Small-Scale Fishing Communities of Katpar, Bhavnagar, Gujarat: Livelihoods, Climate Risks, and Development Pathways

Small-Scale Fishing Communities of Katpar, Bhavnagar, Gujarat: Livelihoods, Climate Risks, and Development Pathways

Need Assessment Report

September 2025

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Message from CEO, Utthan

It gives me great pleasure to present this need assessment report on the fishing community of Katpar village in Mahuva block, Bhavnagar district. This study is part of Utthan's continuing journey to strengthen gender-just, climate-resilient livelihoods and to ensure that the voices of marginalised communities are placed at the centre of development planning.

Utthan has worked for over four decades with women, small farmers, fisherfolk, and tribal communities across Gujarat. Sustainable change within communities emerges when collective voices are heard, local knowledge is respected, and members take ownership of the solutions. Pagadiyas—shore-based, non-mechanised fishers—are central to this vision because they embody traditional ecological knowledge, practise low-impact fishing that safeguards marine biodiversity, and ensure food security for coastal households. Their livelihoods represent both cultural heritage and a sustainable model of resource use, yet they remain among the most marginalised groups in fisheries policy. Recognising and strengthening the role of Pagadiyas is therefore vital not only for equity, but also for the long-term resilience of coastal ecosystems.

This assessment of Katpar fisherfolk is therefore more than a technical exercise; it is an effort to capture the lived experiences, challenges, and aspirations of a community deeply tied to the sea, yet often overlooked in policy and programmes. The findings clearly reveal both strengths and vulnerabilities. Katpar's fisherfolk demonstrate remarkable resilience through women's federations, traditional ecological knowledge, and strong social solidarity. At the same time, they face severe structural barriers: unstable incomes, weak access to welfare schemes, ecological degradation, and conflicts with industrial fishing. These gaps underline the urgent need for systemic reforms that place small-scale fisherfolk on an equal footing with other livelihood groups in terms of rights, recognition, and access to state support.

The recommendations that emerge from this study are grounded in the voices of the community and validated through village assemblies. They point to practical and achievable interventions — from decentralised licensing and fisherfolk collectives to cold storage, social protection, and climate adaptation measures such as plastic interception at Malan Bandhara. Implementing these measures will require the collective will of government, civil society, and the private sector, working in partnership with fisherfolk themselves.

I extend my deep appreciation to the fisherfolk of Mahuva Bandar for sharing their time, stories, and wisdom. I would also like to acknowledge the leadership of **Ms. Pallavi Sobti-Rajpal** (Joint CEO) and **Ms. Jaya Chavda** (Area Manager, Coastal), whose guidance was invaluable in shaping this study. My sincere thanks to **Dr. Selvakumar Vellingiri** and **Ms. Manisha Patel** for leading the research and report writing, and to the field team — **Mr. Jitendra Maru** and **Ms. Shilpa Bambaniya** — for their dedication to data collection, facilitation, and community engagement. We also gratefully acknowledge the support of the **Duleep Matthai Nature Conservation Foundation (DMNCF)**, which made this study possible.

Warm regards,

Pravin Bhikadiya

CEO, Utthan

Executive Summary

This need assessment of Katpar village, Mahuva block, Bhavnagar district, explores the livelihoods, socio-economic conditions, institutional linkages, and environmental challenges of small-scale fisherfolk. Based on household surveys (N = 102), focus group discussions, and village assemblies, the study highlights both vulnerabilities and opportunities for building resilience.

Key Findings

- **Livelihoods**: Pagadiya fishing dominates, with limited diversification into fish selling, boat ownership, and wage labour. Incomes are modest and unstable, heavily shaped by seasonality and ecological change. Women's contributions remain undervalued.
- **Economic Conditions**: While most households report owning houses, the absence of pattas leaves them without tenure security. Access to formal credit and insurance is negligible, and livestock or agriculture provide little buffer.
- **Social Capital**: Women's federations have full membership coverage, but no fisherfolk collective (*munch*) exists. Welfare scheme uptake is partial, with fisherfolk-specific schemes almost absent.
- **Physical Capital**: Electricity, water, and gas access are widespread, but sanitation lags, and cold chain or auction infrastructure is absent.
- **Natural Capital**: Nearly all households reported declining fish diversity, juvenile fish capture, and plastic inflows from Malan Bandhara. Cyclones and economic losses were widely experienced.
- **Governance**: Awareness of fishing regulations exists, but legal aid and grievance mechanisms are absent. Net damage by trawlers is common. Alcohol consumption remains a pervasive social issue.

Recommendations:

- **Licensing & Regulation**: Decentralise licensing, simplify renewals for widows and elderly, and hold awareness camps.
- **Financial Inclusion**: Ensure transparent scheme access, doorstep facilitation, fisherfolk-specific insurance, and SHG/coop-based credit.
- **Livelihoods & Training**: Provide stipends, travel support, and post-training handholding. Promote rope making, aquaculture, and women-focused enterprises.
- **Infrastructure & Markets**: Invest in cold storage, auction platforms, women's cooperative stalls, subsidised diesel/ice, and digital sales platforms.
- **Social Protection**: Extend pensions, health insurance, and disaster compensation for fisherfolk, with special outreach to widows and elderly.
- **Climate & Environment**: Install a plastic filtering system at Malan Bandhara, strengthen awareness on juvenile fish capture, integrate early warnings.
- **Gender equity in fisheries governance**: Ensure that women's representation is included in village-level committees, such as disaster management committees and policy-related decision-making bodies.
- **Governance and support system:** Establish fisherfolk collectives, expand extension services, and set up grievance mechanisms for issues like net damage. Ensure the inclusion of fisherfolk needs in the Gram Panchayat's village development plan (GPDP).

Conclusion

Katpar's fisherfolk show resilience through federation and traditional knowledge but remain structurally marginalised. Strengthening their economic, social, and institutional foundations is essential for sustainable and equitable development.

Chapter 1: Introduction

Aquatic food systems are highly diversified and furnish a variety of environmental, economic, and social benefits and services. They are increasingly recognized – both in the international arena and in the majority of countries and communities – for their nutritional value and ecosystem services that they deliver, upholding healthful diets and sea life. More than they've ever been, they are viable solutions and avenues for increasing global food security and nutrition, enhancing income, and preserving the environment.[1]

The Indian fishery sector plays a pivotal role in the nation's economy, employment generation, and food security. As one of the **top global producers of fish**, India contributes significantly to both **domestic nutrition** and **international trade**. According to recent data from the Ministry of Fisheries, Animal Husbandry and Dairying, India achieved a **total fish production of approximately 17.545 million metric tonnes in 2022–23**, reflecting a substantial increase from previous years and marking a robust growth trajectory[2]

This growth has been especially driven by the inland aquaculture segment, which accounted for over **131.13 lakh tonnes**—more than doubling since 2013–14. India now contributes about **8% of global fish production**, ranking as the **third-largest fish producer** globally and the **largest inland fish producer**[3]. These figures highlight the sector's growing importance and its alignment with national objectives under schemes such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY), aimed at enhancing sustainable fisheries, infrastructure, and livelihoods.

India, with a coastline stretching over 8,000 kilometres and an extensive network of rivers, lakes, reservoirs, and other inland water bodies, possesses immense potential for the development of both capture and aquaculture fisheries. The fisheries sector continues to serve as a vital source of livelihood for millions of fishers and fish farmers, particularly in rural and coastal regions. Beyond its economic significance, the sector contributes meaningfully to the nutritional requirements of the population, with fish being recognised as a major source of affordable animal protein. In this context, the **National Fisheries Policy** has been envisaged as a comprehensive framework aimed at enhancing fish production and productivity, encouraging the adoption of sustainable and responsible fishing practices, and improving the socio-economic well-being of the fisherfolk through targeted interventions and institutional support mechanisms. (Ministry of Fisheries, Animal Husbandry and Dairying, 2020).

Moreover, the Indian fisheries sector is confronted with several critical challenges, including overexploitation of marine resources, degradation of aquatic habitats, and the adverse impacts of climate change, all of which pose significant threats to the long-term sustainability of fish stocks and the health of aquatic ecosystems. Recognising these concerns, the Government of India has undertaken a series of measures aimed at ensuring ecological balance and sustainable resource utilisation. Key interventions include the promotion of responsible fishing practices, the encouragement of technological innovations in aquaculture, and the establishment and effective management of marine protected areas (MPAs). These efforts are aligned with national policy objectives and international commitments to conserve biodiversity while securing the livelihoods of fishing communities[4].

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[1] https://openknowledge.fao.org/items/06690fd0-d133-424c-9673-1849e414543d
[2] https://www.pib.gov.in/PressReleasePage.aspx?PRID=2083813
[3] https://nfdb.gov.in/PDF/State_Fishes_and_Aquatic_Animals_of_India_2024.pdf
[4] Pillai, N. G. K., et al. (2021). Sustainable Fisheries Management in India: Challenges and Opportunities. Indian Journal of Fisheries.

Oceans constitute the largest ecosystem on Earth, covering nearly three-fourths of the planet's surface, and form a critical arena for addressing complex and interlinked developmental challenges such as livelihood generation, climate resilience, maritime trade, and national security. Within this context, the Indian Ocean holds strategic importance, contributing significantly to the economic sustenance, food security, and geopolitical interests of its littoral states. For India, the maritime domain is both vast and vital—comprising a coastline of 8,118 kilometres, encompassing nine maritime states—namely Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha, and West Bengal—and four maritime Union Territories, including Daman and Diu, Puducherry, Lakshadweep, and the Andaman and Nicobar Islands. This extensive coastal and island geography provides direct and indirect livelihood opportunities to millions of coastal communities, particularly those engaged in fishing, aquaculture, and allied marine activities. The Indian coastline, therefore, is not only a geographical asset but also a socio-economic lifeline for the nation's blue economy aspirations.[5] This extensive coast supports a 0.53 million km^2 continental shelf and an Exclusive Economic Zone (EEZ) of 2.02 million km^2, with an estimated annual fish yield potential of 3.93 million tonnes according to Standing Committee on Agriculture (2019–2020).[6]

Marine fisheries constitute a crucial component of India's fisheries sector, with substantial contributions originating from coastal states such as Gujarat, Tamil Nadu, Kerala, West Bengal, and Maharashtra. India is currently recognised as the third-largest fish-producing country globally and holds the distinction of being the second-largest aquaculture producer, following China. The nation contributes approximately 7% of global fish production, underscoring its strategic position in the global seafood economy.

Further enhancing its ecological significance, India is identified as one of the 17 mega-biodiverse countries, harbouring more than 10% of the world's fish biodiversity. This rich aquatic diversity supports a range of marine and inland ecosystems, reinforcing both ecological sustainability and resource availability. In addition to being the largest producer of shrimp globally, India's fisheries sector plays a vital role in ensuring domestic food and nutritional security, while also catering to a robust and expanding international seafood export market. These strengths position the country as a key stakeholder in advancing sustainable fisheries governance and blue economy objectives at both regional and global levels.

India's Coastal and Fisherfolk Profile: A State-wise Perspective

As per the Marine Fisheries Census, 2016, India's extensive coastline, measuring approximately 8,162 kilometres, spans 13 coastal states and Union Territories, supporting a dynamic and culturally rich maritime ecosystem. This coastal belt encompasses 1,363 landing centres and 3,477 marine fishing villages, serving as the backbone of the country's marine fisheries infrastructure. The sector supports a sizable and socio-economically significant population of 37,74,577 fisherfolk, including 6,00,890 families classified as living below the poverty line, thus underscoring both the economic relevance and developmental challenges of coastal communities in India.

Among the maritime states, Tamil Nadu stands out prominently with 349 landing centres and 575 fishing villages, sustaining the largest fisherfolk population, estimated at 7,95,708 individuals. The state also accounts for one of the highest numbers of traditional fishing families, numbering 1,96,784, reflecting its deep-rooted association with marine livelihoods. Andhra Pradesh follows

[5] https://pib.gov.in/PressReleseDetailm.aspx?PRID=1802384&reg=3&lang=1

[6] MPEDA, 2018. MPEDA Annual Report. Retrieved from. https://www.mpeda.gov.in /MPEDA/admin/app/webroot/files/annualreport/1550120514MPEDAAR201718. pdf.

as another significant contributor to the sector, with 1,52,062 traditional fishermen families, highlighting its pivotal role in India's marine fisheries production and coastal economy.

These figures not only illustrate the scale and dispersion of India's coastal fishing population but also reaffirm the critical importance of ensuring inclusive policy frameworks that support livelihood security, infrastructure development, and social protection mechanisms for coastal fisherfolk.

Kerala holds a prominent place in India's fisheries landscape, rooted in a long-standing maritime tradition and a robust coastal culture. The state is home to 1,16,598 traditional fishermen families and supports a fisherfolk population of 5,63,903, reflecting both its historical engagement and contemporary significance in the marine fisheries sector. In contrast, Gujarat, despite possessing the longest coastline in the country—approximately 1,600 kilometres, accounts for 67,610 fishermen families, underscoring the regional diversity in fisheries resource distribution and utilisation across coastal states.

Among the Union Territories, the Lakshadweep Islands and the Andaman & Nicobar Islands make notable contributions to India's artisanal fisheries sector. Though their populations are comparatively smaller, these island territories possess ecologically unique and sensitive coastal ecosystems, which support traditional fishing practices and serve as the primary livelihood base for local fisherfolk communities. Their role in sustaining small-scale marine livelihoods, conserving marine biodiversity, and preserving indigenous fishing knowledge systems is critical, particularly within the broader framework of sustainable coastal resource management and inclusive blue economy development. (see Table 1).

