein Qiniyya Local Council is working to develop the village as a sports tourism destination while involving the local community in the process. Among other initiatives, new sports facilities are being constructed, including a football stadium with a hotel, a sports hall, a swimming pool, and cycling paths. Concurrently, plans are underway to increase physical education hours in schools and to develop awareness of sport training among residents (Mugrabi, 2022).

The PEAK-TO-PEAK event, an international ultra-trail marathon connecting the peaks of the Golan and Hermon, serves as a successful example of the integration between sport tourism and community development. The event involves the local community in organizing, hospitality, and the enjoyment of economic benefits, and creates multicultural connections among communities in the region (Goldfish, 2022).

8. Conclusion

This article has reviewed the multidimensional benefits of sport and physical education and demonstrated how these benefits constitute an essential foundation for sustainable sport tourism development. The findings indicate that investment in sport and physical education is not merely a contribution to public health, but a comprehensive strategy for community and economic development.

The physical benefits of sport, as described in the research by Davis (2005) and Haskell (2007), contribute to a healthier community. The mental and social benefits, as described by Stewart-Brown (2012) and Opstoel (2020), strengthen social cohesion and social capital. And the cognitive benefits, as demonstrated by Trudeau and Shephard (2010) and Hardman (2014), contribute to human capital development (Davis, 2005; Haskell, 2007; Stewart-Brown, 2012; Opstoel, 2020; Trudeau & Shephard, 2010; Hardman, 2014).

When these benefits materialize in a local community, a solid foundation is created for sustainable sport tourism development. A healthy, cohesive, and educated community is capable not only of hosting sports tourists but also of offering them an authentic, unique experience that cannot be replicated.

The case of Ein Qiniyya illustrates how these principles can be implemented in practice, in a rural community seeking to develop itself as an international sport tourism destination. The success of this endeavor depends first and foremost on involving the local community in the process, and on ensuring that village residents are the first to enjoy the benefits of sport and physical activity.

Future research is needed to empirically examine the relationship between community involvement in sport and the success of sport tourism development, and to develop practical models for implementing this approach in additional communities.

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References

- Anderson-Butcher, D., Riley, A., & Amorose, A., et al. (2014). Maximizing Youth Experiences in Community Sport Settings: The Design and Impact of the LiFE Sports Camp. *Journal of Sport Management*, 28(2), 236-249.
- Baena-Extremera, A., Granero-Gallegos, A., & Ortiz-Camacho, M. D. M. (2012). Quasi-experimental study of the effect of an adventure education program on classroom satisfaction, physical self-concept, and social goals in physical education. *Psychologica Belgica*, 52(4), 369-386.
- Barr, S., & Lewin, P. (1994). Learning movement: integrating kinesthetic sense with cognitive skills. *Journal of Aesthetic Education*, 28(1), 83-94.
- Caifas, K., & Taylor, W. (1994). Effects of Physical Activity on Physiological Variables in Adolescence. *Pediatric Exercise Science*, 6(4), 406-423.
- Constantinides, P., Mantalvo, R., & Silverman, S. (2013). Specialists and nonspecialists teach teaching processes in elementary physical education classes. *Teaching and Teacher Education*, 36, 68-76.
- Davis, B., Roscoe, J., & Bull, R. (2005). *Physical Education and the Study of Sport* (5th ed.). Elsevier Limited.
- Diamond, M. (1998). *Enriching Heredity: The Impact of the Environment on the Anatomy of the Brain*. New York, NY: The Free Press.
- Donner, S. (2011). *Sport tourism - the growth engine of the tourism industry?* Calcuallist, 20.03.2011. [Hebrew].
- Driska, A. P., Gould, D. R., Pierce, S., et al. (2017). Understanding psychological changes in adolescent wrestlers participating in an intensive training camp: A mixed-methods investigation. *International Journal of Sport Psychology*, 48(3), 303-330.
- Dwyer, T., Coonan, W. E., Leitch, D. R., Hetzel, B. S., & Baghurst, R. A. (1983). An investigation of the effects of daily physical activity on the health of primary school students in South Australia. *International Journal of Epidemiology*, 12(3), 308-313.
- EQLC, Ein Qiniyya Local Council. (2022). *The springs trail of the beautiful village of Ein Qiniyya, Israel*. Jerusalem, IL: Ashad Publishing Company, Israel Ministry of Tourism. [Hebrew].
- Fernández-Río, J., & Suárez, C. (2016). Feasibility and preliminary views of primary school children on parkour. *Physical Education and Sport Pedagogy*, 21(3), 281-294.
- Goldfish, Inc. (2022). *Ultra-Marathon Peak to Peak*. Haifa: Goldfish Publishing Company. [Hebrew].
- González-García, R. J., Añó-Sanz, V., Parra-Camacho, D., & Calabuig-Moreno, F. (2018). Residents' perceptions of the impact of sport tourism on the community: Analysis and scale validation. *JPES, Journal of Physical Education and Sport*, 18(1), 149-156.
- Gordon, B. (2010). An Examination of the Responsibility Model in a New Zealand Secondary School Physical Education Program. *Journal of Teaching in Physical Education*, 29(1), 21-37.
- Hannaford, C. (1995). *Smart Moves - Why Learning is not All in Your Head*. Arlington: Great Ocean.

- Hardman, K., Murphy, C., Routen, A., et al. (2014). World-Wide Survey of School Physical Education: Final Report 2013. Paris: UNESCO.
- Haskell, W. L., Lee, I. M., Pate, R. R., Powell, K. E., Blair, S. N., Franklin, B. A., ... & Bauman, A. (2007). Physical activity and public health: updated recommendations for adults from the American College of Sports Medicine and the American Heart Association. *Circulation*, 116(9), 1081.
- Hautbois, C. & Desbordes, M. (2008). *Sport et Marketing Public*. Paris: Economica Publishing Company.
- Hervet, R. (1952). Vanves, son expérience, ses perspectives. *Revue Institut Sports*, 24, 4-6.
- IAA, Israel Antiquities Authority. (2019). *Ein Qiniyya Conservation Survey*. Israel Antiquities Authority, The Conservation Administration, North Region. [Hebrew].
- Jansen, W., Raat, H., Joosten-van Zwanenburg, E., Reuvers, I., van Walsem, R., & Brug, J. (2008). A school-based intervention to reduce overweight and inactivity in children aged 6-12 years. *BMC Public Health*, 8, 257-263.
- Jensen, E. (1998). *Teaching with the Brain in Mind*. Alexandria: ASCD Association Publishing Company.
- Keegan, R., Keegan, S., Daley, S., Ordway, C., & Edwards, A. (2013). *Getting Australia moving: Establishing a physically literate active nation* (game plan)—National Institute of Sport Sciences, University of Canberra.
- Kirk, D. (2005). Physical Education, youth sport and lifelong participation: the importance of early learning experiences. *European Physical Education Review*, 11(3), 239-255.
- Li, W., Wright, P., Rukavina, P., & Pickering, M. (2008). Measuring students' perceptions of personal and social responsibility and the relationship to intrinsic motivation in physical education. *Journal of Physical Education, Recreation and Dance*, 27, 167-178.
- Lindner, K. (2002). Physical activity participation and academic performance. *Pediatric Exercise Science*, 14, 155-169.
- Manzano-Sánchez, D., Gómez-Marmol, A., Valero-Valenzuela, A., & Jiménez-Parra, J. F. (2021). School climate and responsibility as predictors of antisocial and prosocial violence: a study towards self-determination theory. *Behavioral Sciences*, 11(3), 36-42.
- Melnick, M. J., Sabo, D. F., & Vanfossen, B. (1992). Educational effects of interscholastic athletic participation on African-American and Hispanic youth. *Adolescence*, 27(106), 295-308.
- Mitchell, S. A., & Walton-Fisette, J. (2021). *The Essentials of Teaching Physical Education: Curriculum, Instruction, and Assessment*. Human Kinetics.
- Mugrabi, W. (2022). *Ein Qiniyya - Golan Heights*. Ein Qiniyya: Ein Qiniyya Local Council Publication. [Hebrew].
- Nordin, S. (2005). *Tourism of tomorrow: Travel trends and forces of change*. ETOUR, European Tourism Research Institute.
- Norton, D. E., Froelicher, E. S., Waters, C. M., & Carrieri-Kohlman, V. (2003). Parental influence on models of primary prevention of cardiovascular disease in children. *European Journal of Cardiovascular Nursing*, 3, 311-322.
- Opstoel, K., Chapelle, L., Prins, F. J., De Meester, A., Haerens, L., van Tartwijk, J., & De Martelaer, K. (2020). Personal and social development in physical education and sports: A review study. *European Physical Education Review*, 26(4), 797-813.
- Pancer, S. M., Pratt, M., Hunsberger, B., & Alisar, S. (2007). Community and political involvement in adolescence: What distinguishes the activists from the uninvolved? *Journal of Community Psychology*, 35(6), 741-759.
- Petkova, T., Galily, D., & Pilyavsky, M. (2024). Globalizing Society and the Cosmopolitan Personality. *Open Journal for Studies in Philosophy*, 8(1), 71-78.

- Pickup, I., Haydn-Davies, D., & Jess, M. (2007). The importance of primary physical education. *Physical Education Matters*, 2(1), 8-11.
- Radicchi, E. (2013). Tourism and sport: Strategic synergies to enhance the sustainable development of a local context. *Physical Culture and Sport*, 57(1), 44-57.
- Shephard, R. J. (1997). Curricular physical activity and academic performance. *Pediatric Exercise Science*, 9(2), 113-126.
- Stewart-Brown, S. (2012). *The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS): Performance in Different Cultural and Geographical Groups*. Mental Well-Being, 133-150.
- Tremarche, P. V., Robinson, E. M., & Graham, L. B. (2007). Physical education and its effect on elementary testing results. *Physical Educator*, 64(2), 58.
- Tremblay, J., Inman, J., & Willms, J. (2000). The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children. *Pediatric Exercise Science*, 12, 312-323.
- Trudeau, F., & Shephard, R. (2010). Relationships of physical activity to brain health and the academic performance of schoolchildren. *American Journal of Lifestyle Medicine*, 4(2), 138-150.



Financial Protection under Public Health Insurance among Socially and Economically Backward Workers: A Comparative Study of Cherthala and Ambalapuzha Taluks in Kerala

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Abstract

Publicly financed health insurance schemes are integral to Universal Health Coverage in India, but their ability to offer financial protection to socially and economically disadvantaged workers has been debated. Over the last two decades, universal public health insurance has been gaining acceptance in low- and middle-income countries, but few studies have examined the impact of public health insurance on out-of-pocket (OOP) expenditure in an Indian context using a between and within compare design context setting: Cherthala and Ambalapuzha taluks in Alappuzha district, Kerala. Using mixed methods approach, this study investigates the protective effect of public health insurance on inpatient OOP expenditure among the most marginalized workers. Based on primary data on insured patients in government taluk hospitals, government medical colleges and large private hospitals, the study explores the incidence of hospitalization, choice of provider and the extent and determinants of inpatient OOP expenditure. Methods — A fully quantitative analysis integrates descriptive statistics with multivariate regression to measure the relationship between insurance status, the type of hospital (private vs. The results show that although public health insurance increases access to inpatient care for workers from socially and economically disadvantaged groups, it still offers only limited financial protection. Patients with insurance still bear high levels of OOP costs, especially for private hospitals, medicines, diagnostics and for longer stay relating to chronic illness. There is significant taluk-level variation in the comparative results which are attributable to the type, spread of health infrastructure, availability of public sector services and dependence of private sector providers. Even with a relatively better public health system in Kerala, people with insurance cover are not protected from financial vulnerability, especially informal and marginalized workers. It highlights the inadequacies of hospital-centric insurance models in environments with fragmented health systems and poverty. To convert insurance coverage into effective financial protection for vulnerable populations, it is critical to re-enforce public provisioning, broaden the benefit packages beyond inpatient care, and regulate private sector costs.

Keywords: public health insurance, financial protection, out-of-pocket expenditure, unorganized workers, health equity, Kerala.

1. Introduction

Achieving Universal Health Coverage (UHC) has emerged as a central objective of health system reform globally, with financial risk protection constituting one of its core dimensions (World Health Organization [WHO], 2010, 2015). Financial protection seeks to ensure that access to needed health services does not expose individuals or households to catastrophic health expenditure or impoverishment. In low- and middle-income countries such as India, this objective remains particularly challenging due to the dominance of out-of-pocket (OOP) payments as a mode of health financing, especially among socially and economically backward populations engaged in informal and unorganised labour (Selvaraj & Karan, 2012; Wagstaff et al., 2016).

India's health system is characterised by a high reliance on OOP expenditure, which accounts for more than half of total health spending, with inpatient care contributing a substantial share of household financial burden (Government of India, 2019; National Sample Survey Office [NSSO], 2015). In response, the state has increasingly relied on publicly financed health insurance schemes—most notably Rashtriya Swasthya Bima Yojana (RSBY) and its successor Ayushman Bharat—Pradhan Mantri Jan Arogya Yojana (PMJAY)—to extend financial protection to poor and vulnerable households (Karan et al., 2014; Prinja et al., 2019). These schemes primarily focus on covering inpatient hospitalisation costs, with the expectation that insurance coverage would reduce OOP expenditure and improve equity in healthcare access.

However, empirical evidence from national and sub-national studies presents a mixed picture regarding the effectiveness of public health insurance in reducing OOP expenditure. While several studies report increased hospital utilisation among insured populations, the impact on financial protection has been modest or uneven, particularly for the poor (Berman et al., 2010; Selvaraj & Karan, 2012; Sriram & Khan, 2020). In many cases, insured households continue to incur significant OOP payments for medicines, diagnostics, informal payments, and services obtained from private providers, thereby limiting the protective role of insurance (Mohanty et al., 2016; Prinja et al., 2019). These gaps are especially pronounced among socially and economically backward workers, whose livelihoods are marked by income insecurity, limited social protection, and heightened vulnerability to health shocks (Joe et al., 2018).

Kerala occupies a distinctive position within India's health landscape, owing to its relatively strong public healthcare infrastructure, favourable health indicators, and long-standing emphasis on public provisioning (Karan et al., 2014; Adithyan, 2024). Recent reforms under the Aardram Mission have further strengthened primary healthcare services and sought to rebuild public trust in government facilities. Yet, Kerala also exhibits high levels of healthcare utilisation and persistent dependence on private hospitals, particularly for inpatient care, which contributes to rising OOP expenditure despite widespread insurance coverage (Mohanty & Ram, 2018; Adithyan, 2024). This paradox raises critical questions about the extent to which insurance-led approaches can deliver meaningful financial protection even in relatively advanced health systems.

Within Kerala, coastal districts such as Alappuzha present a compelling context for examining these issues. The district has a high concentration of socially and economically backward workers engaged in fisheries, coir production, casual labour, and other informal occupations, making them particularly susceptible to healthcare-related financial stress. Moreover, variations in health infrastructure and provider mix across taluks create differential conditions under which public health insurance operates. Comparing Cherthala and Ambalapuzha taluks—each characterised by differing degrees of public sector capacity and private hospital presence—offers a unique opportunity to assess how local health system contexts mediate the relationship between insurance coverage and financial protection.

Against this backdrop, the present study examines the effectiveness of public health insurance in reducing inpatient OOP expenditure among socially and economically backward workers through a comparative analysis of Cherthala and Ambalapuzha taluks in Alappuzha district, Kerala. By focusing on hospital type, morbidity profile, and utilisation patterns, the study seeks to contribute to ongoing debates on the limits of insurance-based UHC strategies and the need for context-sensitive health system strengthening to protect vulnerable populations from financial hardship.

2. Review of literature

The discourse on financial protection in healthcare is firmly anchored in the broader framework of Universal Health Coverage (UHC), where reducing out-of-pocket (OOP) expenditure is a key normative and policy objective (World Health Organization [WHO], 2010; Wagstaff et al., 2016). In low- and middle-income countries, the persistence of high OOP payments has been consistently linked to informal employment, income precarity, and the absence of comprehensive social security systems (Berman et al., 2010; Selvaraj & Karan, 2012). India exemplifies this challenge, where socially and economically backward workers—predominantly engaged in unorganised labour—remain disproportionately exposed to health-related financial shocks despite the expansion of public health insurance schemes (Karan et al., 2014; Prinja et al., 2019).

A substantial body of national-level research has examined the performance of publicly financed health insurance programmes such as RSBY and PMJAY. While evidence indicates increased hospitalisation among insured households, the impact on inpatient OOP expenditure remains limited and uneven (Selvaraj & Karan, 2012; Wagstaff et al., 2016; Sriram & Khan, 2020). Studies consistently report that insured households continue to incur expenses on medicines, diagnostics, informal payments, and post-hospitalisation care, revealing structural limitations in insurance design (Mohanty et al., 2016; Joe et al., 2018). These limitations are particularly acute for informal workers, whose livelihoods are marked by irregular earnings, occupational health risks, and weak bargaining power within healthcare markets.

Kerala presents a distinctive yet paradoxical case in the Indian health landscape. Despite its comparatively strong public healthcare system and favourable health indicators, the state continues to experience high levels of OOP expenditure, largely driven by extensive reliance on private healthcare providers (Karan et al., 2014; Mohanty & Ram, 2018; Adithyan, 2024). Recent reforms under the Aardram Mission have strengthened primary healthcare infrastructure and improved public sector utilisation, yet evidence suggests that insurance-linked reforms alone have not translated into robust financial protection, particularly for inpatient care (Adithyan, 2024). This paradox underscores the need to situate insurance outcomes within local labour markets and socio-economic contexts.

Alappuzha district, historically shaped by coir production, fisheries, and other informal occupations, has received sustained scholarly attention for its distinctive labour structure. Studies on the coir industry highlight the concentration of socially backward communities, the feminisation of labour, and persistent employment insecurity exacerbated by technological change and market restructuring (Florence & Padath, 2024a; Pratheesh, 2021; Pratheesh & Nair, 2022a). Modernisation and mechanisation, while improving productivity, have intensified labour displacement and work alienation, deepening economic vulnerability among traditional workers (Pratheesh et al., 2024). These dynamics have direct implications for health security, as employment instability and declining social cohesion reduce households' capacity to absorb health-related expenses.

Research on coastal and fishing communities in Alappuzha further underscores intersecting vulnerabilities linked to caste, gender, and livelihood precarity. Padath (2025a) documents the transformation of women's roles within fishing households amid socio-cultural change, highlighting increased care burdens and exposure to health risks. Such populations often rely on episodic hospital care while lacking sustained access to preventive and outpatient services, rendering insurance coverage for inpatient care alone insufficient. Complementing this, Padath (2025c) conceptualises civic sense as behavioural infrastructure, offering insights into how trust in public institutions—including healthcare systems—shapes utilisation patterns and compliance, particularly among marginalised groups.

Labour-oriented studies in Kerala have long emphasised the role of informal employment in shaping access to welfare and social protection (Isaac & Raghavan, 1990; Nair et al., 1992). The coir industry literature, in particular, reveals how trade union politics, technological change, and state intervention have produced uneven outcomes for workers' welfare (Rammohan, 1999, 2008; Sudarshana, 2020). These structural conditions intersect with health financing arrangements, influencing hospital choice, treatment pathways, and exposure to OOP expenditure. Workers displaced or deskilled by modernisation are more likely to seek private care due to perceived inadequacies in public facilities, thereby incurring higher costs despite insurance enrolment.

At the sub-district level, variations in health infrastructure and provider mix further mediate the relationship between insurance and financial protection. Comparative studies emphasise that taluk-level differences in public hospital capacity, proximity of private hospitals, and local labour composition significantly influence healthcare utilisation and expenditure outcomes (Mohanty et al., 2016; Joe et al., 2018). However, there remains a notable gap in the literature on taluk-level comparative analyses that explicitly integrate labour structure with insurance outcomes—particularly in districts like Alappuzha, where informal work predominates.

In summary, existing literature establishes that public health insurance in India has expanded access to inpatient care but has not adequately addressed the financial vulnerability of socially and economically backward workers. While Kerala's public health achievements moderate some risks, the persistence of OOP expenditure among informal labour households reflects deeper structural issues related to employment precarity, health system fragmentation, and insurance design limitations. This study builds on and extends the literature by offering a taluk-level comparative analysis of Cherthala and Ambalapuzha, explicitly linking public health insurance performance to labour dynamics and socio-economic marginalisation in coastal Kerala.

3. Methodology

This study adopts a cross-sectional, comparative research design to examine the effectiveness of public health insurance in providing financial protection against inpatient out-of-pocket (OOP) expenditure among socially and economically backward workers in Alappuzha district, Kerala. The analysis focuses on two taluks—Cherthala and Ambalapuzha—selected to capture variation in labour composition, public health infrastructure, and the presence of private hospitals. The study population comprises insured individuals from socially and economically backward households, primarily engaged in unorganised occupations such as coir production, fisheries, and casual wage labour, who experienced inpatient hospitalisation during the reference period.

Primary data were collected through a structured survey administered to patients or caregivers at the point of discharge from selected healthcare facilities. The sampling frame included government taluk hospitals, government medical colleges, and major private hospitals operating in the two taluks. A multi-stage sampling approach was employed to ensure

representation across hospital types and taluks. The survey instrument captured information on socio-demographic characteristics, occupational status, insurance coverage, hospitalisation details, provider choice, length of stay, morbidity profile, and itemised inpatient OOP expenditure, including spending on medicines, diagnostics, procedures, and informal payments.

The primary outcome variable was total inpatient OOP expenditure, analysed both as a continuous measure and as a binary indicator of high financial burden based on percentile thresholds. Key explanatory variables included hospital type, taluk of residence, occupational category, insurance scheme coverage, duration of hospitalisation, and nature of illness. Data analysis combined descriptive statistics to assess expenditure patterns with multivariate regression techniques to identify factors associated with higher OOP expenditure while controlling for socio-economic and clinical covariates. All analyses were conducted using standard statistical software, and results are presented with appropriate measures of statistical significance. Ethical principles of informed consent, confidentiality, and voluntary participation were strictly adhered to throughout the study.

4. Results

This section presents comparative evidence on inpatient utilisation patterns and out-of-pocket (OOP) expenditure among insured socially and economically backward workers in Cherthala and Ambalapuzha taluks. Using facility-level primary data, the analysis quantifies the extent of financial protection offered by public health insurance and identifies how provider type, labour profile, and local health system contexts shape residual OOP burden.

4.1 Socio-economic and occupational profile of hospitalized workers

This section examines the socio-economic and occupational composition of insured hospitalised workers in Cherthala and Ambalapuzha taluks to establish the baseline characteristics of the study population and assess the degree of labour precarity represented in inpatient utilisation. The analysis focuses on employment type, sectoral affiliation, social group, and household income to quantify the concentration of hospitalisation among socially and economically backward workers. Table 1 summarises the socio-economic and occupational characteristics of the insured patients hospitalised in the two taluks. Across both taluks, the inpatient population was dominated by unorganised workers, particularly those engaged in coir-related activities, fisheries, and casual wage labour.