Table 1 India's Coastal area and Fisherfolk state wise

State	Coastal length (km)	Landing centres	Fishing villages	Fishermen families	Traditional fishermen families	BPL families	Fisherfolk population
West Bengal*	158	49	171*	81,067	56,447	55,301	3,68,816
Odisha	480	55	739	1,15,228	92,569	48,601	5,17,623
Andhra Pradesh	974	234	533	1,55,062	1,52,062	1,50,669	5,17,435
Tamil Nadu	1,076	349	575	2,01,855	1,96,784	1,83,683	7,95,708
Puducherry	45	22	39	14,347	14,328	12,968	50,270
Kerala	590	174	220	1,21,637	1,16,598	72,507	5,63,903
Karnataka	300	84	162	32,479	30,897	27,312	1,57,989
Goa	104	32	41	2,986	2,922	650	12,651
Maharashtra	720	155	526	87,717	80,906	27,400	3,64,899
Gujarat	1,600	107	280	67,610	64,395	19,123	3,54,992
Daman & Diu	21	8	12	3,163	3,094	20	15,836
Lakshadweep**	132	37	10	4,163	3,003	1,170	27,934
Andaman & Nicobar***	1,962	57	169	5,944	4,486	1,486	26,521
Total	8,162	1,363	3,477	8,93,258	8,18,491	6,00,890	37,74,577

*** Subsequent reference to villages means Gram Panchayat in West Bengal. ** Fishing islands. ***Landing centres/Landing points (Source: Marine fisheries Census 2016 India)**

The Indian fisheries sector not only supports the livelihoods of around 30 million people, especially in coastal and rural communities, but it also holds immense potential for growth, job creation, and rural development (Ministry of Fisheries, Animal Husbandry & Dairying,2024).[7]

The statistics released by the Ministry of Commerce & Industry (2024) shows that India has significantly increased in seafood exports over the past few years, achieving a growth of 30.81% from 2019-20 to 2023-24. Further it was noted that over the past five years, India's marine product production and exports have steadily increased. From 141.64 lakh tonnes in production and 13.29 lakh tonnes in exports in 2019-20, production rose to 147.25 lakh tonnes while exports dipped in 2020-21 primarily due to the global COVID-19 pandemic. By 2021-22, production reached 162.48 lakh tonnes and exports 13.98 lakh tonnes. This trend continued with production at 175.45 lakh tonnes and exports at 17.54 lakh tonnes in 2022-23. For 2023-24, production is projected to be 182.70 lakh tonnes, with exports expected to reach 18.19 lakh tonnes.[8]

India's seafood export value has experienced a significant upward trend over the past five years. In 2019-20, exports were valued at ₹46,662.85 crore, followed by a slight dip to ₹43,720.98 crore in 2020-21. The sector rebounded strongly in 2021-22, with exports reaching ₹57,586.48 crore, and further increased to ₹63,969.14 crore in 2022-23. For 2023-24, the export value is projected at ₹61,043.68 crore. India stands as a mega-diverse nation, boasting a remarkable wealth of fish species. This biodiversity is a cornerstone of the country's ecological and economic fabric, underpinning its fisheries and aquaculture sectors. With a staggering 3,231 fish species, comprising approximately 9.7% of the global total, India harbours a significant portion of the world's ichthyofauna(Gopi & Mishra, 2015). This diverse assemblage is a testament to the country's varied marine and freshwater ecosystems, ranging from the vast oceans to the intricate riverine networks and serene lakes.

1.1 India's Aquatic Biodiversity: Marine Dominance, Freshwater Riches, and Conservation Concerns

India's aquatic ecosystems reflect a vast and diverse ichthyofauna. Marine ecosystems dominate this diversity, accounting for 75.6% of all fish species in the country. Approximately 2,443 marine fish species are recorded across 927 genera and 230 families. The Andaman and Nicobar Islands, a remote and ecologically distinct archipelago, are recognized as a major hotspot of marine biodiversity, harbouring a remarkable 1,431 fish species (Gopi & Mishra, 2015).

India's freshwater ecosystems—including rivers, lakes, wetlands, and reservoirs—also support a rich variety of fish species. These are especially concentrated in the ecologically sensitive regions of the Western Ghats and Northeast India. In terms of endemism, India is home to 223 endemic fish species, representing 8.75% of the country's total fish species. However, this rich biodiversity is under threat. Approximately 50 marine fish species are listed as threatened and 45 as near threatened on the IUCN Red List, underscoring the urgent need for targeted conservation efforts.(Gopi & Mishra, 2015).

Historical Perspective: The appreciation for India's fish biodiversity has deep historical roots. References to fisheries and conservation practices can be traced back to ancient times, evident in Kautilya's Artha Sastra and Emperor Ashoka's edicts (Joshi et al., 2017)Systematic scientific exploration of Indian fish fauna began in the late 18th century, with pioneering contributions from renowned naturalists like Francis Day and Alcock, who meticulously documented numerous species (Nair & Kumar, 2018; Joshi et al., 2017).

[7] https://pib.gov.in/PressReleasePage.aspx?PRID=2075160

[8] https://www.pib.gov.in/PressNoteDetails.aspx?NoteId=151994&ModuleId=3&reg=3&lang=1

1.2 Fisheries Landscape of Gujarat: Coastal Riches and Socio-Economic Realities

Gujarat, located along India's western coast, possesses abundant natural resources that support a thriving fisheries sector. Contributing nearly 20% of India's total marine fish catch, Gujarat's fisheries are a cornerstone of the state's coastal economy, providing livelihoods to over 300,000 fisherfolk (Gujarat Fisheries Statistics, 2020).

Fishing has historically been the primary livelihood for many coastal communities across Gujarat's extensive 1,600 km coastline, which spans 15 maritime districts, including Valsad, Navsari, Surat, Bharuch, and Bhavnagar. According to the Marine Fisheries Census 2016, Gujarat is home to a total fisherfolk population of 3,54,992. The state comprises 280 fishing villages and 107 landing centres. Gir Somnath emerges as the leading district, with the highest fisherfolk population (83,538), traditional fishing families (12,905), and total fishermen families (14,515), establishing it as a central hub for marine fisheries in the state. Valsad follows with 48,091 fisherfolk, making it the second-largest district in terms of population, trailed by Jamnagar (30,839) and Porbandar (25,073). In contrast, districts like Anand and Bhavnagar report limited engagement in marine fisheries, with only six and 20 fishing villages respectively, and the lowest fisherfolk populations—2,375 and 6,464.

Interestingly, Kutch, despite having the highest number of fishing villages (70), has a moderate fisherfolk population of 22,835. This suggests potential variations in fishing intensity, village size, or family structure. In terms of poverty indicators, Devbhumi Dwarka records the lowest number of Below Poverty Line (BPL) families (238), whereas Valsad and Gir Somnath reflect more significant poverty levels among fisherfolk, with 3,384 and 2,570 BPL families respectively. (Table 2).

Table 2 Fishers population of Gujarat -district wise distribution

District	Landing centres	Fishing villages	Fishermen families	Traditional fishermen families	BPL families	Fisherfolk population
Valsad	25	26	9,690	9,237	3,384	48,091
Navsari	16	18	5,318	5,310	1,738	25,645
Surat	9	21	3,442	3,389	1,422	15,256
Bharuch	3	27	2,413	2,379	1,146	13,943
Anand	0	6	377	336	374	2,375
Ahmedabad	0	19	1,948	1,943	1,244	7,713
Bhavnagar	0	20	1,324	1,302	576	6,464
Amreli	2	8	3,936	3,848	1,242	19,036
Gir Somnath	11	28	14,515	12,905	2,570	83,538
Junagadh	4	4	2,852	2,776	687	13,617
Porbandar	4	4	5,733	5,237	1,267	25,073
Devbhumi Dwarka	8	15	5,139	5,120	238	25,725
Jamnagar	7	10	4,562	4,535	823	30,839
Morbi	0	4	2,070	1,974	700	14,842
Kutch	18	70	4,291	4,104	1,712	22,835
Total	107	280	67,610	64,395	19,123	3,54,992
(Source: Marine fisheries Census 2016 Gujarat)						

1.3 Districtwide and species wise marine fish production

Gujarat remains a major contributor to India's fisheries output, accounting for approximately 20% of national marine fish production and ranking second in overall fish production[1]. In the fiscal year 2023–24, total fish production was projected at 9.15 lakh metric tonnes, comprised of ~7.02 lakh MT marine catch and ~2.13 lakh MT inland yield.[9]

In terms of economic value, fishery production in Gujarat reached ₹15,710 crore in 2023–24, rising sharply from ₹11,743 crore in 2022–23. Simultaneously, exports of fish and fish products climbed to ₹6,087 crore.[10]

Species-wise data from the Commissioner of Fisheries, Gujarat indicates that Ribbonfish and Small Sciaenids are dominant in production. Ribbonfish contributed 70,441 MT, valued at ₹96,074.94 lakhs, while Small Sciaenids accounted for 1,03,510 MT, worth ₹1,09,613.85 lakhs.[11]

High-value species such as White Pomfret, Bombay Duck, and Lobster—despite lower volumes—generate significant revenue. Their aggregated values underscore their premium status in both domestic and export markets.

A breakdown by district reveals:

- Gir Somnath and Junagadh contribute strongly across multiple species, including Ribbonfish, Shrimp, and Threadfin.
- Valsad and Navsari specialize in Bombay Duck and Shrimp.
- Jamnagar and Kachchh focus heavily on Small Sciaenids.
- Amreli demonstrates prominence in Threadfin and Squid/Cuttlefish, while
- **Bhavnagar** stands out for its output of **Catfish** and diverse **miscellaneous species**, among which the latter were estimated to total **6,599 MT** with appreciable value [11]

In total, **Shrimp/Prawns** contribute **₹75,535.19 lakhs** and **Squid/Cuttlefish** contribute **₹62,195.26 lakhs**, emphasizing the economic significance of crustaceans and cephalopods[11]. The **miscellaneous species category**, accounting for **1,08,491 MT** of catch valued at **₹92,526.42 lakhs**, further reflects the ecological diversity of Gujarat's marine waters[11]. Collectively, the districts **Gir Somnath**, **Junagadh**, and **Porbandar** emerge as key hubs for marine fish production due to their volume-weighted contributions and species diversity, making them central to the state's fisheries economy and strategic planning.

1.4 Fish Production and Value (Marine & Inland)

In the past two decades, Gujarat has witnessed a significant growth in its fish production and export sector, which has contributed to the state's economic landscape. The trends in fish

[9] ICSF. (2024). Gujarat ranks 2nd in marine fish production. International Collective in Support of Fishworkers. Available at: https://www.icsf.net/newss/gujarat-ranks-2nd-in-marine-fish-production

[10] Indian Express. (2024). Gujarat Budget: What's for fisheries sector – ₹1,622 crore package, key policy decision and more. The Indian Express, 3rd February 2024. Available at: https://indianexpress.com/article/cities/ahmedabad/gujarat-budget-whats-for-fisheries-sector-rs-1622-crore-package-key-policy-decision-and-more-9847599

[11] Commissioner of Fisheries, Gujarat. (2024). District-wise and Species-wise Marine Fish Production and Value in Gujarat State – 2023–24. Government of Gujarat. Available at: https://data.gov.in/resource/district-wise-and-species-wise-marine-fish-production-and-value-gujarat-state-2023-24

production and the export of fish products reflect both an increase in output and an enhancement in value, highlighting the strength of Gujarat's fisheries industry.

The data of Fish Production and export of Gujarat state 2023-2024 [12] indicates a consistent rise in both marine and inland fish production, with marine fish dominating the total output. In 2001-02, the total fish production stood at 701,603 metric tons, which has steadily grown to 899,828 metric tons in 2023-24. This represents a 28% increase over this period, signalling the sector's expansion. Marine fish production has seen significant increases over the years, peaking in 2023-24 with a record of 704,828 metric tons. In contrast, inland fish production, although comparatively smaller in volume, has also shown growth, reaching 195,000 metric tons in 2023-24.

The value of fish production has mirrored this growth in volume, with the total value of production reaching ₹1,571,034.47 lakhs in 2023-24. This is a significant rise from ₹571,763.71 lakhs in 2001-02, driven largely by marine production, which contributed ₹1,167,448.87 lakhs to the total value. Inland fish, though smaller in volume, accounted for ₹403,585.60 lakhs in 2023-24. This increase in the value of production suggests not only an increase in the quantity of fish produced but also improved prices, possibly due to better market conditions or the introduction of value-added products.

Gujarat's fish export market has similarly expanded. In 2001-02, the state exported 132,175 metric tons of fish products, a figure that surged to 336,991 metric tons by 2023-24. This growth in export quantity is reflective of Gujarat's increasing prominence in the global fish export market. The export value has followed a similar trajectory, growing from ₹625.72 crores in 2001-02 to an impressive ₹6,087 crores in 2023-24, despite a slight fluctuation in the per-ton export value. The highest value of exports occurred in 2012-13 at ₹2,929.61 crores, although the export value has now surpassed this peak, further reinforcing Gujarat's growing export footprint in the global market. The following table provides a detailed view of the annual fish production and export statistics, further illustrating the growth trajectory over the years (Table 3).

[12] https://cof.gujarat.gov.in/Index

Table 3 Fish Production and export of Gujarat in 2023-2024

FISH PORDUCTION & VALUE [MARINE & INLAND] OF GUJARAT STATE								FISH AND FISH PRODUCT EXPORT OF GUJARAT STATE			
SR.NO	YEAR	FISH PRODUCTION IN M.T.			VALUE IN RS. LAKHS			SR. NO	YEAR	QUANTITY IN M. T	VALUE IN Rs. CRORES
		MARINE	INLAND	TOTAL	MARINE	INLAND	TOTAL				
1	2001-02	650829	50774	701603	142127.48	26207.36	168334.84	1	2001-02	132175	625.72
2	2002-03	743638	34267	777905	169681.52	19254.95	188936.47	2	2002-03	134047	760.36
3	2003-04	609136	45436	654572	138667.15	30148.13	168815.28	3	2003-04	108386	614.41
4	2004-05	584951	50628	635579	136495.64	33613.52	170109.16	4	2004-05	119951	704.59
5	2005-06	663884	69936	733820	201544.12	42002.28	243546.4	5	2005-06	136485	934.88
6	2006-07	676762	76821	753583	227061.74	43472.07	270533.81	6	2006-07	188166	1264.61
7	2007-08	680848	78780	759628	239314.68	45087.15	284401.83	7	2007-08	150727	1141.97
8	2008-09	683855	82047	765902	254224.78	52099.19	306323.97	8	2008-09	164725	1485.72
9	2009-10	687445	84071	771516	294223.9	55150.44	349374.34	9	2009-10	183870	1838.75
10	2010-11	688930	85972	774902	356419.96	58684.73	415104.69	10	2010-11	198297	2156.2
11	2011-12	692488	91231	783719	394488.87	65990.71	460479.58	11	2011-12	196850	2533.99
12	2012-13	693560	94930	788490	434603.63	78463.92	513067.55	12	2012-13	242057	2929.61
13	2013-14	695580	102913	798493	446214.36	94015.48	540229.84	13	2013-14	251920	3658.57
14	2014-15	698450	111482	809932	473488.45	126133.65	599622.1	14	2014-15	245434	3645.23
15	2015-16	697328	112232	809560	480877.37	128225.24	609102.61	15	2015-16	208624	3567.24
16	2016-17	698832	116725	815557	484201.19	139188.03	623389.22	16	2016-17	237442	4417.4
17	2017-18	700743	137685	838428	495088.22	181285.35	676373.57	17	2017-18	312568	5071.05
18	2018-19	699230	142880	842110	506510.16	194004.23	700514.39	18	2018-19	305326	5202.3
19	2019-20	700809	157463	858272	532915.45	228351.88	761267.33	19	2019-20	279751	5019.48
20	2020-21	619720	124705	744425	632875.64	244456.34	877331.98	20	2020-21	228072	4254.21
21	2021-22	688272	185689	873961	765950.07	356176.52	1122126.6	21	2021-22	232619	5232.88
22	2022-23	703000	194422	897422	789923.3	384475.39	1174398.7	22	2022-23	284850	5864.3
23	2023-24	704828	195000	899828	1167448.87	403585.6	1571034.5	23	2023-24	336991	6087

1.5 Small scale fisherfolk of Gujarat

The term "small-scale fishery" is multifaceted and has been interpreted in various ways across different regions of the world. It is also referred to as artisanal, traditional, native, subsistence, or inshore fisheries (Johnson, 2006). There is no single, universally accepted definition for small-scale fisheries due to their inherent diversity and complexity(Alfaro-Shigueto et al., 2010). Nonetheless, many researchers have defined small-scale fisheries based on factors such as the scale of operations, technology level, employment generation, and the degree of capital investment(Carvalho, 2011). For example, Alfaro-Shigueto et al. (2010) define small-scale fisheries based on vessel size, specifying vessels that are up to 15 meters in length and are typically operated manually within 5 nautical miles of the coast. It is important to note, however, that in Gujarat, many fishing vessels that are under 15 meters in length often operate beyond 5 nautical miles. These fisheries are primarily labour-intensive, with fishers utilizing low-capital gear to harvest smaller catches compared to industrial fisheries(Hauck, 2008).

Small-scale fisheries in many countries are primarily defined by a combination of local biological, social, economic, and political factors(Carvalho, 2011). Johnson's (2006) extensive research further categorizes small-scale fisheries into two subtypes: subsistence fisheries and domestic commodity production. These two categories are distinguished by various criteria, including social-institutional organization, knowledge and technology, and spatial and temporal considerations.

Johnson (2006) explains that small-scale fisheries are not just limited to catching fish for personal or family use. When used for domestic commodity production, they usually operate on a larger scale, covering more areas, involving more activities, and reaching bigger markets compared to subsistence[13] fisheries.

Further, more than 90% of the global fishing population are small-scale fishers, the majority of whom reside in developing countries.(Hauck, 2008). These fisheries play a crucial role not only in food security but also as a primary source of animal protein for over a billion people(Alfaro-Shigueto et al., 2010). In addition to their economic importance, small-scale fisheries contribute to employment generation and poverty alleviation (Sowman, 2006). They also play a key role in promoting social justice and ecological sustainability (Reed et al., 2013). Furthermore, small-scale fisheries are characterized by significant cultural diversity, particularly when contrasted with the homogeneity of industrial fisheries(McGoodwin, 1995).

The definitions of artisanal and mechanized boats in the Indian context are complex and often unclear, with significant variations. Pillai et al. (2000) from the Central Marine Fisheries Research Institute of India identify bag net fishing as an artisanal practice along the Gujarat coast. However, based on factors such as the distance travelled by bag netters, the number of days spent at sea per trip, and the type of technology used, bag net fishing can also be classified as small- or medium-scale and semi-mechanized fishing.(Pillai et al., 2000).

The pagadiya are the part of artisanal fisherfolk of Gujarat and they use the foot for fishing. For approximately 400 years, the fishing community of Gujarat practices the traditional ‘Pagadiya’ method of fishing on foot. This cost-effective technique involves setting nets in the water during low tide and collecting the catch after high tide. The moon's phases and resulting tidal variations significantly influence catch rates. Pagadiya fishers typically engage in bag net fishing for 20 to 22 days each month. According to the lunar calendar, fishing is most productive on 20 days, while the remaining 8 days yield scant catches. This traditional knowledge allows fishers to plan their

[13] *small-scale fishing practices where fish are caught for personal consumption or for the consumption of dependents*

activities efficiently. Seasonal analysis reveals that catches are highest during the winter, followed by the monsoon and summer months. As per the study conducted by Jignesh Anjani and Prajith, K.K. (2017) in the Kutch region, the average daily catch per unit is approximately 6 kg in the monsoon, 10.3 kg in winter, and 4 kg in summer. The catch composition indicates that Acetes and other low-value non-penaeid shrimp account for 24% of the total catch, followed by penaeid shrimp and Bombay duck. Seasonal variations in species composition are evident, with Bombay duck dominating during the monsoon, Acetes in winter, and penaeid shrimp in summer. However, only 10% of the catch is of high value. The study identified poaching and operational difficulties as major challenges faced by Pagadiya fishers. Additionally, the coastal population has a deep understanding of lunar periodicity and its correlation with fishing activities.

Table 4 Pagadiya Fishermen of Gujarat

Sr. No.	Name of the District	No. of Pagadiya Fishermen
1	Valsad	24
2	Navsari	55
3	The Dangs	0
4	Surat	103
5	Tapi	0
6	Bharuch	768
7	Narmada	11
8	Vadodara	2
9	Panchmahal	0
10	Dahod	0
11	Anand	115
12	Kheda	20
13	Ahmedabad	234
14	Gandhinagar	0
15	Mehsana	25
16	Patan	75
17	Sabarkantha	20
18	Banaskantha	0
19	Surendranagar	130
20	Rajkot	502
21	Bhavnagar	228
22	Kachchh	489
23	Jamnagar	110
24	Porbandar	49
25	Junagadh	267
26	Amreli	144
	Total	**3,371**

The pagadiya fishermen data of Government of Gujarat (2012-2013) shows the distribution of Pagadiya fishermen across Gujarat's districts, with a total of 3,371 individuals practicing this method. Bharuch reports the highest number, with 768 Pagadiya fishermen, followed by Rajkot with 502 and Kachchh with 489. Ahmedabad also has a significant number, with 234 fishermen.

Several districts, including The Dangs, Tapi, Panchmahal, Dahod, Gandhinagar, and Banaskantha, report no Pagadiya fishermen. Other districts, such as Vadodara (2 fishermen), Mahesana (25 fishermen), and Valsad (24 fishermen), have comparatively low numbers. Moderate numbers are recorded in districts like Anand (115 fishermen), Navsari (55 fishermen), and Junagadh (267 fishermen). The data highlights the concentration of Pagadiya fishermen in specific districts, with

Bharuch, Rajkot, and Kachchh having the highest representation, while some districts report no activity.

Women and Their Contribution in Fishing in Gujarat

Women play a vital role in Gujarat's fisheries sector. Their participation spans the entire fisheries value chain—from fish seed collection to post-harvest processing and marketing. In fact, women dominate post-harvest activities, especially in peeling, drying, and vending, where they form the backbone of local economies (Joshi et al., 2016).

In Amreli and nearby districts, their engagement in fish processing often compensates for the irregular income patterns of male fishers (Vase et al., 2019). Despite this, women still face structural barriers, including poor access to technology, credit, training, and market linkages. While some policies do aim to support their participation, much of their work remains informal and unrecognized (Sharma et al., 2017).

Key Challenges Faced by Fishing Communities in Gujarat

1. Declining Fish Stocks and Overfishing

Industrial fishing and environmentally harmful practices have led to reduced marine biodiversity and lower catch volumes for traditional fishers. Artisanal fishers in Bhavnagar and Amreli report a consistent drop in catch, which has exacerbated livelihood insecurity (Gujarathi-Talati, 2022).

2. Climate Change and Environmental Stress

Shifts in sea temperature, irregular monsoons, and extreme weather events have disrupted fishing calendars. Fish migration and breeding cycles are also changing, posing challenges to traditional fishing knowledge systems (Das, 2017).

3. Gender Inequality and Marginalization

Women continue to be left out of fisheries decision-making, despite their essential contributions. Their work is often classified as secondary or supplementary, limiting access to benefits and policy support (Johnson & Jyothis, 2006).

4. Limited Access to Resources and Technology

Most artisanal fishers in Gujarat still depend on traditional techniques. In regions like Amreli, small-boat owners and crew lack access to cold chains, better gear, or reliable transportation, reducing their competitiveness (Vase et al., 2019).

5. Economic Vulnerability

Fishing households, especially those led by women or operating in informal markets, are vulnerable to price shocks, debt, and lack of safety nets. Many are stuck in low-income cycles without diversification options (Burman & Katyaini, 2022).

6. Inadequate Government Support

Despite their role in marine food security, artisanal and small-scale fishers struggle to access benefits from government schemes, often due to bureaucratic inefficiencies or lack of awareness at the community level (Sharma et al., 2017).

7. Unsustainable Fishing Practices

Illegal trawling and unregulated mechanized fishing continue to degrade the ecosystem, particularly affecting the livelihoods of Pagadiya fishers in Bhavnagar and Veraval (Parappurathu & Achamveetil, 2020).

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Chapter 2: Methodology

2.1 Introduction

Understanding the layered challenges faced by small scale fisherfolk demands a methodology that is both analytically rigorous and deeply attuned to the lived realities of coastal communities. This chapter presents the methodological approach adopted for the needs assessment of Katpar village located in Mahuva block of Bhavnagar district. The research was designed and conducted by Utthan, an organization with more than four decades of experience advancing the rights and livelihoods of vulnerable groups across Gujarat.

The assessment sought to explore not only what fisherfolk *do*—in terms of fishing practices, occupations, and seasonal work—but also how they experience vulnerability, navigate change, and aspire for transformation in the face of mounting environmental, economic, and social pressures. Recognizing that these phenomena cannot be understood through numbers alone, the research design deliberately combined quantitative and qualitative methods to enable a layered and participatory understanding.

To frame this inquiry, a conceptual model was developed to guide the collection, analysis, and interpretation of data. This model—explained below—places the resilience and vulnerability of fisherfolk households at its center, shaped by their entitlements, assets, exposures, and aspirations.

2.2 Conceptual Framework

This study is guided by the **Sustainable Livelihoods Framework (DFID)**, which posits that a household's capacity to withstand shocks, adapt to change, and enhance its quality of life is shaped by five interconnected domains:

1. **Structural Identity** – Social position shaped by caste, gender, religion, age, disability, and household composition.
2. **Livelihood System** – Nature of fishing practices, ownership of gear and boats, diversification of income sources, and opportunities for alternative employment.
3. **Economic Conditions** – Stability and amount of income, access to credit, levels of indebtedness, and financial burdens.
4. **Environmental Exposure** – Degree of vulnerability to cyclones, saline intrusion, biodiversity loss, and other climate change impacts.
5. **Institutional and Social Support** – Access to government schemes, identification documents, cooperatives, self-help groups (SHGs), and village-level federations.

Importantly, gender is embedded as a cross-cutting axis within this framework. Women's restricted access to assets, institutions, markets, and mobility systematically constrains their capacity to cope with risks and to drive change.

Table 5 Domains of the Sustainable Livelihoods Framework Applied in the Study

Domain	Key Elements
Structural Identity	Gender, caste, religion, age, disability, household composition
Livelihood System	Fishing type (Pagadiya, mechanized), boat/net ownership, diversification of income, seasonal variation
Economic Conditions	Income stability, access to credit/loans, debt burden, financial obligations
Environmental Exposure	Cyclones, saline intrusion, fish catch decline, biodiversity loss, plastic waste
Institutional & Social Support	Access to schemes/SHGs, legal documents, cooperatives/federations, awareness of entitlements
Gender as a Cross-Cutting Dimension	Gendered labour, women's decision-making, mobility constraints, unequal workload and discrimination

2.3 Objectives of the Study

The assessment sought to answer a core question: **How do fisherfolk in Katpar navigate vulnerabilities across structural, economic, environmental, and institutional dimensions, while negotiating gendered constraints and seeking pathways for more secure and sustainable livelihoods?**

To address this, the following objectives were framed:

- To profile the demographic, social, and gendered structure of fisherfolk households.
- To document fishing practices, ownership of assets, diversification of income, and seasonal migration patterns.
- To examine income stability, access to credit, indebtedness, and related financial pressures.
- To assess exposure to environmental shocks and ecological risks, and the coping strategies adopted by the community.
- To analyse access to welfare entitlements, cooperatives, SHGs, and government programmes.
- To understand the specific challenges faced by women in accessing resources, institutions, and decision-making spaces.
- To capture the aspirations of community members, particularly youth and women, regarding future livelihood pathways.