Table 1. Socio-economic and occupational profile of insured inpatients (%)

Characteristic	Cherthala (n=180)	Ambalapuzha (n=170)	Total (n=350)
Unorganised workers	82.2	78.8	80.6
Coir sector workers	41.7	18.2	30.3
Fisheries-related workers	14.4	36.5	25.1
Casual wage labour	26.1	24.1	25.1
SC/ST/OBC households	69.4	72.9	71.1
Monthly household income < ₹10,000	63.9	67.6	65.7

The hospitalisation among insured patients is highly concentrated within unorganised sector workers in both taluks, comprising over four-fifths of all inpatient episodes.

Empirically analysing the sectoral distribution, we can see a statistically significant type-level variation along with taluk-level details, where the largest share of occupation in Cherthala corresponds to coir workers, in opposition to the dominating presence of fisheries workers in Ambalapuzha. Such divergence likely reflects local labour economies instead of variances in insurance access or ability to go to the hospital.

Scheduled Castes, Scheduled Tribes and Other Backward Classes constituted about 69 % in Cherthala and 72 % in Ambalapuzha taluks, showing that social group composition is very high among the former and the latter. Additional economic fragility is evident in income distribution, with almost two-thirds of the hospitalised families reporting monthly incomes below ₹10,000. Though occupations differ, the uniformity in the concentration of income across taluks highlights the notion that economic deprivation is a common underlining trait. In short, the table demonstrates that inpatient uptake through public health insurance in Alappuzha is mainly achieved by those in the informal labour markets and the vulnerable groups. These baseline characteristics provide a reference for the empirical examination of the subsequent differences in provider choice and out-of-pocket payment of the insured population.

4.2 Hospital utilization patterns by taluk and provider type

This subsection examines the distribution of inpatient utilisation across public and private healthcare facilities among insured workers in Cherthala and Ambalapuzha taluks. The analysis quantifies how hospital choice varies by taluk despite uniform insurance coverage, with particular attention to the relative use of government taluk hospitals, government medical colleges, and private hospitals.

Table 2. Distribution of hospitalisations by provider type (%)

Hospital Type	Cherthala	Ambalapuzha	Total
Government taluk hospitals	28.9	41.8	35.1
Government medical colleges	16.1	19.4	17.7
Private hospitals	55.0	38.8	47.2

The data show a clear taluk-level difference in provider utilisation. In Cherthala, private hospitals accounted for more than half of all inpatient admissions (55.0%), exceeding the combined share of government taluk hospitals and medical colleges. In contrast, Ambalapuzha exhibited greater reliance on public sector facilities, with government hospitals together accounting for 61.2% of total hospitalisations. Government taluk hospitals were utilised more frequently in Ambalapuzha than in Cherthala, with a difference of nearly 13 percentage points. Utilisation of government medical colleges remained relatively similar across taluks, indicating that referral-level public facilities play a comparable role in both locations. The higher private sector share in Cherthala suggests differential access, availability, or perceived effectiveness of public facilities at the taluk level.

Across the combined sample, private hospitals constituted the single largest provider category, accounting for nearly half of all inpatient episodes among insured workers. This pattern indicates that insurance coverage does not translate into predominant utilisation of public facilities, even among socially and economically backward populations. Overall, the table demonstrates that provider choice among insured workers is shaped by local health system contexts rather than insurance status alone. The observed variation between Cherthala and Ambalapuzha establishes an empirical basis for examining how provider type influences inpatient out-of-pocket expenditure in subsequent analyses.

4.3 Inpatient out-of-pocket expenditure among the insured

This section quantifies the magnitude and distribution of inpatient out-of-pocket (OOP) expenditure incurred by insured workers across Cherthala and Ambalapuzha taluks and examines variation by provider type. The analysis focuses on mean expenditure levels and the composition of OOP spending to assess the extent of residual financial burden among the insured population.

Table 3. Mean inpatient OOP expenditure (₹)

Category	Cherthala (Mean ± SD)	Ambalapuzha (Mean ± SD)
Overall OOP expenditure	14,860 ± 9,420	11,230 ± 7,810
Public hospitals	6,540 ± 4,110	5,120 ± 3,680
Private hospitals	21,480 ± 10,260	18,950 ± 9,740
Medicines & diagnostics	58% of total OOP	61% of total OOP

The results indicate substantial inpatient OOP expenditure among insured workers in both taluks, with higher average expenditure observed in Cherthala. The mean overall OOP expenditure in Cherthala exceeded that of Ambalapuzha by approximately ₹3,600, reflecting differences in provider utilisation and expenditure composition. Across both taluks, inpatient care obtained from private hospitals resulted in markedly higher OOP expenditure compared to public hospitals. The mean OOP cost in private facilities was more than three times that incurred in public hospitals in each taluk. The standard deviations indicate considerable dispersion in expenditure, suggesting heterogeneity in case severity, length of stay, and service utilisation even within the insured population.

Medicines and diagnostic tests constituted the largest component of OOP expenditure, accounting for more than half of total spending in both taluks. This expenditure pattern remained consistent across provider types, indicating limited coverage or effective reimbursement for these cost components under existing insurance arrangements. Overall, the table demonstrates that insurance coverage does not eliminate inpatient OOP expenditure and that the magnitude of residual costs varies systematically by taluk and hospital type. The concentration of higher expenditure in private facilities establishes a quantitative link between provider choice and financial burden, forming the basis for examining determinants of high OOP expenditure in the subsequent subsection.

4.4 Determinants of high inpatient OOP expenditure

Table 4 reports the results of the multivariate logistic regression estimating the association between patient characteristics, provider type, and the likelihood of incurring high inpatient out-of-pocket (OOP) expenditure among insured workers. The dependent variable is defined as inpatient OOP expenditure above the upper quartile of the sample distribution.

Table 4. Determinants of high inpatient OOP expenditure (Logistic Regression)

Variable	Odds Ratio (OR)	95% CI	p-value
Treatment in private hospital	3.12	2.01–4.84	<0.001
Length of stay (>5 days)	1.87	1.22–2.86	0.004
Chronic illness	1.69	1.11–2.56	0.015
Casual/unorganised labour	1.43	1.01–2.04	0.047
Residence in Cherthala taluk	1.38	1.00–1.92	0.049

Regression results show provider type has the most significant association with high inpatient OOP expenditure. After adjusting for confounding variables, high OOP costs were over three times more common among patients treated in private hospitals compared to those treated in public facilities. The impact of hospital stay was also statistically significant: staying longer than five days was associated with a much higher likelihood of higher OOP expenditure. Financial burden was independently related to clinical characteristics. Chronic illness status was also a strong determinant of high OOP expenditure, a measure that could reflect repeated diagnostic testing, extended treatment, or higher intensity care [51]. Occupational status remained a strong determinant, with casual and unorganised workers at the highest risk of experiencing financial hardships over other occupational groups.

After adjustment for patient specifics, taluk of residence remained associated with higher OOP expenditure among insured (in Cherthala, v. Ambalapuzha). This indicates that there may be additional effects of local health system factors on financial outcomes beyond the effects of individual socio-economic or clinical characteristics. Age and gender were not significant predictors in the adjusted model. Overall, these regression estimates suggest that high inpatient OOP among insured workers is driven more by provider choice, length of stay, illness profile, and local health system context than demographics per se.

5. Discussion

Publicly funded medical care can increase access to inpatient care among disadvantaged workers in coastal Kerala, but this study shows that increased access has not yet resulted in complete financial protection. The prevalence of hospitalisation covered by insurance among unorganised workers hailing from poorer and socially disadvantaged households suggests that at least some insurance schemes are reaching appropriate target populations. The sustained presence of significant OOP expenditure for these populations evidence structural constraints in the design and operation of top-down insurance-based protection mechanisms in mixed health systems.

The composition of jobs then matters significantly to both how health care is used and how high the financial risk. In the special case of coir production, fisheries, and casual labours, the unstable income associated with the occupation and the exposure to increased occupational health risks render them more likely to take inpatient care while further limiting their ability to bear residual medical costs. This disproportionate burden of hospitalisation amongst such workers indicates that health shocks are binding in the context of labour precarity, exacerbating economic vulnerability even in the presence of nominal insurance coverage. This pattern is consistent with wider evidence indicating the tenuous integration of informal labour markets to formal social protection systems.

The selection of the provider becomes a salient factor in cost. Although Kerala has comparatively stronger public healthcare infrastructure, this was not reflected in the choice of facility, with large proportions of insured patients continuing to seek care from private hospitals, especially at Cherthala. This dependence not only indicates a perception of the differentials in quality but also local differences in the availability of care and referral pathways. This significant OOP cost differential attributed to private admissions documents the incomplete net regulation of the private sector by public insurance in respect to prices and services, consistent with national-level studies that document comparable disconnects between insurance and expenditure.

Clinical characteristics are additional modifiers of financial outcomes. Prolonged stays in the hospital in addition to chronic ailments considerably raised OOP spending suggesting that even if insurance coverage provides a lump sum benefit, it inaccurately estimates expenses against long term care or labourise medical conditions. High spending on medicines and

diagnostics reflects ongoing coverage gaps in benefits packages and supply-side constraints in public facilities which incentivise insured patients to source inputs from markets.

Local health system contexts mediating insurance effectiveness is shown by taluk-level variation. Higher financial burden in Cherthala, even after adjusting for individual attributes, reveals that spatial inequalities in public provisioning and private sector supremacy create the determinants of insurance outcomes; they create greater electronic, but narrower other, financial accessibility. This supports the conclusion that even if insurance coverage were achieved, the uneven capacity of health systems at sub-district levels cannot be countered.

Overall, these results indicate that although public health insurance has succeeded to some extent in improving hospital access for marginalised workers in Alappuzha, its role in financial risk protection is partial and unequal. Despite insurance coverage, the continuation of OOP expenditure among insured populations indicates a structural misalignment between the design of insurance, labour-market realities, and the functioning of Kerala's mixed health system.

5.1 Policy implications

Public health insurance reforms under PMJAY and Kerala's Aardram Mission need to move beyond a narrow focus on hospitalisation coverage and address the structural sources of residual out-of-pocket expenditure faced by socially and economically backward workers. First, benefit packages under PMJAY should be recalibrated to ensure comprehensive coverage of medicines, diagnostics, and follow-up care during inpatient episodes, as these components account for the largest share of OOP spending even among insured patients. Strengthening price standardisation and timely reimbursement mechanisms—particularly for private hospitals empanelled under PMJAY—is essential to curb cost shifting onto patients and to enforce effective financial protection.

Second, the Aardram Mission's emphasis on revitalising primary and secondary public health facilities should be strategically aligned with insurance implementation. Expanding diagnostic capacity, drug availability, and specialist services at government taluk hospitals in districts such as Alappuzha would reduce dependence on private providers and limit avoidable inpatient admissions. Insurance utilisation pathways should be explicitly linked to strengthened public facilities through referral protocols and gatekeeping mechanisms, ensuring that insured patients are not systematically diverted to higher-cost private care.

Third, insurance design must recognise the specific vulnerabilities of unorganised and informal workers. PMJAY enrolment and service delivery should be accompanied by targeted outreach through labour collectives, coir societies, fisheries cooperatives, and local self-government institutions to improve awareness of entitlements and grievance redressal mechanisms. Simplifying administrative procedures and ensuring cashless treatment in practice—not merely in policy—would reduce indirect financial barriers for workers with unstable incomes.