2.4 Research Questions

The study was guided by the following research questions:

1. How do caste, gender, age, and household composition shape fisherfolk households' vulnerabilities and opportunities?

2. What fishing practices, asset ownership patterns, and livelihood diversification strategies are followed in Katpar?
3. How stable are household incomes, and what challenges do fisherfolk face with credit access, debt burdens, and financial obligations?
4. How do climate change, cyclones, saline intrusion, biodiversity loss, and fish stock decline affect livelihoods and resilience?
5. What institutional mechanisms—government schemes, SHGs, cooperatives, federations—are accessible to fisherfolk, and how inclusive are they?
6. How do gendered roles and norms influence women's access to assets, institutions, markets, and decision-making power?
7. What are the immediate needs and long-term aspirations of the community, particularly youth and women, regarding fishing and alternative livelihoods?

2.5 Study area: Katpar Gram Panchayat

Katpar is a situated in Mahuva block of Bhavnagar district, Gujarat, along the Saurashtra coast of the Arabian Sea. Administratively, it is recognised as both a Gram Panchayat and a Census Town. Its jurisdiction extends over 18.34 km^2, encompassing dense residential clusters and fishing-related spaces such as curing yards, landing points, and local markets.

The Census of India (2011) recorded Katpar's population at 8,677 persons across 1,814 households. Of these, 4,405 were male and 4,272 females, yielding a sex ratio of 970 females per 1,000 males, higher than the Gujarat average. Children (0–6 years) constituted 16.4% of the population (1,423 persons), signalling a youthful demographic.

Literacy remains a critical challenge. The overall literacy rate was 62.03%, considerably lower than the state average. Male literacy (77.15%) outpaces female literacy (46.47%) by a wide margin, highlighting entrenched gender disparities in education that directly affect livelihood diversification and women's empowerment.

The Gram Panchayaat is overwhelmingly Hindu (~99.5%), with a very small Muslim minority (≈0.5%). Caste and community affiliations continue to shape access to entitlements, cooperative membership, and local power structures, reflecting wider patterns in Gujarat's fishing communities.

Katpar Village Profile (Marine Fisheries Census 2016)

Katpar, situated in Mahuva Taluka of Bhavnagar District, is a small but significant marine fishing settlement along the Gulf of Khambhat. As per the Marine Fisheries Census 2016, the village comprises 85 fishing families, all of whom are traditional fisher households. Among them, 29 families are identified as Below Poverty Line (BPL), indicating the prevalence of economic vulnerability in the community.

The total fisherfolk population of Katpar is 341 individuals, with an average family size of four. Of this, 174 are males and 167 are females, giving the village a sex ratio of 960 females per 1,000 males. The demographic structure includes 85 adult males and 82 adult females, alongside 26 children under the age of five (12 boys and 14 girls) and 148 children above five years (77 boys and 71 girls). This reveals a youthful population, where the dependency burden is significant.

Fishing remains the principal occupation in Katpar. The census records 155 individuals as part of the occupied population, with 85 engaged as full-time active fisherfolk. No part-time fishers or

fish seed collectors were reported, underscoring the strong reliance on full-time artisanal fishing. In addition, 70 individuals—entirely women—are engaged in fish marketing, highlighting the critical but often undervalued role of women in sustaining household incomes and ensuring the movement of fish to markets. No villagers were reported as involved in net making, processing, peeling, or other allied occupations, and none were engaged in occupations outside the fisheries sector.

The housing stock in Katpar indicates moderate material well-being but limited amenities. Of the 85 total households, 81 are pucca structures and 4 are kutcha. All houses are small, with fewer than three rooms, and none have toilet facilities within the premises. Despite this, all households have electricity connections and access to potable tap water. No families reported reliance on wells, handpumps, borewells, or other sources, making piped water supply the sole source of drinking water.

Katpar is socially homogenous, with all families belonging to the Hindu religion and none to Scheduled Caste or Scheduled Tribe categories. Institutional participation remains absent, as the village reported no membership in fisheries cooperatives or other cooperative societies.

In summary, Katpar presents the profile of a traditional fishing settlement where full-time fishing and women's participation in fish marketing are central to the economy. Despite universal access to electricity and potable water, the absence of sanitation facilities and cooperative participation, coupled with widespread poverty, constrains the community's ability to strengthen its livelihood resilience and institutional voice.

Figure 1 Katpar Village -map

2.6 Research Design and Strategy

This study employed a cross-sectional, mixed-methods design, combining quantitative surveys with qualitative participatory tools. This approach allowed for both the breadth of household-

level data and the depth of community insights, thereby ensuring a holistic understanding of fisherfolk realities in Katpar.

Sampling

A complete enumeration strategy was adopted. All 102 fisherfolk households in Katpar were surveyed, ensuring full coverage and inclusivity. This method strengthened the representativeness of the findings and provided a robust base for disaggregated analysis across gender, occupation, and socio-economic status.

Village Assemblies

In parallel, eight village assemblies were conducted as part of the broader process of fisherfolk mobilisation and collectivisation. These assemblies provided a forum for fisher families to voice their concerns, priorities, and suggestions. The deliberations from these assemblies were systematically documented and integrated into the analysis, thereby grounding the findings in the lived experiences and perspectives of the community.

2.7 Data Collection Methods

2.7.1 Structured Household Survey

The household questionnaire was developed based on Utthan's field experience, policy gaps observed, and community insights. It was digitized using KoboCollect, ensuring real-time data validation and minimizing manual error.The data been collected between April – May 2025.

The survey covered modules on:

- **Demographics**: Age, gender, religion, education, disability
- **Livelihoods**: Type of fishing, secondary income, seasonal work
- **Assets**: Boat, net, GPS, insurance, cold storage, housing
- **Income and Debt**: Daily wages, loan sources, credit burdens
- **Access to Services**: Water, electricity, sanitation, healthcare
- **Scheme Participation**: PMMSY, Ayushman Bharat, SHGs, KCC, e-Shram, widow pensions
- **Environmental Impacts**: Declining catch, plastic waste, cyclone damage
- **Aspirations**: Interest in rope making, goat rearing, aquaculture, seaweed farming

Interviews were conducted in Gujarati by trained field staff. All respondents provided informed oral consent.

2.7.2 Village Assemblies

In addition to household surveys, the village assemblies were conducted as part of the broader process of fisherfolk mobilisation and collectivisation. These assemblies created platforms for fisher families to discuss challenges and propose solutions. The issues raised were systematically documented and integrated into the analysis.

Alongside, four focused group discussions (FGDs) were organised with different community segments to explore themes in greater detail. These discussions centred on:

- Changing fishing patterns and environmental signals

- Debt traps, migration, and intergenerational transitions
- Gendered labour roles in fish drying, selling, and unpaid care work
- Community narratives of risk, resilience, and future aspirations

By combining survey data with participatory dialogues, the methodology ensured that the report reflects both the quantitative dimensions of vulnerability and the qualitative richness of lived experiences.

2.8 Data Analysis

The survey data were processed and analysed using Open-source data analysis software. This enabled the generation of descriptive statistics and cross-tabulations across key variables. Findings from the quantitative analysis were further triangulated with insights from village assemblies, ensuring that patterns observed in the data were interpreted in light of community perspectives. This integration strengthened the validity and contextual grounding of the results presented in this report.

2.9 Ethical Considerations

The study adhered to strict ethical standards to safeguard the dignity and rights of participants. Before each interview or discussion, researchers sought and obtained oral informed consent, ensuring that participants clearly understood the purpose of the study and their role within it. At every stage, respondents were reminded that their participation was voluntary, and they retained the right to skip questions or withdraw altogether without any consequence. In conducting the fieldwork, particular attention was paid to cultural norms and gender sensitivities, so that both women and men felt comfortable and respected during the process.

2.10 Limitations

This study has certain methodological and contextual limitations that must be acknowledged. First, the research design is cross-sectional, providing a snapshot of community conditions at a single point in time. Consequently, the analysis may not capture the seasonal fluctuations in fish catch, household income, and migration patterns that are integral to the livelihoods of fisherfolk.

Second, data related to income, debt, and participation in government schemes were self-reported by respondents. Such data are susceptible to recall bias, underreporting, and reluctance in disclosing sensitive financial information, which may affect the precision of estimates.

Third, while the sampling strategy aimed for inclusivity through complete household enumeration and stratified focus group discussions, it is possible that the perspectives of certain marginalised groups, such as persons with disabilities, are underrepresented in the dataset.

Finally, although the study engaged extensively with community narratives regarding environmental change, declining catch, and climate-related risks, it did not employ scientific climate modelling or longitudinal environmental datasets. As a result, the report reflects primarily the perceptions and lived experiences of the community, rather than providing formal projections of long-term climate trends.

Chapter 3: Results

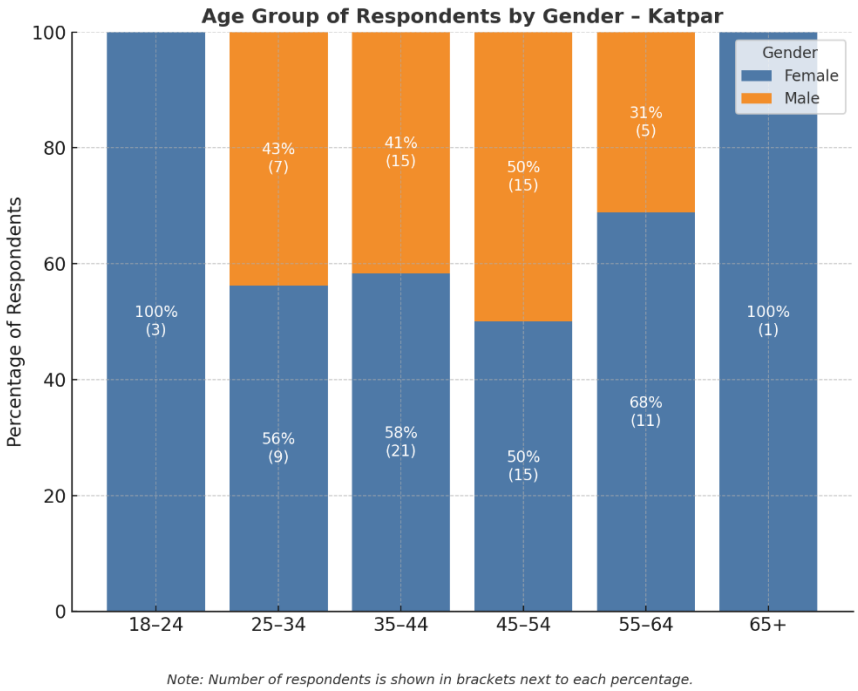
3.1 Structural Identity of Fisherfolk Households

The structural identity of fisherfolk households in Katpar provides a critical lens to understand the socioeconomic and institutional positioning of this community. Household characteristics such as age, gender, caste, religion, marital status, household size, education, and the presence of elderly or disabled members shape the ways in which vulnerability and resilience are experienced. This section draws on data from the 102 fisherfolk households surveyed and presents a disaggregated profile of the community.

3.1.1 Age and Gender Profile

The age profile of respondents reflects a wide distribution across adult life stages, with the highest concentration in the 35–44 (35.3%) and 45–54 (29.4%) groups. The 25–34 group (15.7%) also features notably, suggesting that younger adults are beginning to assume household and economic responsibilities. By contrast, the 55–64 (16.7%) and 65+ (1.0%) categories together account for 17.6% of respondents, highlighting the presence of ageing fisherfolk whose needs often go unaddressed. The 18–24 age group had the fewest respondents, which may indicate youth outmigration, disinterest in traditional fishing occupations, or migration for non-fishing employment.

Figure 2 Age and gender distribution of the respondents



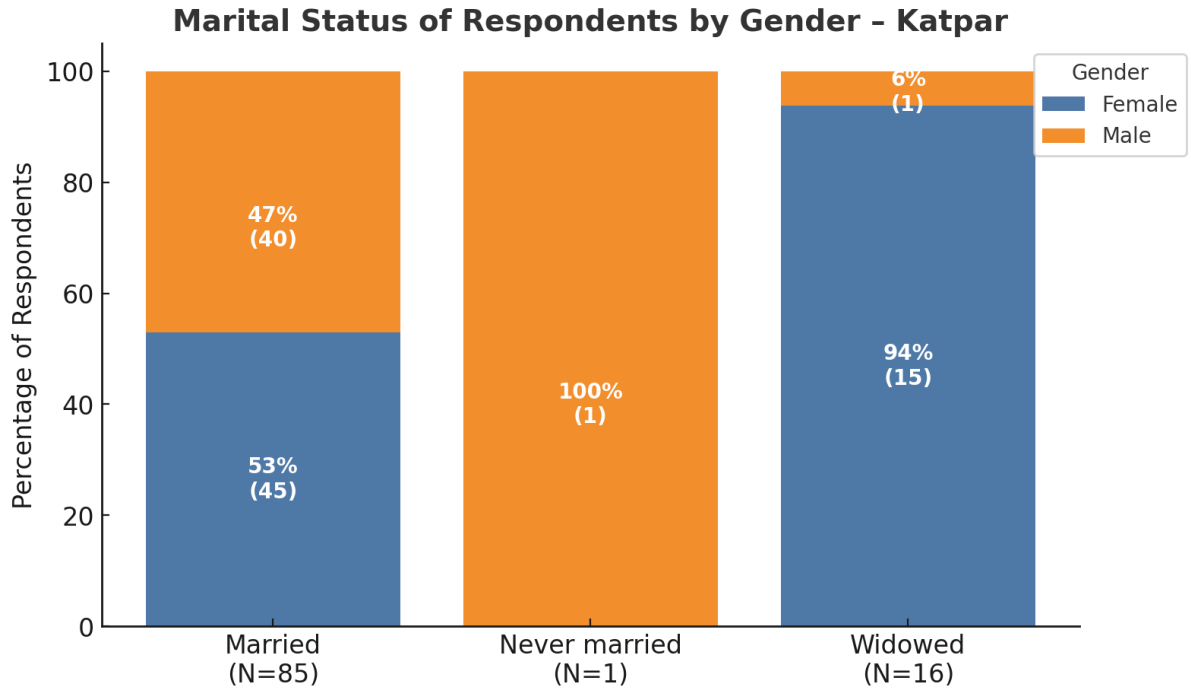
Note: Number of respondents is shown in brackets next to each percentage.