Finally, district- and taluk-level monitoring of insurance performance should be institutionalised to capture spatial variations in utilisation and financial burden. Integrating PMJAY data systems with Kerala's public health information infrastructure would enable real-time tracking of OOP expenditure patterns and provider behaviour. Such locally grounded governance mechanisms are critical for translating insurance coverage into meaningful financial protection within Kerala's mixed health system, particularly for marginalised labour populations in coastal districts.

6. Conclusion

This study demonstrates that public health insurance has expanded inpatient access among socially and economically backward workers in coastal Kerala, yet its capacity to provide effective financial protection remains limited. Despite insurance coverage, insured households continue to incur substantial out-of-pocket expenditure during hospitalisation, particularly when care is sought from private providers. The persistence of such expenditure indicates that insurance has functioned more as an access-enabling mechanism than as a comprehensive financial risk protection tool.

The findings highlight the central role of provider type and local health system context in shaping financial outcomes. Higher reliance on private hospitals, longer hospital stays, and chronic illness significantly increase financial burden, while taluk-level variation underscores the influence of spatial inequalities in public health infrastructure. These patterns suggest that insurance outcomes are mediated less by individual characteristics and more by structural features of healthcare delivery within Kerala's mixed system.

Importantly, the concentration of hospitalisation among informal and socially disadvantaged workers reveals a convergence of labour precarity and health vulnerability. For these groups, even partial cost exposure during inpatient care can translate into economic distress, reinforcing cycles of insecurity. The study thus challenges assumptions that high insurance coverage alone is sufficient to achieve financial protection in contexts marked by informal labour markets and private sector dominance.

Finally, the evidence underscores the need to reframe public health insurance as one component of a broader health system strategy. Without parallel investments in public provisioning, regulation of private care, and attention to local labour realities, insurance coverage will continue to fall short of delivering equitable financial protection for vulnerable populations.

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References

- Adithyan, G. S. (2024). Kerala's progress towards universal health coverage: The road travelled and beyond. *BMC Public Health*, 24, Article 112.
- Berman, P., Ahuja, R., & Bhandari, L. (2010). The impoverishing effect of healthcare payments in India. *Economic & Political Weekly*, 45(16), 65–71.
- Florence, M. A., & Padath, P. (2024a). Technological modernization and its challenges in coir industry in Alappuzha. *Journal of Social Sciences and Economics*, 3(2), 92–99.
- Government of India (2019). *National health accounts estimates for India*. MoHFW.
- Isaac, T. M., & Raghavan, P. (1990). *A policy framework for the revitalization of the coir industry in Kerala*. CDS.
- Joe, W., Rudra, S., & Subramanian, S. V. (2018). Horizontal inequity in health care utilisation in India. *Health Policy and Planning*, 33(3), 430–440.

- Karan, A., Yip, W., & Mahal, A. (2014). Extending health insurance to the poor in India. *Social Science & Medicine*, 181, 83–92.
- Mohanty, S. K., & Ram, F. (2018). Spatial patterns of poverty and health spending in India. *Population Research and Policy Review*, 37(4), 547–571.
- Mohanty, S. K., Kim, R., Khan, P. K., & Subramanian, S. V. (2016). Geographic variation in catastrophic health spending in India. *Health Policy and Planning*, 33(2), 192–203.
- Nair, K. N., Isaac, T. M., Van, P. A., & Stuijvenberg, J. (1992). *Modernisation and employment: The coir industry in Kerala*. Sage.
- Padath, P. (2025a). Beyond the waves: Ethnic socio-cultural life and transforming women's roles in the Alappuzha sea fishermen community. *Indialogs*, 12(1), 49–73.
- Padath, P. (2025c). Civic sense as behavioral infrastructure. *Koya University Journal of Humanities and Social Sciences*, 8(2), 622–632.
- Pratheesh, P. (2021). Modernization, coir worker and labour alienation. *IARJSET*, 8(9). <https://doi.org/10.17148/iarjset.2021.8905>
- Pratheesh, P., & Nair, N. G. (2022a). Performance of coir industry in Alappuzha and labour displacement. *HuSS International Journal of Research in Humanities and Social Sciences*, 9(2), 65.
- Pratheesh, P., Reema, M., & Florence, M. A. (2024). Addressing unemployment through the coir industry. *Asian Research Journal of Arts & Social Sciences*, 22(9), 107–119.
- Prinja, S., et al. (2019). The cost of universal health care in India. *PLOS Medicine*, 16(7), e1002955.
- Rammohan, K. T. (1999). *Technological change in Kerala industry*. CSSS.
- Rammohan, K. T. (2008). *Coir in India: History of technology*. Springer.
- Selvaraj, S., & Karan, A. K. (2012). Why publicly financed health insurance schemes are ineffective. *Economic & Political Weekly*, 47(11), 60–68.
- Sriram, S., & Khan, M. M. (2020). Effect of health insurance on inpatient OOP costs. *BMC Health Services Research*, 20, 839.
- Sudarshana, B. (2020). Productive forces in the coir industry. In *The political economy of uneven rural development* (pp. 145–186).
- Wagstaff, A., et al. (2016). Progress on catastrophic health spending. *The Lancet Global Health*, 6(2), e169–e179.
- World Health Organization. (2010). *Health systems financing: The path to universal coverage*.
- World Health Organization. (2015). *Tracking universal health coverage*.



Community Perceptions and Adaptation Dynamics in Inland Fisheries of Vembanad Lake, Kerala

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Abstract

Flood has become a recurrent climate shock in Kerala with ramification on inland fishery and wetland-oriented community livelihoods. This paper examines fisherfolk's constructs of flood-induced eco-change and its association with socioeconomic vulnerability and adaptation mechanisms within a Ramsar site-analyzed Vembanad Lake tropical wetland. The study relies on a convergent parallel design and is built on household surveys, focus group discussions (FGDs) and key informant interviews (KIIs) carried out in 12 fishing villages of Alappuzha, Kottayam and Pathanamthitta districts. Model of Heckman two steps for willingness to using adaptive practices on cage aquaculture, biofloc system and water quality management — that is conducted regarding quantitative analysis with regard to social and economic variables. The findings 78% of the public believe flood is an important ecological threat which involves siltation water depth reduction, insufficient density of commercially viable species and alien species insurrection confirming it to be one of the major ecological disturbances. Of those, more than three-quarters suffered a reduction in their earnings of greater than a third of annual income, evidencing heightened livelihood insecurity. The majority (79.8%) of respondents are open to adapting and adjusting in response to climate change, coupled with a willingness to pay extra costs if they were well-educated, have better household income, and access social protection. It then argues that whilst capture fisheries tend to display some ecological resistance to degradation, sustainable change is contingent on wetland governance unification and locally appropriate policy frameworks that respond increasingly to the impacts of a changing climate.

Keywords: floods; inland fisheries, livelihood vulnerability, community perceptions, climate adaptation, wetland governance, Vembanad Lake.

1. Introduction

Floods are a major climate disturbance of global freshwater ecosystems scheduled by climate change with potential inter-annual effects through hydrologic regime shifts and persistent changes of water quality and biodiversity (Poff et al., 2010; Junk et al., 2014). Such disturbances vary and have diverse impacts, but lowland lakes, especially inland fisheries, which depend on fragile equilibria of depth, flow, and species diversity are intimately vulnerable to such disturbances. South Asia is also characterized by concentrated populations dependent on fisheries and the ecological importance of many tropical wetland (Allan et al., 2005; Dudgeon et al., 2006), which further exacerbates these vulnerabilities. The point of intersection between a biodiversity hotspot and socioeconomic dependence is exemplified by Kerala's Vembanad Lake,

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the longest lake in India that also falls under a Ramsar wetland. More than 20,000 inland fisher households depend on the lake for livelihood through commercial harvest of a variety of species, including *Etroplus suratensis* (pearl spot), giant freshwater prawns, and clams (Kurup & Sebastian, 2002; Arun et al., 2016).

The unprecedented floods of 2018 and 2019, in sequence, exposed this wetland system's high sensitivity to climatic shocks. Heavy precipitation led to extensive silt deposition, blockage of channels and degradation of water quality throughout Vembanad and its riverine inflows (KSDMA, 2019). This hydro-geomorphic change decreased fishing depth and fragmentation of breeding habitats resulted in substantial declines with a number of important fish and prawn species. Post-flood field surveys reported a decline in pearl spot and freshwater prawns with the appearance of invasive species — African catfish (*Clarias gariepinus*) — and suckerfish leading to increased pressure on native biodiversity (ATREE, 2019; Nandan & Jayachandran, 2020). These ecological changes directly manifested into livelihood pressures where fisher households reported decreased fishing effort and income—a pattern mirrored in other flood-prone tropical wetlands (Welcomme et al., 2010; Youn et al., 2014).

In addition to its focus on ecological change, this study is framed by the traditions of environmental sociology and livelihood sociology which address how environmental risks are socially understood, institutionally mediated, and unevenly experienced across populations. Floods here are not just as biophysical phenomena, but risks framed by social experiences, that alter daily practices of adaptation, reveal gaps in institutions, and direct decisions on adaptation. Empirically, building upon perceptions shared by fisher households about their hardships, their economic strategies, and their relationships with collective institutions, the paper reframes the classic environmentally-deterministic analytical recourse of understanding anthropogenic climate impacts (or environmental degradation) and shifts it instead upon the social articulation processes that renders ecological disruption into a vulnerability motif of livelihoods. In this way, it addresses sociological calls for integrated analyses integrating environmental change, risk, and collective action in climate-sensitive livelihood systems.

In addition to short-term ecological disruption, repeated flooding brings long-term uncertainty for fisheries viability in a world of increasing climate variability. Studies comparing tropical and subtropical wetlands have shown that flood-induced sediment loading and nutrient pulses may temporarily increase fish production but at disturbance frequencies that exceed ecological recovery thresholds, these disturbances may ultimately undermine long-term productivity and diversity (Baran & Myschowoda, 2009; Winemiller et al., 2016). In Vembanad, while recent data indicate some degree of ecological resilience, the repeated extreme events coupled with cumulative impacts of siltation and habitat loss have started to pose risks of internal capture fisheries over the longer term. The biological hotspot and socioeconomic safety net character of the lake means we are alarmed, because ecological degradation instantly translates into breakdown of livelihoods.

Against this background, the aim of the present study is to produce systematic evidence on (1) the ecological impacts of flooding in fisheries; and (2) the perceptions and responses of fishing communities to flood as an ecosystem inflection point. The integrated assessment of ecological disruption, livelihood impacts and adaptive orientation that the study provides at the level of inland fisher households, is the result of combining empirical data from household-level surveys with information from community interactions and econometric analysis. In so doing, this task provides a practical and theoretical contribution to sociological discussions on environmental hazard, institutional moderation and collective coping mechanisms in vulnerable livelihood systems dependent on wetlands as critical resources.

2. Review of literature

A large body of literature focusing on ecohydrological change induced by floods identify hydrological variability as a key driver of fisheries production across river floodplain and wetland systems. Floods are ecological disturbances or renewal mechanisms that affect sediment dynamics, nutrient fluxes and access to breeding and nursery habitats (Welcomme et al., 2010; Winemiller et al., 2016). Although seasonal flooding can promote fish recruitment and biomass in the short term through habitat connectivity, high-magnitude or recurrent flood events often decrease long-term productivity through enhanced sedimentation, fragmentation of habitat, and disruption of trophic habitats (Baran & Myschowoda, 2009; Junk et al., 2014). This juxtaposition has been well documented in the Mekong (and other systems such as Amazon and Congo) where there are (1) periods of ecological provision and productivity offset by (2) structural stresses that propagate through aquatic food webs and livelihoods (Poff et al., 2010; Schneider et al., 2023).