Across nearly all age groups, female respondents outnumbered males. This was particularly visible among older respondents: in the 55–64 group, 68.8% were women, and in the 65+ group, the only respondent was female. These dynamics reflect a community where women remain socially and economically active well into later life, and where longevity results in an overrepresentation of women in older age categories.

3.1.2 Marital Status

Most respondents (85 individuals; 83.3%) reported being married, reflecting the centrality of conjugal households as economic units in traditional fishing communities. Widowhood accounted for 16 respondents (15.7%), of which 15 (93.8%) were women. Only one respondent (1.0%) reported never having married, suggesting that remaining single into later adulthood is uncommon.

Figure 3 Marital status of the respondents by gender



Note: Number of respondents is shown in brackets next to each percentage.

The heavy concentration of widow's points to a structurally vulnerable group, often heading households without adult male labour. These women frequently manage single-person or female-headed households, and their economic insecurity is compounded by limited institutional support.

3.1.3 Social Category and Religion

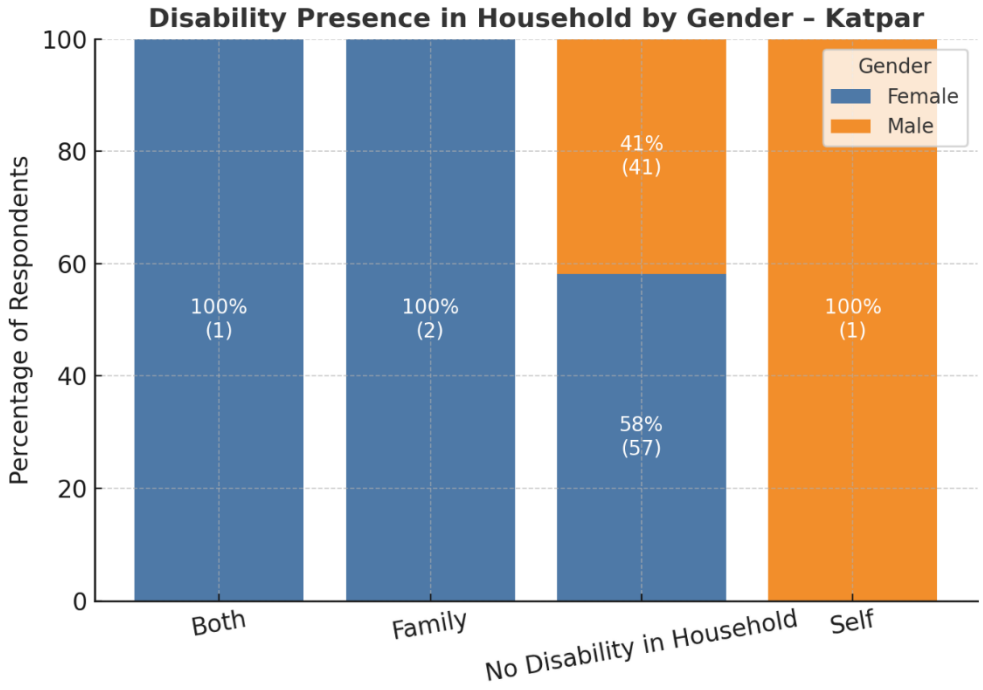
All respondents in Katpar identified as Hindu, reflecting religious homogeneity. Within this group, 101 respondents (99.0%) reported belonging to the Other Backward Classes (OBC), while just one respondent (1.0%) was from the General category.

The overwhelming predominance of OBC households underlines the historical disadvantages faced by this community in terms of education, employment, and access to resources. At the same time, OBC status formally recognises their eligibility for affirmative action and welfare schemes aimed at improving social and economic conditions.

3.1.4 Disability Presence

Among the surveyed households, 4 respondents (3.9%) reported the presence of disability: one man reporting his own disability, two women reporting disability in family members, and one woman reporting both self and family disability.

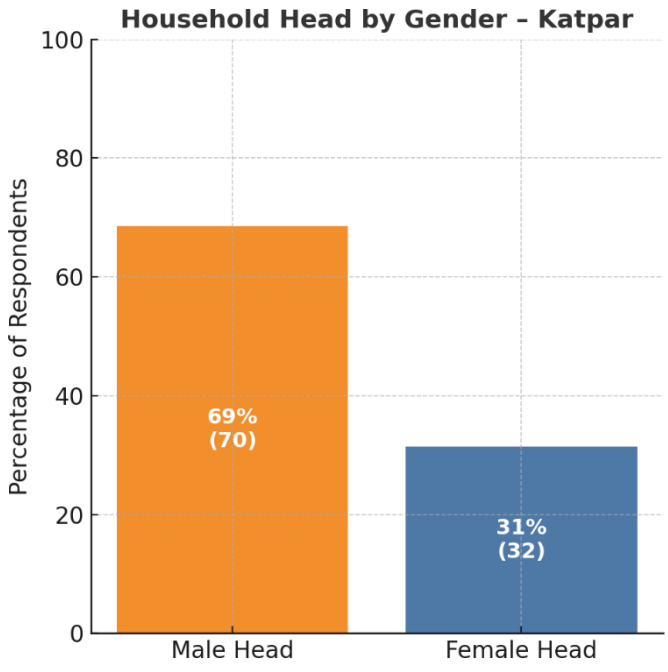
Figure 4 Disability presence in the family



Note: Number of respondents is shown in brackets next to each percentage.

The majority (96.1%) reported no disability. While this low prevalence may appear positive, it may also reflect underreporting due to stigma, limited awareness, absence of formal diagnosis, or lack of official certification. Women were more likely to report disability within their households, reflecting both their caregiving responsibilities and their central role in responding to survey questions.

3.1.5 Household Headship

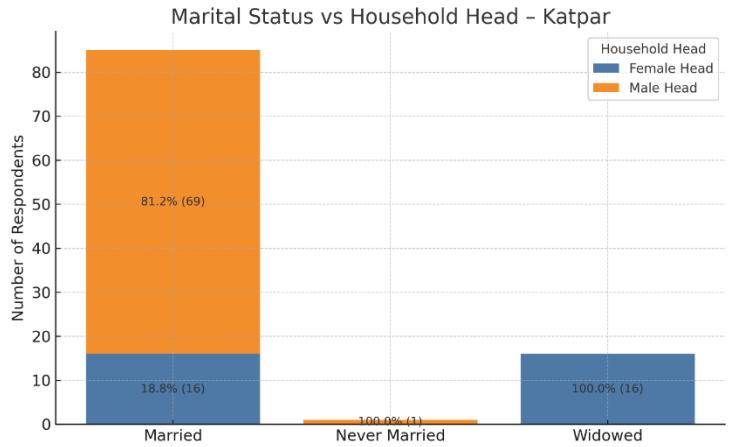


Note: Number of respondents is shown in brackets next to percentage.

Out of the 102 households, 70 (68.6%) were male-headed and 32 (31.4%) were female-headed. Analysis shows a statistically significant relationship between marital status and headship (χ^2 = 41.67, p < 0.0001). Widowhood strongly correlates with female headship: 7 of 9 widowed respondents (77.8%) were recognised as female household heads.

Figure 5 Household Head by Gender

Figure 6 Marital status and household headship



This finding indicates that female headship arises primarily from widowhood, rather than independent economic agency. Female-headed households therefore represent a structurally vulnerable group: their recognition as heads does not necessarily translate into greater autonomy but rather reflects the absence of male members. This pattern emphasises the importance of prioritising female-headed households, particularly widows, in the design and delivery of livelihood, housing, and social security schemes.

3.1.6 Educational Status

Educational attainment in Katpar is very low overall, with more than half of respondents, 54 out of 102 (52.9%), reporting that they are non-literate. Only 30 respondents (29.4%) reported basic ability to read and write, while 14 (13.7%) had completed primary schooling and 4 (3.9%) had progressed to secondary level. Importantly, no respondent had reached higher secondary education, underscoring the sharp ceiling on formal learning in the village.

Table 6 Educational status of the respondents

Gender (N)	Non-literate	Ability to read and write	Primary Schooling	Secondary Schooling
Female (N=60)	43 (71.7%)	10 (16.7%)	6 (10.0%)	1 (1.7%)
Male (N=42)	11 (26.2%)	20 (47.6%)	8 (19.0%)	3 (7.1%)
Grand Total (N=102)	54 (52.9%)	30 (29.4%)	14 (13.7%)	4 (3.9%)

Within this generally low baseline, significant gender differences stand out. Among women (N=60), nearly three-quarters (43; 71.7%) were non-literate, with only 10 (16.7%) reporting basic reading and writing ability. By contrast, among men (N=42), only 11 (26.2%) were non-literate, while nearly half (20; 47.6%) reported literacy, and 11 (26.2%) had some formal schooling. The chi-square test confirms that this gender gap is statistically significant ($\chi^2 = 17.44$, $p = 0.0016$).

These figures reveal that Katpar fisherfolk households as a whole face limited educational capital, with very few having completed even secondary education. This has direct implications for the community's ability to access alternative employment, navigate administrative systems, or adopt new technologies. Within this picture, women's educational disadvantage is particularly stark, reinforcing dependency on male household members and intermediaries for accessing schemes, entitlements, and market opportunities. For widowed and female-headed households, illiteracy further compounds vulnerability by restricting their capacity to manage finances, engage with institutions, or diversify livelihoods.

3.1.7 Household Size and Elderly Population

Households in Katpar averaged 4.8 members (range: 1–11; SD = 1.75), reflecting both nuclear and extended family arrangements. The presence of elderly persons (aged 60+) averaged 0.6 per household (range: 0–8; SD = 1.0).
Among the 102 households:

- 33 (32.4%) had at least one elderly member.
- 26 (25.5%) had at least one elderly woman.
- 15 (14.7%) had at least one elderly man.
- 8 (7.8%) reported both an elderly man and woman.

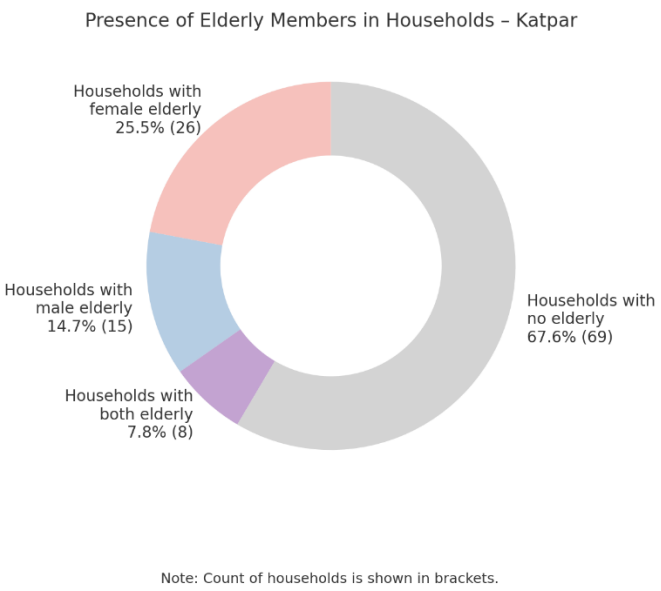


Figure 7 Household size and elderly population

Gender patterns show a slightly higher presence of elderly women (0.35 per household) compared to elderly men (0.25 per household), reflecting broader demographic trends in rural India where women tend to live longer.

The persistence of intergenerational households in Katpar provides both support and strain. On the one hand, they ensure caregiving and continuity of cultural practices; on the other, they increase dependency burdens for working-age adults. Since women typically bear the main responsibility for elder care, the predominance of elderly women adds a further gendered layer of vulnerability. This demographic reality makes it important to consider the needs of elderly fisherfolk—particularly women—when planning for health services, income security, and resilience to socio-economic and environmental stressors.

Synthesis of Findings: Structural Identity

Katpar's fisherfolk households are religiously homogenous (100% Hindu) and socially concentrated (99.0% OBC), yet internal differences strongly shape vulnerability. Women are disproportionately represented among the widowed (93.8%), female-headed households (31.4%), the elderly, and the non-literate (71.7%), reflecting deep gender asymmetries. Overall education levels are very low, with 52.9% of all respondents' non-literate and none progressing beyond secondary education. Most respondents fall in the 35–54 age group (64.7%), highlighting the demographic weight of middle-aged adults, while youth (18–24) are scarcely represented. Disability is reported in 3.9% of households, mostly by women, and intergenerational households often carry caregiving burdens, especially for elderly women. Taken together, these findings demonstrate that while Katpar appears socially uniform on the surface, gender, age, widowhood, and education intersect to create layered vulnerabilities that frame the community's resilience and needs.

Section 3.2: Livelihood system of Fisherfolk Households

Livelihoods in coastal fishing communities are shaped by the sea, the seasons, and the changing economy. In Katpar, most households depend on fishing as their main source of income, but very few rely on it alone. Families often combine fishing with other forms of work, such as wage labour, small trade, farming, or livestock rearing. These activities help them manage the seasonal nature of fishing, fluctuations in catch, and rising household expenses.