Inland capture fisheries in South Asia that depend on predictable seasonal flows and sediment–nutrient balances are particularly vulnerable to climatic variability. For example, empirical studies from floodplain systems in Bangladesh show that although unregulated floods initially increase catch volumes, recurring extreme events lead to silted channels, hypoxia, and decreased species richness in the long term (Allan et al., 2005; Dudgeon et al., 2006). Patterns similar to this have been seen across large Indian river systems like the Ganga and Brahmaputra, where massive floods often separate ecological recovery from livelihood stability (Patnaik, 2003). In these situations, fishing communities are often left economically vulnerable for many years even after partial species recovery [1], which highlights the limits of ecological resilience in the absence of reinforcing institutional and governance arrangements (Welcomme, Galaz & Uitto, 2010).

These dynamics at the interface of ecosystems, livelihoods, and governance dynamics provide an illustrative opportunity to learn from Kerala's wetland systems. The Vembanad estuarine complex has a long history of supporting fisheries for inland fish species (*Etroplus suratensis*, *Macrobrachium rosenbergii* and commercially important clams) and studies in the past 5 decades have shown the rich biodiversity of the estuary (Kurup & Sebastian, 2002). Despite this, previous research has highlighted the extent of anthropogenic modification of hydrological regimes, and habitat connectivity through barrage construction, land reclamation and aquaculture intensification (Arun et al., 2016), prior to contemporary floods. Overlaying these threats, the record floods of 2018 and 2019 caused extensive sedimentation, changes in salinity and spatial disaggregation of the lake system (KSDMA, 2019; Author, 2025). The effects of the floods were recorded in post-flood evaluations of catch volume reductions and drastic changes to species composition such as the increasing dominance of harmful species that threaten native stocks and fishing livelihoods such as African catfish (*Clarias gariepinus*) and suckerfish (ATREE, 2019; Nandan & Jayachandran, 2020; Author, 2025).

A wider body of literature has explored resilience pathways in wetland fisheries and highlighted that resilience is not synonymous with recovery, nor is recovery assured. In the Mekong basin, some species show the capacity for plastic breeding strategies and rapid dispersal, representing adaptive responses to flooding that may enable partial persistence under intermediate disturbance regimes (Baran & Myschowoda, 2009). Few fish populations in Vembanad have bounced back post-flood, but only to levels which do not match past diversity or abundance (ATREE, 2019). Thus, our results reveal a fractal kind of resilience that depends not only on environmental tipping points and disturbance intervals, but also on the responses to disturbances in forms of governance, management actions, and socioeconomic environments within which fisheries operate. Comparative studies among tropical wetlands reveal that weak or absent integrated floodplain management and community-based governance mechanisms lead recurrent floods to push ecosystems into degraded, less productive stable states (Winemiller et al., 2016; FAO, 2020).

Collectively, the existing literature demonstrates that floods act as multifaceted and dynamic ecological drivers in inland fisheries that can produce both short-lived pulses in productivity and long-lived structural degradation. Although global and regional studies have provided insights regarding hydrological variability, sediment dynamics and species-specific responses in tropical floodplain systems, significant limitations remain. More specifically, much of this literature focuses on biophysical indicators of flood impacts, with relatively less attention to the ways in which fishing communities perceive, interpret and respond to ecological change in wetland ecosystems.

Second, analyses of studies that address livelihoods often examine economic outcomes in isolation from ecological processes that drive livelihoods, producing fragmented analyses that can miss the coupled nature of social–ecological systems. Lastly, although the occurrence of extremes induced by climate change has been increasingly recognized, robust empirical studies relating flooding-driven ecological disruption to community-level adaptation decisions, particularly in tropical wetlands designated as Ramsar sites, are rare. While past studies of Vembanad Lake describe ecological changes and declining catches following flooding, an integrated assessment of fisherfolk perceptions of ecological change, livelihood vulnerability and adaptive capacity are lacking. This gap is particularly important considering the lake not only provides critical livelihoods for thousands of inland fishers, but is also a biodiversity hotspot.

Without integrated evidence, policymakers are challenged in developing adaptation strategies as they are often designed without sufficient grounding in local risk perceptions, economic constraints, or willingness to alternative practice adoption. To fill this gap, the current study aims to explore flood-driven ecological change from a multi-pronged ecological, socioeconomic, and behavioural perspective, enabling us to see how chronic floods manifest as livelihood vulnerability, and the circumstances under which adaptive responses may be possible. The juxtaposition of community perceptions with empirical indicators and econometric evidence ensures the study speaks directly to the unresolved research problem about the impact of climate-driven floods on fisheries sustainability and household resilience in a complex tropical wetland system.

3. Methodology

To analyse the mediating role of flood events in the relationships between ecological change and livelihood vulnerability in inland fisheries this study employs a multidisciplinary empirical approach, integrating environmental sociology, livelihood analysis, and fisheries economics. The analysis was inclusive not just of biophysical effects but also of the many ways in which such environmental risks can be interpreted, perceived, and experienced, in addition to how dependent households interictally manage and institutionalized via collective arrangements.

Study area Fieldwork was done in the Vembanad Lake system which is the longest inland freshwater lake system in India and is designated as a Ramsar wetland covering Alappuzha, Kottayam and Pathanamthitta districts in Kerala (Figure 1). We chose the study area based on a combination of high ecological importance, heavy reliance on inland capture fisheries for livelihoods, and substantial risk from extreme flooding in 2018 and 2019.

We used a multistage sampling design to ensure representation both spatially and socially. Stage one consisted of selecting three lake-dependent districts. The second stage involved the random selection of ten fishing villages within the major fishing clusters. The third stage comprised a cross-sectional household survey (n=132) stratified by cooperative membership and access to social security schemes—elements previously recognised to modulate adaptive capacity within the small-scale fisheries. The data on 450 fisher households were collected

through a survey. The sample size was determined by Cochran's formula, with a 95 percent level of confidence and a 5 percent level of significance.

The study collected primary data using data collection methods that included a structured household survey, focus group discussions, and key informant interviews. Details of the household survey, including demographic information, perceptions of environmental change (including siltation, water-quality degradation, and species abundance), and livelihoods (fishing effort and household income) before and after flooding events were recorded together with details of the flooding event occurred. Focus on species-level perceptions — *Etroplus suratensis* (pearl spot), *Macrobrachium rosenbergii* (giant freshwater prawn), clams, tilapia and catfish. Methods: Willingness to adopt adaptive practices (cage aquaculture, biofloc systems) was assessed using contingent valuation (CV) questions, and direct CV was used to elicit maximum monthly willingness to contribute from respondents. Focus group discussions were used to check survey findings and contextualise household responses while key informant interviews involving institutional representatives from cooperatives and fisheries officials provided institutional insights on adaptation and governance.

Quantitative data combined descriptive statistics with a two-step Heckman selection model to control for selection bias in estimates of willingness-to-contribute values. The first stage employed a probit model to estimate the probability of the category adaptive, given education, household income, cooperative membership, and access social security. Stage 2 For the second stage, we estimated monthly contribution levels conditional on adoption as a function of household socioeconomic characteristics. Truncated regression confirmed that results were robust to sensitivity checks. All Statistical analyses were performed using STATA 16.0 and graphical visualisations were created using R version 4.0.

The study was approved by an institutional review board with appropriate ethics oversight. All participants provided written informed consent ahead of data collection, and participation was voluntary and anonymous during the study.

4. Results and analysis

The analysis draws on survey data from 450 fisher households across the Vembanad Lake system to examine the social and ecological consequences of recent flood events. Results are organized to reflect the study's empirical framework, beginning with household and livelihood characteristics, followed by reported ecological changes affecting fisheries, and subsequent economic impacts on fishing effort and income. The section concludes with econometric evidence on households' adoption of and contribution toward adaptive practices. This sequential presentation facilitates an integrated assessment of how flood-induced environmental disruptions translate into livelihood vulnerability and shape community-level adaptive responses within a complex wetland system.

4.1 Socioeconomic characteristics of fisher households

The socioeconomic profile of the surveyed fisher households establishes the contextual baseline for interpreting variations in ecological perceptions, livelihood impacts, and adaptive responses to flood events in the Vembanad Lake system. A total of 450 households were surveyed across three districts, with representation from Alappuzha (180 households), Kottayam (150), and Pathanamthitta (120). This distribution reflects spatial diversity in flood exposure and degrees of dependence on inland capture fisheries.

Table 1. Socioeconomic profile of surveyed fisher households (n=450)

Variable	Category / Mean	% / SD
District distribution	Alappuzha (180), Kottayam (150), Pathanamthitta (120)	–
Gender of respondent	Male	82%
Mean age (years)	42.7	SD=9.3
Mean fishing experience (years)	21.3	SD=7.8
Education level	No formal education (13%); Primary (64%); Secondary (23%)	–
Cooperative membership	Yes	73%
Access to social security schemes	Yes	38%

The respondent pool was predominantly male (82%), reflecting the gendered organization of inland capture fisheries, where men primarily engage in active fishing while women contribute through ancillary activities such as clam collection, net repair, and post-harvest processing. The mean age of respondents was 42.7 years (SD=9.3), indicating that most households were headed by individuals within their prime working years. This demographic composition underscores the direct implications of flood-induced disruptions for household income stability and long-term livelihood security.

Fishing experience averaged 21.3 years (SD=7.8), suggesting deep occupational embeddedness and long-term familiarity with seasonal hydrological variations and ecological cycles of the lake. The relatively narrow dispersion around the mean indicates a socially homogeneous fishing population with intergenerational continuity in fishing as a primary livelihood. Such experiential depth provides a credible basis for assessing perceived ecological changes following flood events.

Educational attainment was limited across the sample, with nearly two-thirds of respondents reporting only primary education and 13 percent lacking formal schooling altogether. This pattern reflects persistent structural constraints faced by inland fishing communities and has direct implications for engagement with technically complex adaptation measures. While cooperative membership was high (73%), indicating strong institutional linkage within the fisheries sector, access to formal social security and insurance schemes remained limited to 38 percent of households.

The combined distribution of these indicators reveals a dual structural condition. On the one hand, high cooperative participation suggests institutional pathways through which collective adaptation and information dissemination may be mobilized. On the other, low educational attainment and restricted social security coverage expose households to heightened vulnerability during ecological shocks. Together, these socioeconomic characteristics frame the conditions under which flood impacts are experienced and shape the scope for adaptive responses examined in subsequent sections.

4.2 Perceived ecological changes and species-level impacts

Survey responses indicate widespread perception of ecological alteration in the Vembanad Lake system following the flood events. A substantial majority of households reported changes in hydrological and habitat conditions that directly affected fishing operations and species

availability. These perceptions were consistent across districts, though intensity varied with proximity to open lake zones and flood exposure.

Table 2. Perceived ecological changes and species-level impacts reported by fisher households (n=450)

Ecological indicator / Species	Reported change	% of households
Siltation and sediment deposition	Increased	81%
Reduction in effective water depth	Yes	76%
Water quality deterioration (turbidity, odor, hypoxia)	Yes	69%
Altered flow and navigability constraints	Yes	64%
Decline in <i>Etroplus suratensis</i> (pearl spot)	Reduced availability	72%
Decline in <i>Macrobrachium rosenbergii</i> (freshwater prawn)	Reduced availability	68%
Decline in clam resources	Reduced availability	61%
Increase in tilapia	Increased presence	43%
Increase in African catfish / suckerfish	Increased presence	49%

The most frequently reported ecological stressor was increased siltation, cited by 81 percent of respondents, followed by reduction in effective fishing depth (76 percent). Respondents noted that sediment deposition constrained the use of traditional fishing gear and reduced access to customary fishing grounds, particularly during the post-monsoon season. Water quality deterioration was reported by 69 percent of households, commonly described in terms of increased turbidity, seasonal hypoxia, and reduced fish vitality. Altered flow patterns and navigability constraints were also widely noted, affecting fishing effort and spatial mobility.