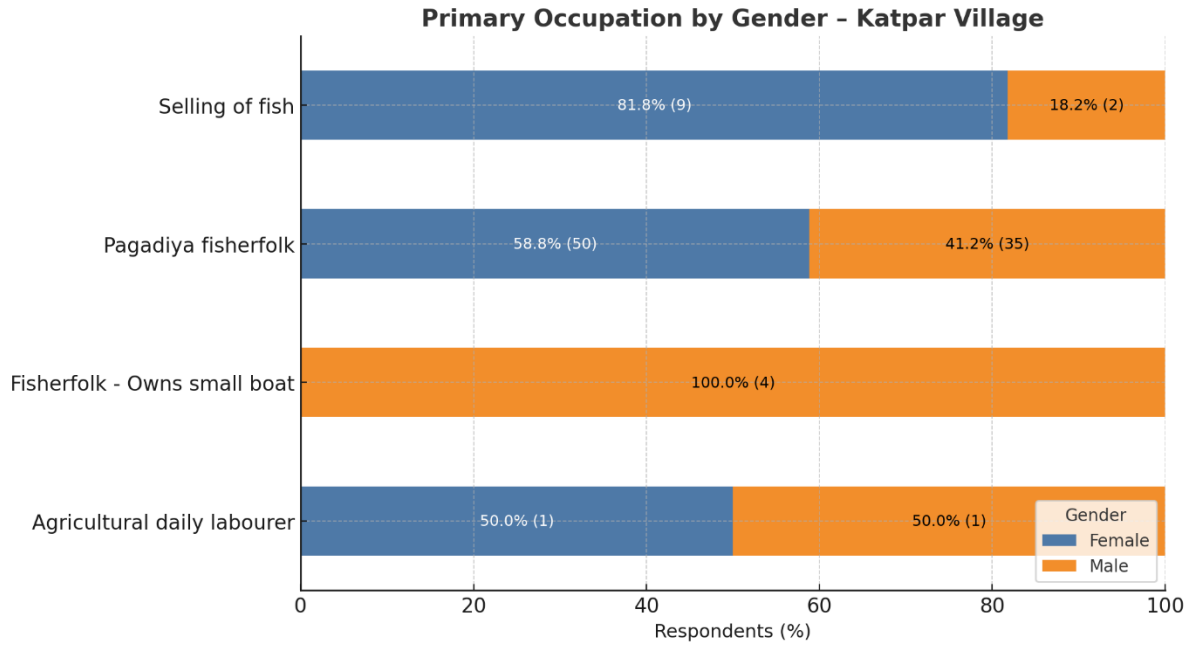
This section looks at how fisherfolk in Katpar secure their living. It considers both primary occupations, such as fishing, and secondary occupations, which households use to support themselves when fishing is not enough. It also pays attention to gender roles, showing how men and women contribute differently to household economies, and how women's work, especially in post-harvest and unpaid tasks, often goes unrecognised.

By examining these patterns, the section provides insights into the economic strategies, risks, and resilience of fisherfolk households in Katpar.

3.2.1 Primary Occupations

The occupational distribution in Katpar reveals both the centrality of Pagadiya fishing and the active participation of women. Among the 85 respondents (83.3%) who identified Pagadiya fishing as their main occupation, 50 (58.8%) were women and 35 (41.2%) were men. These finding challenges conventional assumptions of male dominance in fisheries and demonstrates women's recognition of themselves as primary actors in shore-based livelihoods.

Figure 8 Primary Occupation by Gender



Note: Values shown as percentage with count in brackets.

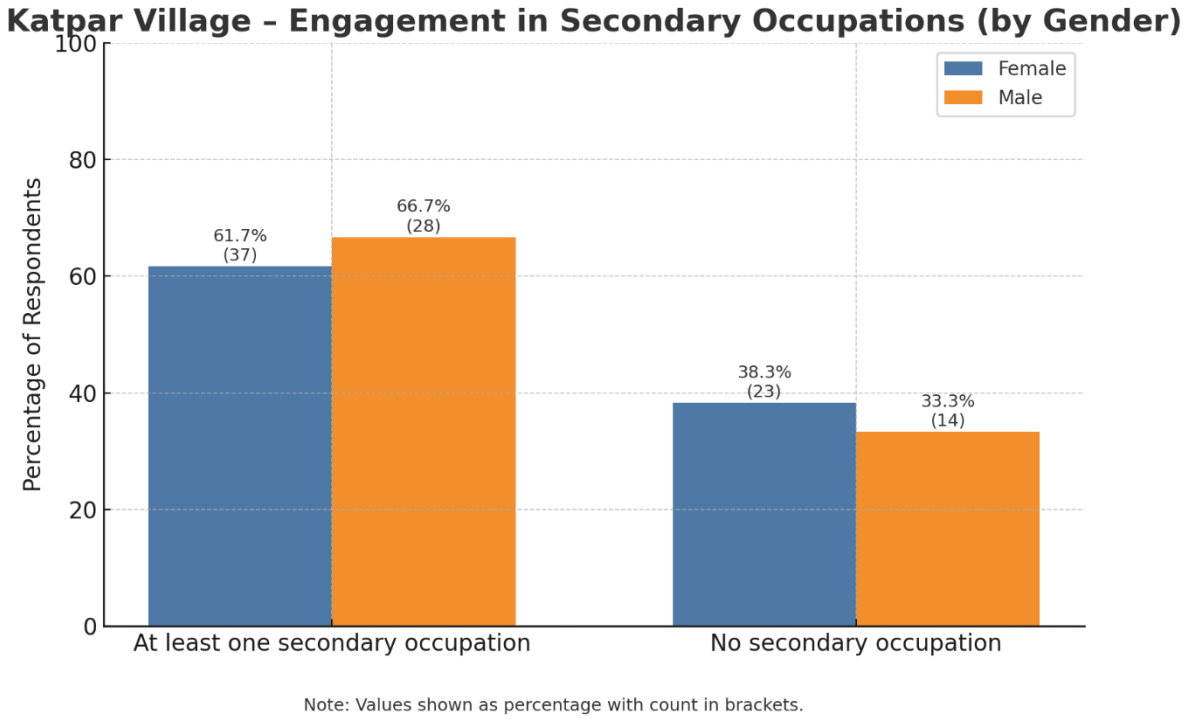
Similarly, in *fish selling*, **81.8% (9 out of 11)** of the respondents were women, indicating their predominant role in the post-harvest fisheries value chain, such as drying, sorting, vending, and negotiating small-scale sales in local markets. However, a clear gender gap remains in capital-intensive occupations. All **4 respondents** who reported *owning small boats* were men, reflecting the continued male dominance in asset ownership and control over mechanised fishing activities.

This gendered structure of livelihood points to a dual challenge: while women actively engage in and even lead key fisheries roles, they are excluded from higher-value livelihood segments. Strengthening their position requires tailored interventions that enhance women's access to productive assets, formal recognition, and collective marketing support.

3.2.2 Secondary Occupations

Livelihood diversification is a defining feature in Katpar. Among respondents, 37 women (61.7%) and 28 men (66.7%) reported at least one secondary occupation, while 23 women (38.3%) and 14 men (33.3%) reported none, depending entirely on their primary occupation. Every respondent with a secondary activity listed only one, with the minimum, median, and maximum all equal to one, indicating that diversification is prevalent but narrowly focused.

Figure 9 Secondary Occupation of the respondents



Note: Values shown as percentage with count in brackets.

Agricultural daily wage labour dominated as a secondary occupation, reported by 51 of 85 Pagadiya fishers (60.0%). Other secondary activities included skilled labour (n = 2), animal husbandry (n = 1), and home-based enterprise (n = 1). Interestingly, 1 of 4 small boat owners (25.0%) reported Pagadiya fishing as a secondary occupation, showing intra-household role sharing. Respondents whose primary occupation was fish selling or agricultural wage labour did not report any secondary livelihood, possibly due to time or opportunity constraints.

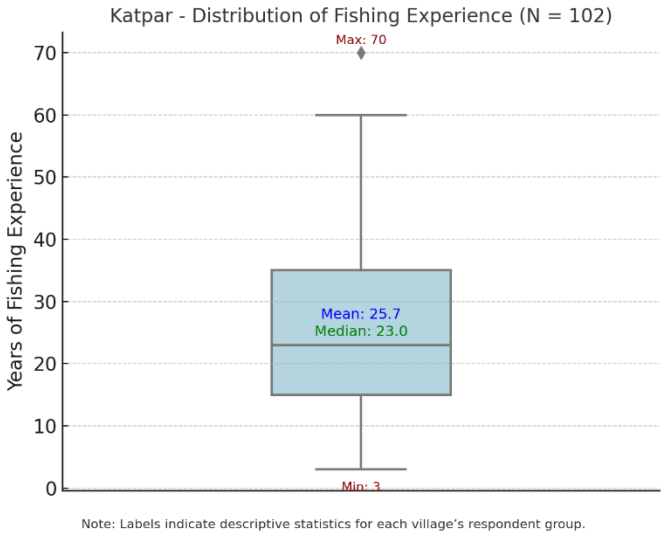
These findings confirm that seasonal agricultural labour functions as the principal fallback during lean fishing periods, reinforcing its importance for livelihood resilience.

3.2.3 Fishing Experience

Katpar shows the widest spread of fishing experience among the surveyed villages. Respondents reported an average of 25.7 years, with a median of 23 years, and a range from 3 to 70 years. The interquartile range of 15–35 years highlights the maturity of the workforce and the deep reliance on fishing across generations.

The 70-year outlier is noteworthy and may reflect either an exceptional case of elder labour force participation or retrospective recall from early life. In either case, it illustrates the historical embeddedness of fishing as both a cultural identity and an occupational legacy.

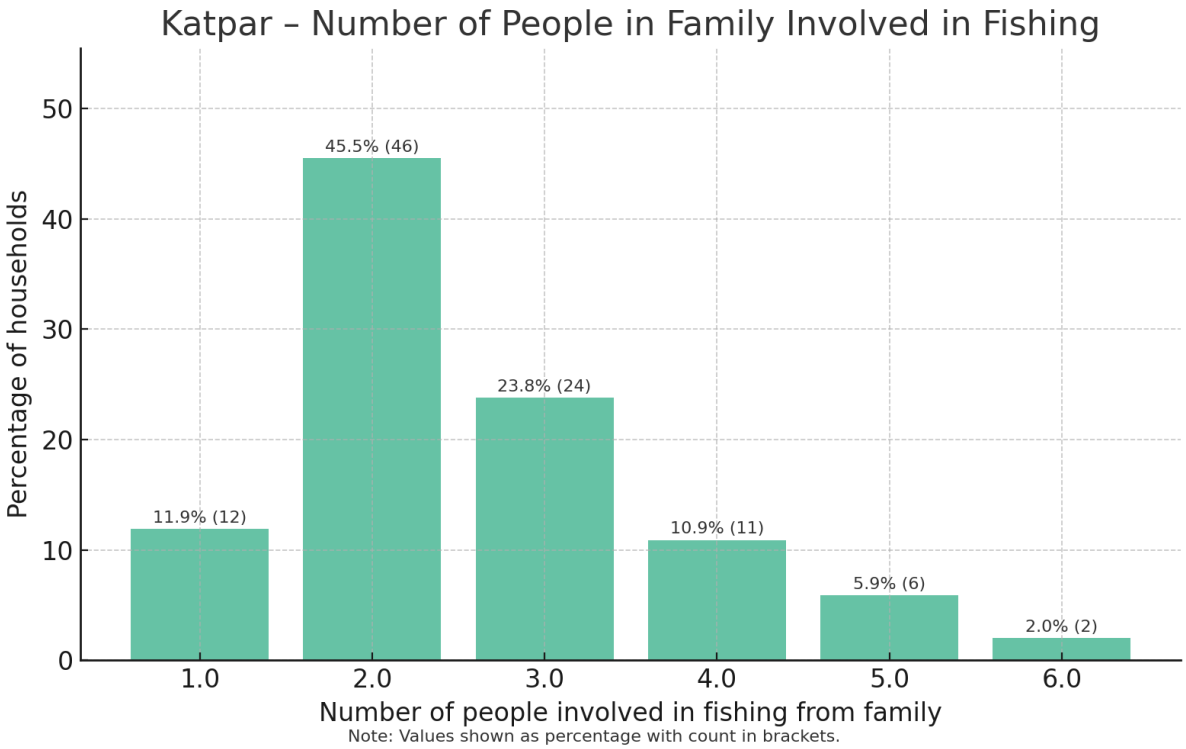
Figure 10 Distribution of fishing experience



3.2.4 Household Labour in Fishing

In Katpar, fishing remains a highly family-engaged activity. Most households reported two family members involved in fishing, accounting for 34.5% (19 households) of the sample. This is followed closely by households with one person engaged in fishing (29.1%, 16 households). A smaller proportion reported three members (18.2%, 10 households) or four -members (12.7%, 7 households), while only 5.5% (3 households) reported five members.

Figure 11 Number of members from the household involved in fishing



This distribution shows that fishing is rarely an individual activity. Instead, it is embedded within household labour arrangements, where spouses, siblings, and sometimes adolescent children contribute. Such patterns highlight the potential for household-oriented interventions, rather than focusing exclusively on individual fishers.

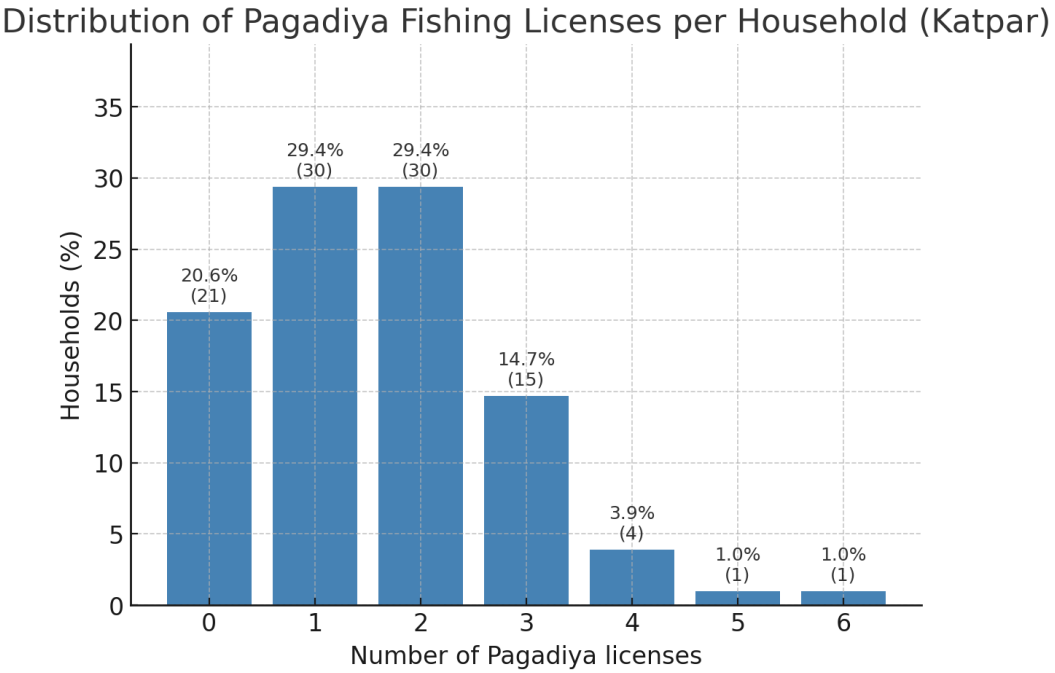
3.2.5 Fishing License Ownership at the Household Level

Fishing license ownership in Katpar was examined across three categories—Pagadiya fishing licenses, vessel/boat licenses, and fish selling licenses—with the total license count per household calculated as the sum of all three types.