Species-level perceptions reveal a clear shift in catch composition. Declines in commercially valuable species were reported by a majority of households, with 72 percent citing reduced availability of pearl spot and 68 percent reporting declines in freshwater prawns. Clam resources were perceived to have declined by 61 percent of respondents, particularly in areas affected by prolonged sediment accumulation. In contrast, nearly half of the households reported an increased presence of non-native or low-value species, including African catfish and suckerfish, while 43 percent observed greater prevalence of tilapia.

These patterns suggest that flood-induced ecological change was not limited to temporary disruption but involved reconfiguration of habitat conditions and species dominance. Although some respondents reported partial recovery of select species in subsequent seasons, such recoveries were widely perceived as insufficient to restore pre-flood catch diversity or economic value. The persistence of invasive and low-demand species was viewed as a longer-term ecological concern rather than a transient outcome of flooding.

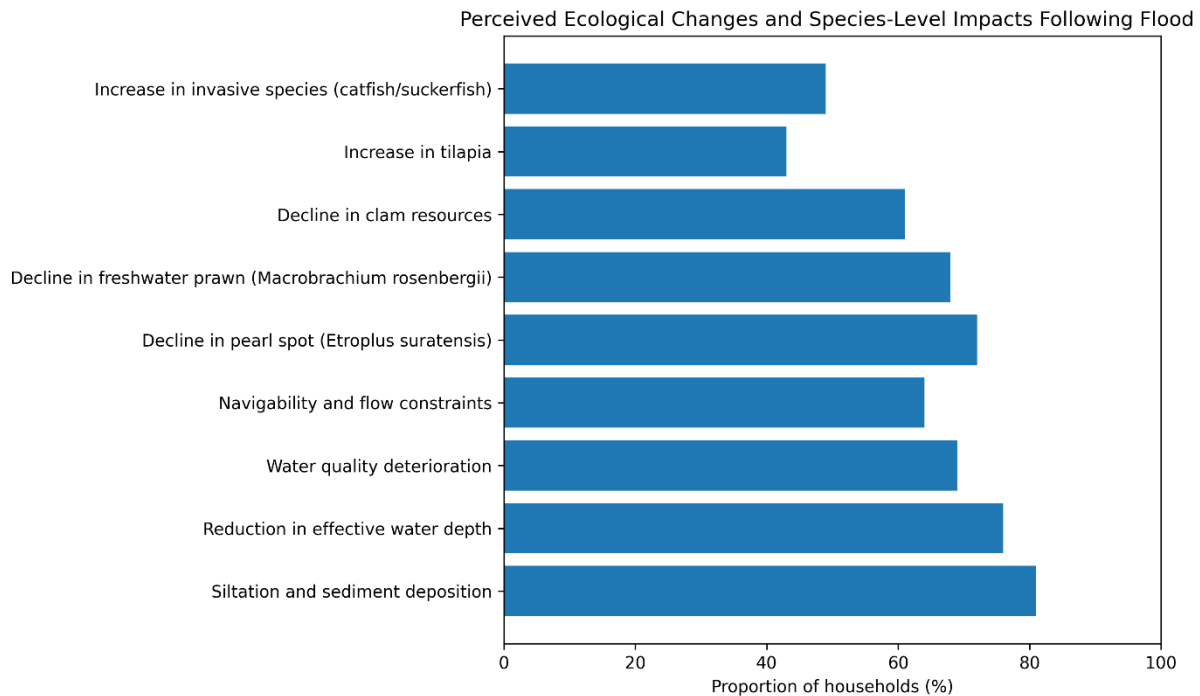


Figure 1. Perceived ecological changes and species-level impacts reported by fisher households

Figure 1 illustrates the proportion of surveyed households reporting major post-flood ecological stressors and changes in species availability in the Vembanad Lake system. Siltation, reduced water depth, and water-quality deterioration emerge as the most widely perceived ecological changes. Species-level perceptions indicate substantial declines in commercially valuable taxa alongside increased prevalence of invasive and low-value species, reflecting a broader reconfiguration of fisheries habitats following flood events. Taken together, the distribution of perceived ecological changes provides a structured ecological context for understanding the livelihood impacts and adaptive responses examined in the following section.

4.3 Economic and livelihood impacts of flood events

The economic and livelihood impacts reported in this section are derived from household-level survey data (n=450) comparing pre-flood and post-flood fishing conditions, including annual fishing income, number of fishing days, and flood-related expenditure on fishing gear. Income losses and effort reductions were calculated as relative changes from baseline pre-flood conditions reported by respondents.

Table 3. Changes in fishing income, effort, and expenditure following flood events (n=450)

Indicator	Pre-flood Category	Post-flood Category	% of households / Mean (SD)
Annual fishing income change	Loss < 20%	–	10%
	Loss 20–30%	–	18%
	Loss > 33%	–	72%
Fishing effort (days/year)	Mean = 216 days	Mean = 154 days	SD=32 (pre); SD=27 (post)
Change in fishing effort	–	–	29% reduction
Statistical test (effort)	Paired t-test	–	$t = 14.62$; $p < 0.01$
Increase in gear-related expenditure	No	Yes	47%

Household survey responses indicate a substantial decline in fishing income following the flood events. On average, annual fishing income declined by approximately 34 percent relative to pre-flood baselines. Income losses were widespread rather than concentrated among a small subset of households. Nearly three-quarters of respondents (72 percent) reported income reductions exceeding one-third of their annual earnings, while a further 18 percent experienced losses in the range of 20–30 percent. Only 10 percent of households reported income losses below 20 percent, underscoring the systemic nature of flood-induced livelihood disruption. Fishing effort, measured as the number of fishing days per year, also declined markedly. Prior to the floods, households reported an average of 216 fishing days per year (SD=32). This figure fell to 154 days (SD=27) in the post-flood period, representing a 29 percent reduction in annual fishing effort. A paired t-test confirms that this reduction is statistically significant ($t=14.62$, $p<0.01$), indicating that the observed decline is unlikely to be attributable to random variation.

In addition to income and effort losses, households faced increased expenditure pressures associated with flood damage. Nearly half of the respondents (47 percent) reported higher costs related to the repair or replacement of fishing gear, including nets, boats, and engines damaged during flood events. These additional expenditures compounded income losses and further constrained households' capacity to reinvest in fishing activities, particularly among those lacking access to insurance or social security coverage.

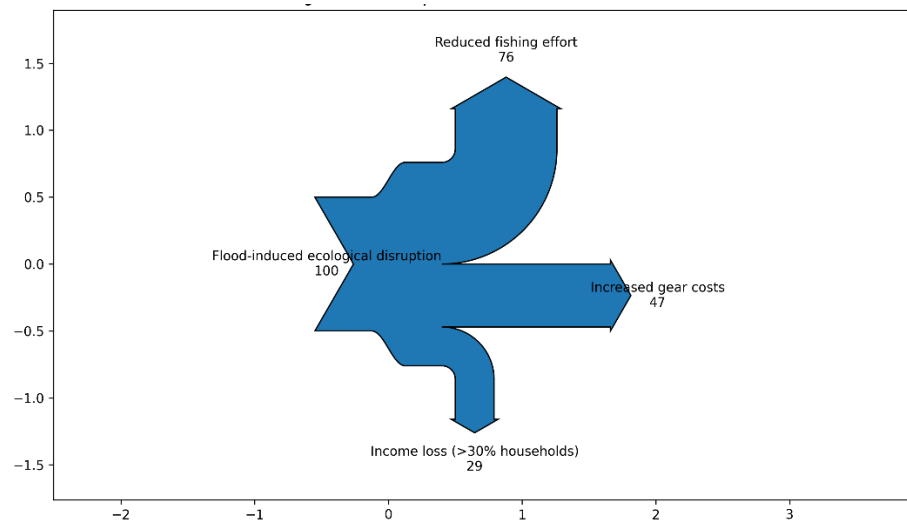


Figure 2. Cascading livelihood impacts of flood events on inland fisheries

This Sankey-style visualization shows how flood-induced ecological disruption translates into multiple, reinforcing livelihood impacts, based on your Results Sections 4.2 and 4.3:

- Ecological disruption (siltation, depth reduction, water-quality decline)
→ leads to reduced fishing effort (29% decline in fishing days)
- Reduced effort
→ contributes to substantial income losses (over 70% households losing >1/3 income)
- Income decline
→ compounded by increased gear-related expenditures (47% households)

The width of flows reflects the relative magnitude of reported impacts, enabling reviewers to visually grasp the compounding nature of flood effects rather than seeing them as isolated outcomes. Taken together, the combined evidence from income distribution, effort reduction, and expenditure escalation demonstrates that floods affected fishing livelihoods through multiple reinforcing mechanisms. Reduced ecological productivity, constrained access to fishing grounds, and rising operational costs interacted to intensify household vulnerability, creating the conditions under which adaptive responses became both necessary and unevenly accessible.

4.4 Adaptive responses and willingness to adopt flood-resilient practices

Adaptive responses reported in this section are derived from household survey data (n=450) capturing respondents stated willingness to adopt flood-resilient practices and their maximum monthly financial contribution toward such measures. Willingness-to-contribute values were elicited using contingent valuation questions, as described in the methodology.

Table 4. Adoption preferences and willingness-to-contribute (WTC) among fisher households (n=450)

Indicator	Category / Statistic	Value
Willingness to adopt any adaptive practice	Yes	62%
Preferred adaptive option	Cage aquaculture	41%
	Biofloc systems	34%
	Water-quality management	25%
Mean WTC (₹/month)	–	₹230
Median WTC (₹/month)	–	₹220
Standard deviation (₹)	–	₹54
WTC distribution	₹150–199	23%
	₹200–250	61%
	> ₹300	16%
High-value outliers	> ₹350	<5%

Survey results indicate that 62 percent of households expressed willingness to adopt at least one flood-resilient practice in response to recurrent livelihood disruptions. Among preferred options, cage aquaculture emerged as the most frequently cited, followed by biofloc systems and basic water-quality management measures. Adoption willingness was more commonly reported among households that experienced higher income losses and reduced fishing effort, suggesting that adaptive orientation was shaped by lived economic stress rather than generalized climate awareness.

Willingness-to-contribute values exhibited a unimodal and positively skewed distribution, with a clear clustering in the ₹200–250 range. The mean monthly contribution (₹230) exceeded the median (₹220), reflecting the influence of a smaller subset of households willing to contribute higher amounts. While nearly two-thirds of respondents converged around a moderate contribution range, lower and higher contribution segments indicate differentiated adaptive capacity across households. High-value outliers above ₹350 were limited in number and did not dominate the overall distribution.

To address potential selection bias in estimating contribution levels—given that only a subset of households expressed adoption willingness—the following section presents econometric results from a two-step Heckman selection model.

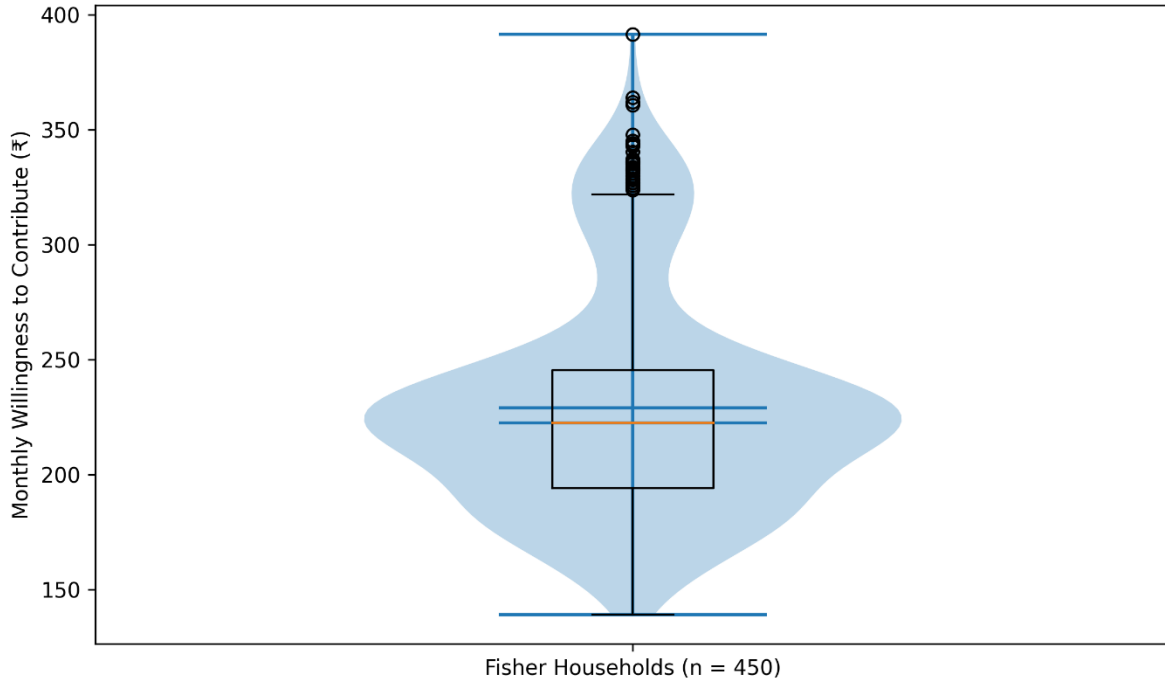


Figure 3. Distribution of household willingness to contribute toward flood-resilient practices

Households stated monthly willingness to pay for flood-resilience practices, shape of the distributional curve is presented in Figure 4. This density peak is also visible in the visualization and suggests that we have a single contribution range size instead of multiple ranges that would suggest fragmentation into different groups. It is positively skewed, and the mass of the distribution is closer to the low end of the scale and tapers off towards higher values of contribution. The position of the mean above the median shown as the internal pins contrast with the range of higher-valued responses which cumulatively draw more outliers for their presence but do not distort the general figure. In other words, look how tightly the interquartile range is squeezed, contrasting the broadness of the overall range of values: the bulk of the responses occupied a relatively narrow band of possibility, while outliers still remained outliers. The violin plot indicates that participation is continuous rather than polarized, with no sharp discontinuities or secondary modes in contribution levels. Such a visual pattern implies heterogeneity of willingness-to-contribute across households, yet some overlap, which allows a distributional micro-foundational approach to scrutinizing behavioural and socio-economic determinants of adoption and contribution in our econometric analysis below.

4.5 Determinants of adoption and contribution: Heckman selection model results

The econometric results reported in this section are derived from household survey data (n=450) on stated willingness to adopt flood-resilient practices and the corresponding monthly willingness-to-contribute (WTC) amounts. To address potential selection bias arising from the fact that contribution values are observed only for households expressing adoption willingness, a two-step Heckman selection model was estimated, as specified in the methodology.

Table 5. Heckman two-step model estimates for adoption and willingness to contribute (n=450)

Variable	Selection equation (Adoption: Probit)	Outcome equation (WTC: OLS)
Education (years)	0.042*** (0.011)	3.18*** (0.94)
Household income (baseline)	0.0009** (0.0004)	0.021** (0.009)
Cooperative membership (1 = yes)	0.317*** (0.089)	24.6** (10.8)
Access to social security (1 = yes)	0.284** (0.121)	19.3* (11.2)
Fishing experience (years)	0.006 (0.005)	0.41 (0.36)
Age of household head (years)	-0.004 (0.006)	-0.28 (0.44)
Constant	-1.126*** (0.302)	112.7*** (31.5)
Inverse Mills Ratio (λ)	—	0.361** (0.158)
Observations	450	279
Log-likelihood / R ²	-241.3	0.27

Notes: Robust standard errors in parentheses.

**p < 0.01, *p < 0.05, p < 0.10.

Positive and statistically significant associations are observed between household education, baseline wage, membership in a cooperative, and access to social security schemes with the likelihood of flood-resilient practice adoption. The selection equation does not indicate the effects of the fishing experiences and age are significant. In the outcome equation, education and income are still positive correlated with the amount of monthly contribution, and cooperate member and access to social security are still positively correlated with the stated WTC values.

The Inverse Mills Ratio (λ) is positive, statistically significant which implies selection bias is present and also confirms the correctness of applying the Heckman correction. These results imply that unobservable affecting adoption willingness are related to levels of contribution, and that estimates arising without correction would be biased.

These findings identify the broadest socioeconomic and institutional determinants of adoption and contribution intensity providing a statistical foundation for the differences in adaptive capacity seen across fisher households.

5. Discussion

The study shows that flood events in the Vembanad Lake system are not merely ephemeral environmental shocks but are embedded socio-ecological disruptions that transform fisheries ecology, livelihood stability and adaptive capacity concurrently. The analysis combines household perceptions, livelihood outcomes influence with econometric evidence to provide a more comprehensive explanation that extends beyond sectoral assessments of floods to show how ecological disturbance becomes socially consequential through particular institutional and economic channels. By so doing, the research makes a contribution to global discussions around the sustainable well-being of climate vulnerable livelihood systems in relation to environmental risk, resilience and adaptation.

The reported ecological changes — sedimentation, decreased effective water depth, impaired water quality, and shifted species assemblages — suggest that habitat conditions have changed rather than reflecting a temporary state after flooding. Although much is speculated about how flood pulses promote ecosystem productivity in tropical wetlands, our findings further show that repeated large-scale floods drive the system beyond regenerative thresholds, leading to habitat simplification and loss of commercially important species. That said, the subsequent changes are not inferred based on only biophysical indices, but rather regularly articulated through the lived experiences of fisher households, giving credence to perception-based ecological assessment as a sociologically meaningful data source. Therefore, confirming that perceptions are a key domain in the manner in which changes in the environment are experienced, understood and acted upon by small-scale fisheries.

When institutional buffering mechanisms are weak, the livelihood impacts documented in this study illustrate the limits of ecological resilience. This suggests that partial recovery of the species does not lead to full recovery of livelihood, as illustrated by still significant income losses, reduced fishing efforts, and increased expenditures on fishing gear. While ecologically- and socially-resilient floodplain fisheries have been reported internationally, this study contributes to the literature on multiple livelihood stressors by proving how they interact. The conjunctive impact of decreased days at sea, reduced value of catch, and increasing cost of fishing, gives rise to compounding vulnerabilities instead of affording gradual adjustment for households. Flood impacts can thus not be treated as single-point shocks but processes that rearrange the economic sustainability of fishing as time goes by.

Finally, this social differentiation of resilience is further elucidated by adaptive responses. An examination of the distribution of willingness-to-contribute values shows no extreme polarization, and no widespread inability to contribute. Instead, most households cluster around a grant contributing \$5.00-\$9.99 range, suggesting that conditions of economic stress exist for which collective adaptation capacity lies in wait. That convergence is significant sociologically: it implies that readiness to adapt depends less on the individual willingness to take risk and more on the perception of what is technically possible to do with the economy as a whole within the community. The lack of clear bimodality in contributions suggests that adaptation is not viewed as the preserve of richer households that poor households reject, nor as something so desirable to be rejected out of hand by poorer resource households.

The estimations provide econometric support for this reading by showing that education, income at the baseline, cooperative membership and access to social security are the most important covariates of adoption probability and measure of contribution. These results underscore that adaptation capacity is institutionally mediated, not just income-dependent. Cooperative membership is especially salient highlighting the importance of collective institutions to overcome contractual and informational impediments to adaptation. Access to social security (like the conditional cash transfers made by these same governments) seems to give enough stability to households that they can make long-term investments to move their livelihood ahead, even while immediate conditions are insecure. Conversely, fishing experience age does not have a significant effect on adoption or contribution, implying that building experiential knowledge in the fishing sector does little to transcend hard structural constraints.

Analytically transferable insights than context-bound conclusions are what the Vembanad case offers from an international perspective. Similar studies in tropical wetlands of Asia, Africa and Latin America report analogous ecological agents of stress—sedimentation, habitat fragmentation and biological invasion—after extreme floods. The present study differs in that it illustrates how these ecological processes lead to more or less adaptive social outcomes when mediated by institutions such as cooperative or social protection systems. In this regard, Vembanad is an evidence case of seemingly global processes observed in floodplain fisheries where

ecological disruption translates to vulnerability in livelihood, not naturally, but through differential access to resources of institutional support and collective action.

The results cast doubt too on technocratic assumptions that knowledge is the only thing standing between adaptation adoption. While adoption willingness is conditional and shaped by individual and institutional feasibility and method associations, despite high livelihood costs of adaptation, there are costs of adaptation imposed in an institutional way using a trust-institutional cost nexus and collective action capacity. This applies also to adaptation policy at a level that is not local. Technological “solutions” that fail to grapple with structural access have the potential to produce more of the status quo, and harm uptake (even in communities that acknowledge they need to do better).

In summary, the analyses provide a sociological contribution to knowledge on climate adaptation by highlighting resilient relationalities. Resilience is not so much a characteristic of ecosystems or households, but rather an emergent property of the dynamic interlinked nature of ecological disturbance; livelihood susceptibility and institutional configuration. Moreover, floods are both spectacles that reveal ecological fragility and social fault lines, and events that lay out possibilities for collective adaptation if they can be imagined. The paper provides a typology that allows for the analysis of experiences, impact and response to climate-related shock, which ties together empirical data in terms of perceived understanding, impact on livelihood and response across different forms and geographies of wetland/floodplain.

The Vembanad Lake system case study also provides evidence to suggest that a climate change signal can drive the re-structuring of inland fisheries through multi-stressor mediated socioecological pathways – something that is likely become more apparent with greater climate variability. This research demonstrates that even though ecological rebound or technological change might promote an interpretation of adaptation, such activities as reinforcing channels in institutions which give families power to adapt -or at least want to adapt-and then make it so are the actions behind sustained adaptive engagement. These findings have worldwide implications in relation to inland fishery, given that places with intermittent floods as well as high dependency and low social protection (such study areas) will require adapted responses considering a combination of ecological and social attributes.

6. Conclusion

Situated in the Vembanad Lake system, this study examined how repeated mega floods have altered the configurations of inland fisheries activity, livelihood and adaptive capacity, with a sociological framing of ecological disruption embedded within vulnerability, institution and collective action. Integrating household perceptions, livelihood impacts and econometric evidence the paper demonstrates that floods are not simply environmental shocks but socially mediated events that reconfigure fishing practices, issues of income stability, and adaptation pathways.

The findings also reveal that flood-induced ecological impacts, particularly silting and shallowness of water bodies as well as deterioration in water quality, and change in species composition are widespread among fishing communities, and are strongly associated with livelihood stress. This disruption was characterized by large reductions in fishing effort, widespread loss of income and rising operational costs, indicating how environmental shocks translate to sequential social pressures. Crucially our analysis shows that where ecological systems partially recover it is unlinked from recovery in livelihoods and as such the resilience of fisheries to ecosystem perturbations does not insulate fishers from that same shock.