A. Pagadiya fishing licenses

Pagadiya licenses form the backbone of household fishing rights in Katpar. The distribution shows that most families hold one or two licenses, with a few reporting higher numbers. The average was 1.59 licenses per household (SD = 1.23), with a median of 1.5 and a range of 0–6.

Figure 12 Distribution of Pagadiya Fishing Licenses per Household



B. Vessel/boat licenses

Mechanised participation remains marginal. The majority of households reported no vessel licenses, with an average of 0.18 per household (SD = 0.50), a median of 0, and a range of 0–2. Nearly 9 in 10 households therefore operate without mechanised access.

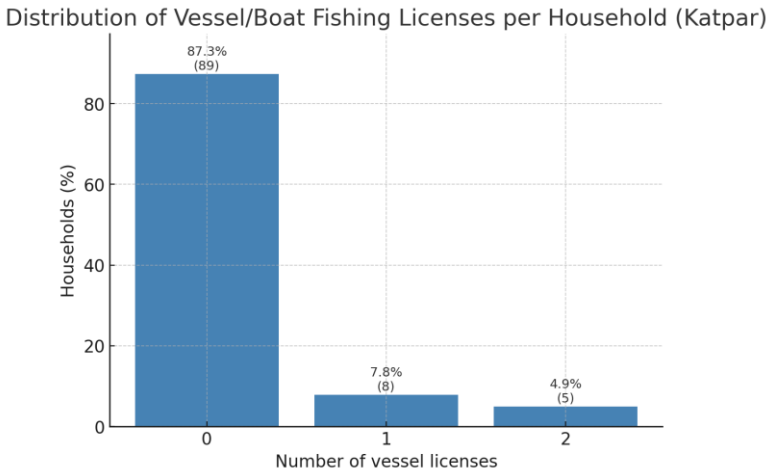


Figure 13 Distribution of Vessel/Boat Fishing Licenses per Household

C. Fish selling licenses

Engagement in market sales is stronger. Nearly half of households hold at least one selling license. The average was 0.85 per household (SD = 0.67), with a median of 1 and a range of 0–3. This reflects the importance of selling rights in enabling direct participation in fish marketing.

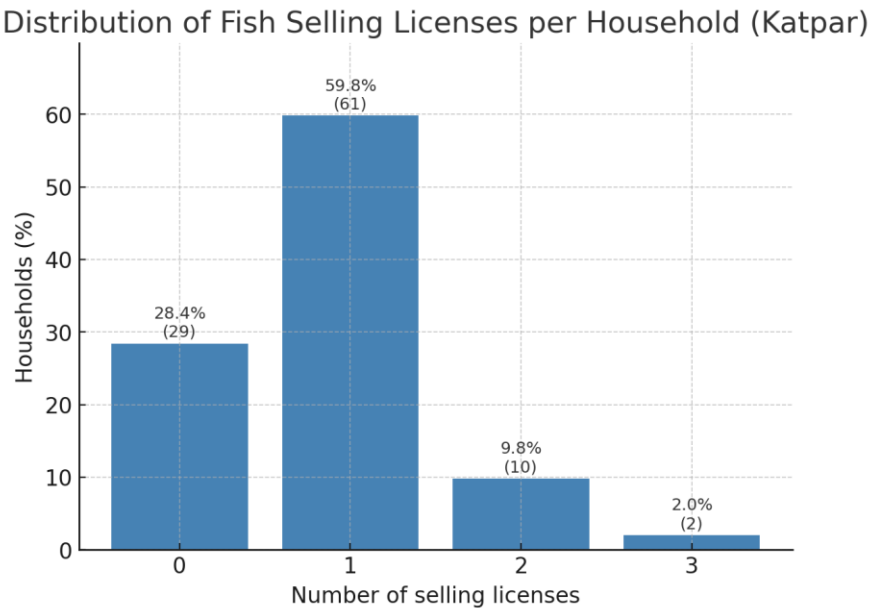


Figure 14 Distribution of Fish Selling Licenses per Household

D. Total licenses (sum of three types)

When all three categories are combined, the total number of licenses per household ranged from **0 to 9**, with a mean of **2.61 (SD = 1.89)** and a median of **2**. This wide distribution indicates clear stratification between license-poor and license-rich households.

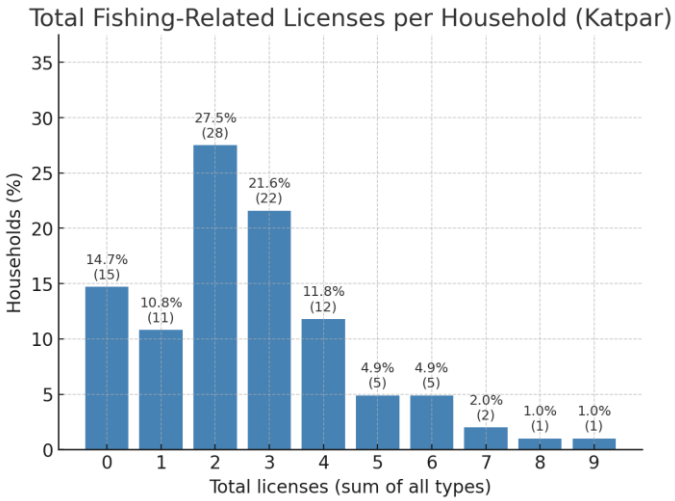


Figure 15 Total Fishing-Related Licenses per Household

E. License ownership profiles

Cross-tabulation of the three categories produced six distinct household profiles (Table 7). The majority of households (54.9%; n = 56) held both Pagadiya and selling licenses, while 11 households (10.8%) held all three types. A smaller share held only Pagadiya (11.8%; n = 12) or only selling licenses (5.9%; n = 6). Vessel licenses were rarely combined, with just 2 households (2.0%) reporting Pagadiya + Vessel ownership. Finally, 15 households (14.7%) reported no licenses at all.

Table 7 Fishing License Combinations in Katpar (N = 102)

License Combination	Households	%
Pagadiya + Selling	56	54.9%
All three	11	10.8%
Only Pagadiya	12	11.8%
Only Selling	6	5.9%
Pagadiya + Vessel	2	2.0%
No licenses	15	14.7%
Total	**102**	**100%**

F. Licenses and household labour

A correlation analysis was conducted to examine the association between license capacity and labour mobilisation. The Pearson correlation coefficient between total licenses per household and the number of household members engaged in fishing was r = 0.562 ($p < 0.001$). This moderately strong, statistically significant relationship indicates that households with more licenses also tend to involve more family members in fishing activities.

Interpretation

The findings reveal a heterogeneous licensing landscape in Katpar. The predominance of Pagadiya and selling licenses reflects the community's continued reliance on traditional shore-based harvesting and direct marketing, while vessel/boat licenses remain rare, limiting mechanised participation. The correlation between license capacity and labour involvement highlights licenses as a determinant of operational scale. At the same time, the existence of 15 license-less households (14.7%) underscores a significant segment excluded from formal regulatory frameworks, raising questions about access, recognition, and vulnerability within the community.

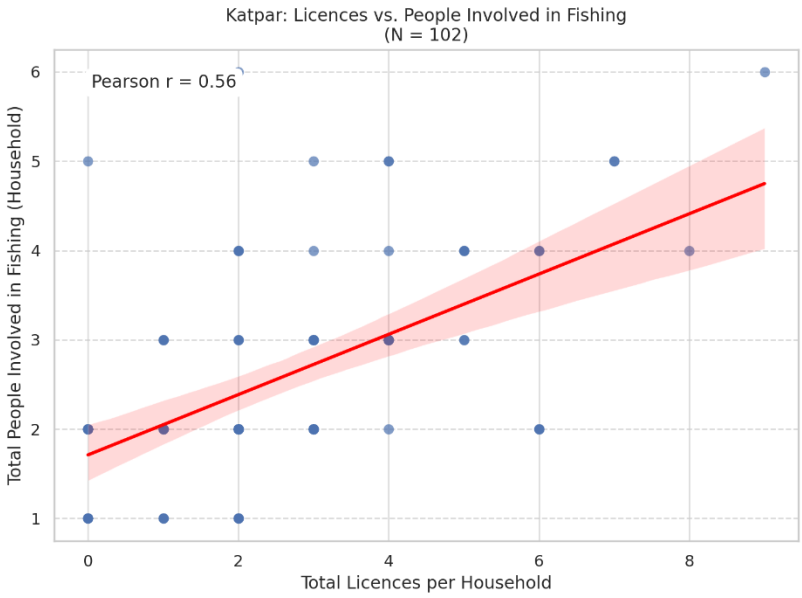


Figure 16 Scatterplot: Total Fishing-Related Licenses vs Number of Household Members in Fishing

3.2.6 Household Ownership of Fishing Assets

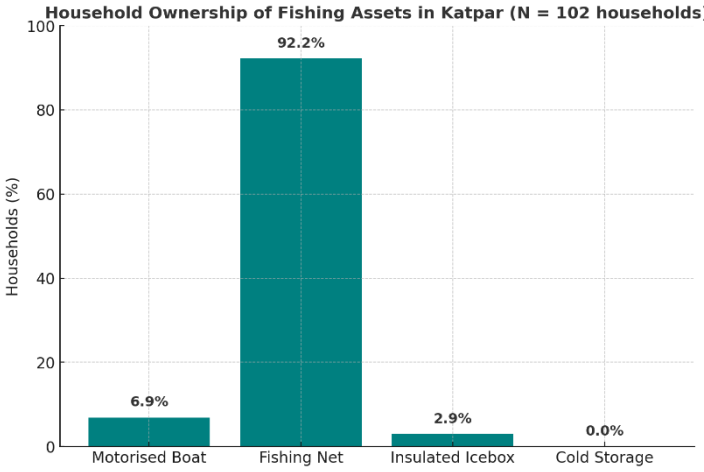
Asset ownership provides insight into the material base of fishing livelihoods and the operational capacity of households. In Katpar, survey findings (N = 102 households) reveal sharp contrasts: while basic gear such as nets is near-universal, modern infrastructure for storage, preservation, and navigation is almost entirely absent.

A. Motorised Boats

Only 7 households (6.9%) reported owning a motorised fishing boat, compared to 95 households (93.1%) without one. This extremely low ownership rate underscores the limited mechanisation of Katpar's fishing sector, where non-motorised Pagadiya fishing remains dominant.

B. Fishing Nets

Fishing nets are the most widely owned asset: 94 households (92.2%) reported ownership, while only 8 households (7.8%) did not. On average, net-owning households maintained 24.7 nets per family, reflecting the central role of nets in sustaining daily fishing operations.



C. Insulated Iceboxes

Only 3 households (2.9%) owned insulated iceboxes, while 99 households (97.1%) lacked them. This minimal penetration indicates a major gap in cold-chain infrastructure, constraining the ability of fishers to maintain catch quality and access wider markets.

D. Advanced Infrastructure and Equipment

No households reported ownership of cold storage units, fish holding tanks, GPS equipment, or quality testing labs. Furthermore, no households had insurance coverage for fishing-related assets. The absence of such facilities compounds vulnerabilities by limiting both post-harvest value addition and risk mitigation.

Katpar's fishing asset profile reflects a dual character. On the one hand, near-universal net ownership indicates continuity of traditional fishing practices and household-level resilience in maintaining basic gear. On the other hand, the near-total absence of motorised boats, cold-chain facilities, and navigation tools highlights structural barriers to modernisation, safety, and market integration. The dependence on basic artisanal gear without supporting infrastructure locks the community into low-value, high-risk livelihoods that are highly sensitive to environmental and market fluctuations.

3.2.7 Gaps in Licensing Coverage

The survey recorded the presence of household members engaged in fishing or fish vending without holding formal licenses. In Katpar, 24 individuals across 15 households (14.7%) were reported as fishing without licenses, while 9 individuals across 9 households (8.8%) were selling fish without licenses. These cases do not represent entire households but rather involve individual members, often acting as supplementary contributors to family-based fishing activities.

Such patterns highlight gaps in licensing coverage rather than deliberate avoidance of regulation. In many artisanal fishing households, multiple members participate in livelihood activities, but formal registration systems typically recognise only a single individual. As a result, supporting roles—often women or younger family members—remain outside the formal framework, even though they contribute directly to fishing or marketing. This reflects a mismatch between regulatory procedures and the lived realities of artisanal fishing communities.