The study's key innovation is to attend to the adaptive response to structural constraint. Yet, economic pressure has not blanked out all capacity for joint adaptation: the willingness-to-contribute values are focused into a large one-value-excess lot at moderately-high

contribution levels. This pattern runs counter to policy assumptions in climate adaptation for small-scale fisheries which hold either that adaptation is homogeneously constrained, or only driven by individual ability. But not, at the end of the day, reason and explanation - only as an operation socially structured, institutionally mediated: readiness to adaptation. Significantly, the econometric evidence is consistent with such a reading in that education, income, cooperative membership and access to social security are found to be important influencers of both adoption decisions and the quantum of contributions made while the individuals age and fishing experience does not manifest independent effects. These results contribute to putting institutions in the centre of adaptation processes, and to further shift agency from mere awareness or exposure towards dependence on institutional facilitation, enablement or constraints for adaptive action.

The paper contributes to discussions of environmental risk and resilience by showing how everyday practice through livelihood strategies make climate-induced disturbances consequential and how institutionally entrenched practices further amplify that consequentiality. Floods are diagnostic events, exposing the existing conditions of stratification over access to protection, resources, and collective organization, but also generate pressures that push adaptation. This indicates that resilience is revealed to be relational and contingent, and is made through the interplay of ecological change, livelihood dependency and institutional support, rather than residing solely in ecosystems or households.

Though the research is based on empirical data from the Vembanad Lake system, the insights are of wider relevance to inland fisheries and community dependent wetlands across the globe. Other floodplain systems around the globe in Asia, Africa, and Latin America are likely to have similar patterns of ecological strain, reliance on livelihoods, and unevenness of institutions. This study provides an analytical framework for informing future sociological and interdisciplinary research on climate adaptation that links perception based ecological assessment with livelihood impacts and adaptive decision making, which can be applied beyond our specific regional context.

There are some unavoidable limitations of this study. Ecological change in this study was measured based on community understandings rather than direct biophysical measurement, which is common in studies addressing the social dimensions of environmental change and fundamental to understanding meanings of environmental change and social response. The second was that the analysis was based on the stated willingness of farmers to implement and invest in adaptive practices, as opposed to actual behaviour, which may well change over time. The third relation is that, though interpretation and triangulation were informed by qualitative data, the Results stressed quantitative analysis and, in future research, a greater ethnographic depth around adaptation processes appears possible.

This work can also be extended to study longitudinal adaptation outcomes, examine biophysical indicators nested with social data, and/or study the intersections of gender, caste and inter-generational vulnerability and resilience in inland fisheries in future studies. If compared to that across wetland systems, such research would further refine our understanding of how institutional configurations (combined with governance regime) shape adaptation.

Thus, the study illustrates that efforts to alleviate flood-related vulnerability in inland fisheries cannot solely be based on ecological restoration or technological solutions. Creating stronger institutional access, social protections and collective governance mechanisms — all essential for adaptive capacity under increasing climate variability — is underappreciated and widely ignored in global climate discourses. This research highlights the social aspects of flood effects and adaptation, providing a more holistic view of resilience in climate-dependent livelihoods systems.

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References

- Allan, J. D., Abell, R., Hogan, Z., Revenga, C., Taylor, B. W., Welcomme, R. L., & Winemiller, K. O. (2005). Overfishing of inland waters. *BioScience*, 55(12), 1041–1051. [https://doi.org/10.1641/0006-3568\(2005\)055\[1041:OOIW\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2005)055[1041:OOIW]2.0.CO;2)
- Allison, E. H., Ellis, F., & Horemans, B. (2003). Livelihoods and diversification in inland fisheries: Implications for fishery management. *Food Policy*, 28(4), 333–358. [https://doi.org/10.1016/S0306-9192\(03\)00013-4](https://doi.org/10.1016/S0306-9192(03)00013-4)
- Arun, P. R., Remya, L., & Jayachandran, P. R. (2016). Fishing practices and socioeconomic conditions of fishers in Vembanad Lake, Kerala, India. *Indian Journal of Fisheries*, 63(3), 95–100. <https://doi.org/10.21077/ijf.2016.63.3.56651-13>
- Ashoka Trust for Research in Ecology and the Environment (2019). *Ecological impacts of the 2018 Kerala floods: Rapid assessment report*. ATREE.
- Baran, E., Jantunen, T., & Chong, C. K. (2007). *Values of inland fisheries in the Mekong River Basin*. WorldFish Center.
- Baran, E., & Myschowoda, C. (2009). Have fish catches been declining in the Mekong River Basin? *Fisheries Management and Ecology*, 16(1), 1–11. <https://doi.org/10.1111/j.1365-2400.2008.00638.x>
- Baran, E., & Myschowoda, C. (2009). Dams and fisheries in the Mekong Basin. *Aquatic Ecosystem Health & Management*, 12(3), 227–234. <https://doi.org/10.1080/14634980903149902>
- Belton, B., Haque, M. M., Little, D. C., & Sinh, L. X. (2014). Certifying “better management practices” in shrimp aquaculture: A step towards sustainability or a step backwards? *Food Policy*, 43, 160–170. <https://doi.org/10.1016/j.foodpol.2013.09.005>
- Castello, L., Isaac, V. J., & Thapa, R. (2015). Flood pulse effects on multispecies fishery yields in the Lower Amazon. *Proceedings of the National Academy of Sciences*, 112(13), 4403–4408. <https://doi.org/10.1073/pnas.1422037112>
- Dudgeon, D., Arthington, A. H., Gessner, M. O., Kawabata, Z.-I., Knowler, D. J., L  v  que, C., Naiman, R. J., Prieur-Richard, A.-H., Soto, D., Stiassny, M. L. J., & Sullivan, C. A. (2006). Freshwater biodiversity: Importance, threats, status and conservation challenges. *Biological Reviews*, 81(2), 163–182. <https://doi.org/10.1017/S1464793105006950>
- Food and Agriculture Organization of the United Nations. (2020). *The state of world fisheries and aquaculture 2020: Sustainability in action*. FAO. <https://doi.org/10.4060/ca9229en>
- Florence, M. A., & Pratheesh, P. (2024). Technological modernization and its challenges in the coir industry in Alappuzha. *Journal of Social Sciences and Economics*, 3(2), 92–99. <https://doi.org/10.61363/cp35z418>
- Hossain, M. S., Das, I., Genevier, L., Hazra, S., Rahman, M., Barange, M., & Fernandes, J. A. (2012). Vulnerability of hilsa fisheries in Bangladesh to climate change and variability. *Global Environmental Change*, 22(3), 461–472. <https://doi.org/10.1016/j.gloenvcha.2012.02.001>
- Junk, W. J., An, S., Finlayson, C. M., Gopal, B., Kvet, J., Mitchell, S. A., Mitsch, W. J., & Robarts, R. D. (2014). Current state of knowledge regarding the world’s wetlands and their future under global climate change: A synthesis. *Aquatic Sciences*, 75(1), 151–167. <https://doi.org/10.1007/s00027-012-0278-z>
- Junk, W. J., Piedade, M. T. F., Sch  ngart, J., Cohn-Haft, M., Adeney, J. M., & Wittmann, F. (2014). A classification of major naturally occurring Amazonian lowland wetlands. *Wetlands*, 34(4), 845–862. <https://doi.org/10.1007/s13157-014-0551-4>

- Kerala State Disaster Management Authority. (2019). *Rebuild Kerala: Post-disaster needs assessment floods and landslides—August 2018*. Government of Kerala.
- Krishnakumar, K., Ali, A., & Pereira, B. (2019). Invasion of African catfish (*Clarias gariepinus*) in inland waters of Kerala: A threat to native biodiversity. *Journal of Inland Fisheries Society of India*, 51(2), 1–6.
- Kurup, B. M., & Sebastian, M. J. (2002). Fishery resources of Vembanad Lake. *Journal of the Marine Biological Association of India*, 44(1–2), 123–131.
- Nandan, S. B., & Jayachandran, P. R. (2020). Ecological changes in Vembanad Lake after the Kerala floods: A preliminary assessment. *Indian Journal of Fisheries*, 67(1), 12–21.
- Nandan, S. B., & Jayachandran, P. R. (2020). Exotic fish species invasions in Kerala's inland waters: Implications for native biodiversity. *Journal of Aquatic Biology & Fisheries*, 8, 45–53.
- Poff, N. L., Olden, J. D., Merritt, D. M., & Pepin, D. M. (2010). Homogenization of regional river dynamics by dams and global biodiversity implications. *Proceedings of the National Academy of Sciences*, 104(14), 5732–5737. <https://doi.org/10.1073/pnas.0609812104>
- Pratheesh, P. (2025a). Beyond the waves: Ethnic socio-cultural life and transforming women's roles in the Alappuzha sea fishermen community. *Indialogs*, 12(1), 49–73. <https://doi.org/10.5565/rev/indialogs.305>
- Pratheesh, P. (2025b). Reframing Kerala's archaeological horizons within the Indian Ocean and Southeast Asian maritime world. *SunText Review of Arts & Social Sciences*, 6(2), Article 196. <https://doi.org/10.51737/2766-4600.2025.096>
- Pratheesh, P., & Florence, M. A. (2024). Pathiramanal Island in Vembanad Lake in Kerala: A study of ecological issues. *Kakatiya Journal of Historical Studies*, 19(1), 240–258.
- Pratheesh, P., & Florence, M. A. (2025). Global warming and local solutions: A study of Chethy Beach of Alappuzha. *Journal of Interdisciplinary Research*, 3(1), 56–80.
- Pratheesh, P., Reema, M., & Florence, M. A. (2024). Addressing unemployment through the coir industry: An analysis of national efforts and challenges. *Asian Research Journal of Arts & Social Sciences*, 22(9), 107–119. <https://doi.org/10.9734/arjass/2024/v22i9579>
- Salagrama, V. (2006). Post-tsunami rehabilitation of fishing communities and fisheries-based livelihoods in Tamil Nadu, India. *Disasters*, 30(1), 82–105. <https://doi.org/10.1111/j.1467-9523.2006.00306.x>
- Sarma, D., Bhattacharjya, B. K., & Yadava, Y. S. (2010). Participatory approach to wetland management: A case study from Deepor Beel, Assam, India. *Journal of Environmental Management*, 91(6), 1413–1421. <https://doi.org/10.1016/j.jenvman.2010.01.004>
- Welcomme, R. L., Cowx, I. G., Coates, D., Béné, C., Funge-Smith, S., Halls, A., & Lorenzen, K. (2010). Inland capture fisheries. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1554), 2881–2896. <https://doi.org/10.1098/rstb.2010.0168>
- Winemiller, K. O., McIntyre, P. B., Castello, L., Fluet-Chouinard, E., Giarrizzo, T., Nam, S., Baird, I. G., Darwall, W., Lujan, N. K., Harrison, I., Stiassny, M. L. J., Silvano, R. A. M., Fitzgerald, D. B., Pelicice, F. M., Agostinho, A. A., Gomes, L. C., Albert, J. S., Baran, E., Petrere, M., & Sáenz, L. (2016). Balancing hydropower and biodiversity in the Amazon, Congo, and Mekong. *Science*, 351(6269), 128–129. <https://doi.org/10.1126/science.aac7082>
- Youn, S.-J., Taylor, W. W., Lynch, A. J., Cowx, I. G., Beard, T. D., Bartley, D., & Wu, F. (2014). Inland capture fishery contributions to global food security and threats to their future. *Global Food Security*, 3(3–4), 142–148. <https://doi.org/10.1016/j.gfs.2014.09.005>



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