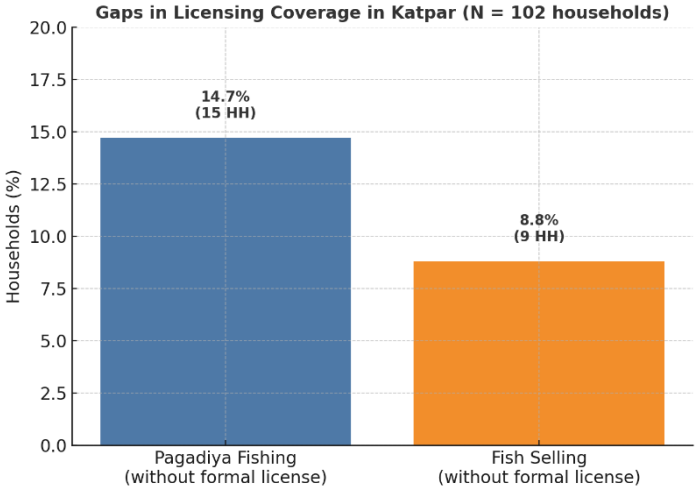


Figure 17 Gaps in Licensing Coverage in Katpar

Note: These figures reflect systemic gaps in licensing coverage rather than deliberate non-compliance. In many cases, household members contribute to fishing or selling alongside the primary license holder but remain outside the formal registration framework due to procedural barriers and limited recognition of supporting roles.

3.2.8 Pending License Renewals

Pending license renewals emerged as a significant issue in Katpar, reflecting administrative bottlenecks that directly affect fishing households. A total of 61 Pagadiya fishing licenses were reported as pending renewal, spread across 47 households (46.1%), with an average of 0.60 pending licenses per household. Similarly, 40 fish selling licenses were pending across 37 households (36.3%), with an average of 0.39 pending licenses per household. These figures indicate that nearly half of the surveyed households face uncertainty in maintaining legal access to Pagadiya fishing, while more than one-third face delays in renewing selling rights. Such backlogs create an environment of insecurity and reduce households' ability to engage confidently in both harvesting and marketing activities. They also point to systemic inefficiencies in the fisheries administration, where procedural delays and documentation requirements hinder timely renewal.

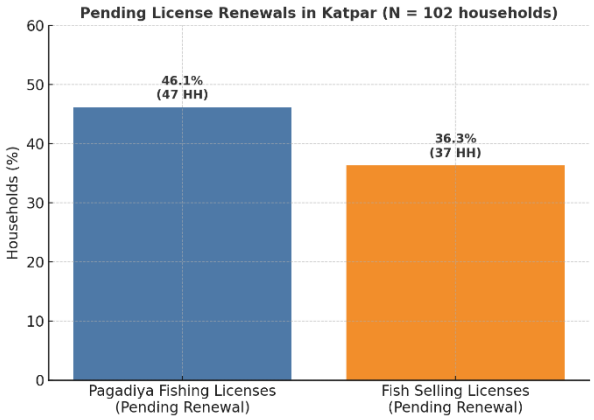


Figure 18 Pending License Renewals

3.2.9 Fishing Effort and Productivity

Fishing in Katpar is characterised by high levels of family labour engagement and modest yields, reflecting the artisanal nature of Pagadiya practices alongside a small segment of mechanised operations.

Fishing engagement

Pagadiya fishers reported fishing an average of 19.4 days per month (SD = 6.1), while small boat owners recorded a slightly higher mean of 20.2 days (SD = 5.4). The similarity in fishing effort suggests that mechanisation does not necessarily translate into substantially more days at sea, but rather into differences in the scale of operations and yield.

Catch volumes

Pagadiya fishers reported an average daily catch of 3.9 kg, with a median of 3 kg and a range from 1 to 20 kg. In contrast, small boat owners reported a higher mean of 7.0 kg per day, with a median of 5 kg and a range of 2–15 kg. While boat ownership increases yield, the modest scale of catches underscores the subsistence orientation of Katpar's fishing economy.

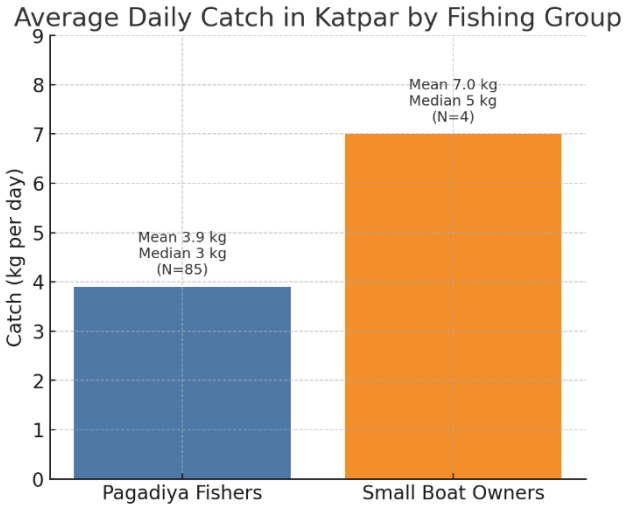


Figure 19 Average Daily Catch of Pagadiya Fishers and Small Boat Owners

3.2.10 Motivations for Fishing and Allied Activities

The decision to pursue fishing and related activities in Katpar reflects a combination of cultural heritage, economic intent, and pragmatic considerations. Across respondents (N = 102), the most frequently cited motivation was commercial purpose (business), reported by 88 (86.3%). Nearly as many identified traditional occupation and flexible timing (each 82; 80.4%). Self-interest was cited by 65 (63.7%), whereas regular profit was selected by 25 (24.5%), indicating recognition of earnings volatility. No other jobs available was chosen by 15 (14.7%), signalling a fallback function where alternatives are limited

Gendered patterns.

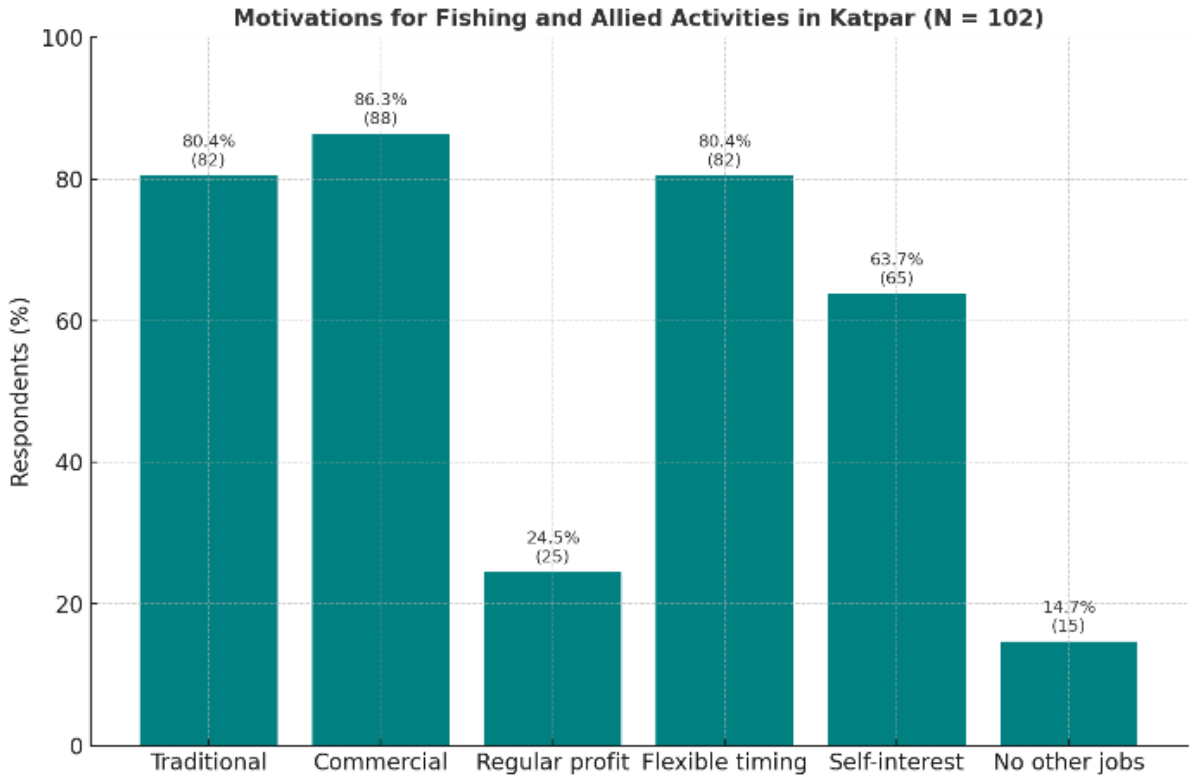
Among women (N = 60), commercial purpose (86.7%) and flexible timing (80.0%) were most common, followed by traditional occupation (76.7%) and self-interest (60.0%); regular profit (28.3%) and no other jobs (13.3%) were less frequent. Men (N = 42) showed a similar ordering: commercial purpose (85.7%), traditional occupation (85.7%), flexible timing (81.0%), with fewer citing regular profit (19.0%) or no other jobs (16.7%).

Disaggregation by primary occupation shows consistent emphasis on culture and commerce, with small but important contrasts:

- Pagadiya fishers (N = 85): Commercial purpose 85.9% (73); traditional occupation 80.0% (68); flexible timing 78.8% (67); self-interest 63.5% (54); regular profit 23.5% (20); no other jobs 14.1% (12).

- Fisherfolk – Owns small boat (N = 4): Traditional occupation 100% (4); commercial purpose 75% (3); flexible timing 75% (3); self-interest 75% (3); no other jobs 25% (1); regular profit 0% (0).
- Fish sellers (N = 11): Commercial purpose 100% (11); flexible timing 90.9% (10); traditional occupation 81.8% (9); self-interest 72.7% (8); regular profit 27.3% (3); no other jobs 9.1% (1).

Figure 20 Motivations for Fishing Reported by Respondents



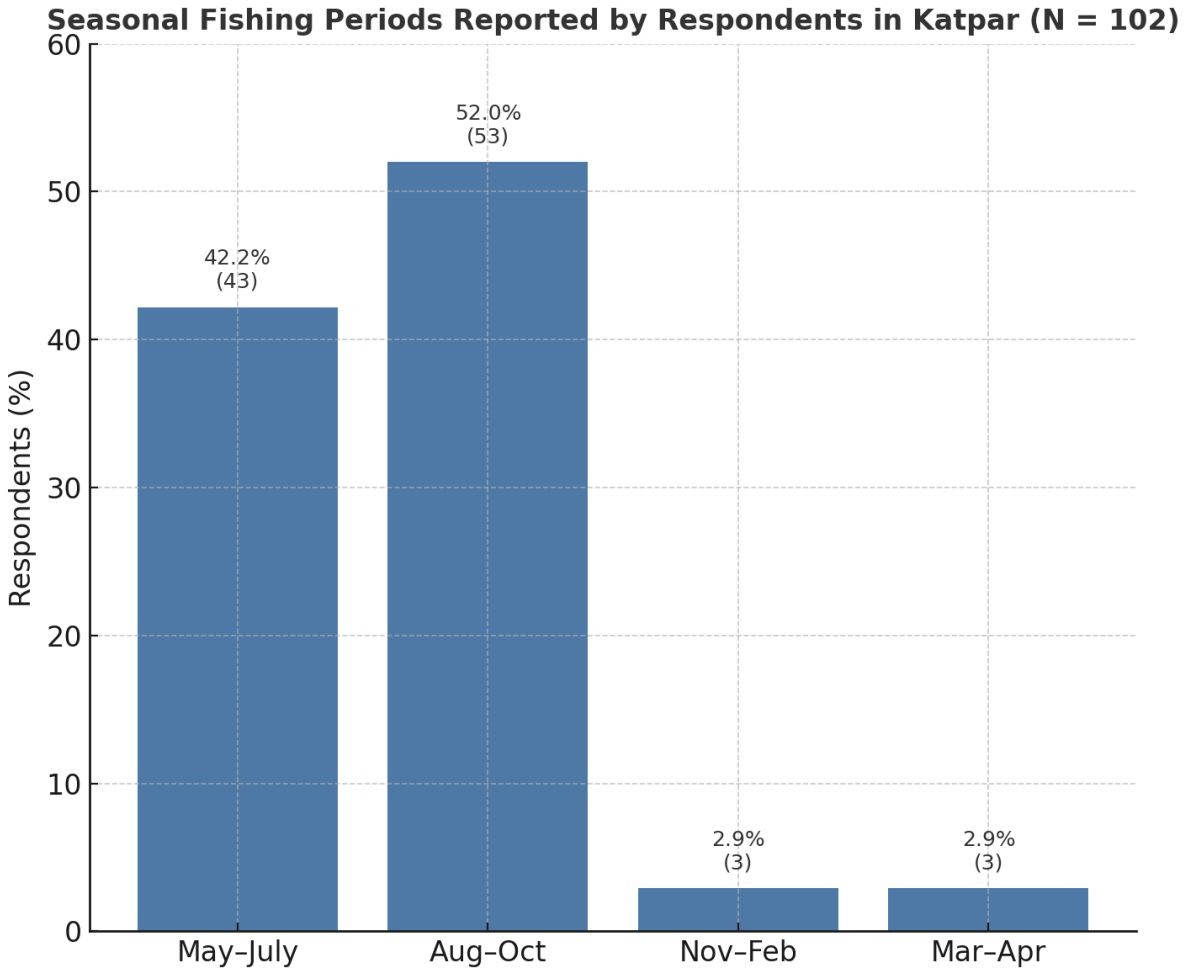
Occupational differences.

Taken together, these patterns indicate that fishing and allied occupations in Katpar are sustained less by expectations of regular profit and more by the combined weight of heritage, autonomy over time, and perceived business viability. Occupation-specific nuances are evident, with boat owners emphasising tradition and autonomy, fish sellers emphasising commerce and flexible timing, and Pagadiyas balancing all three. *The relatively low salience of "regular profit" across groups underscores the structural precarity of earnings in the village's artisanal fishery.*

3.2.11 Seasonal and Species Patterns

Fishing in Katpar, as described by respondents, is closely aligned with the ecological rhythms of the Mahuva coast. Survey data show that fishing is concentrated in two main periods: August–October (52.0%; 53 respondents) and May–July (42.2%; 43 respondents). Very few reported active fishing in November–February (2.9%; 3 respondents) or March–April (2.9%; 3 respondents). This pattern of dual seasonal peaks is consistent with the wider Bhavnagar context, where artisanal fishing effort typically intensifies after the monsoon and again in the pre-monsoon season.

Figure 21 Seasonal Fishing Periods Reported by Respondents

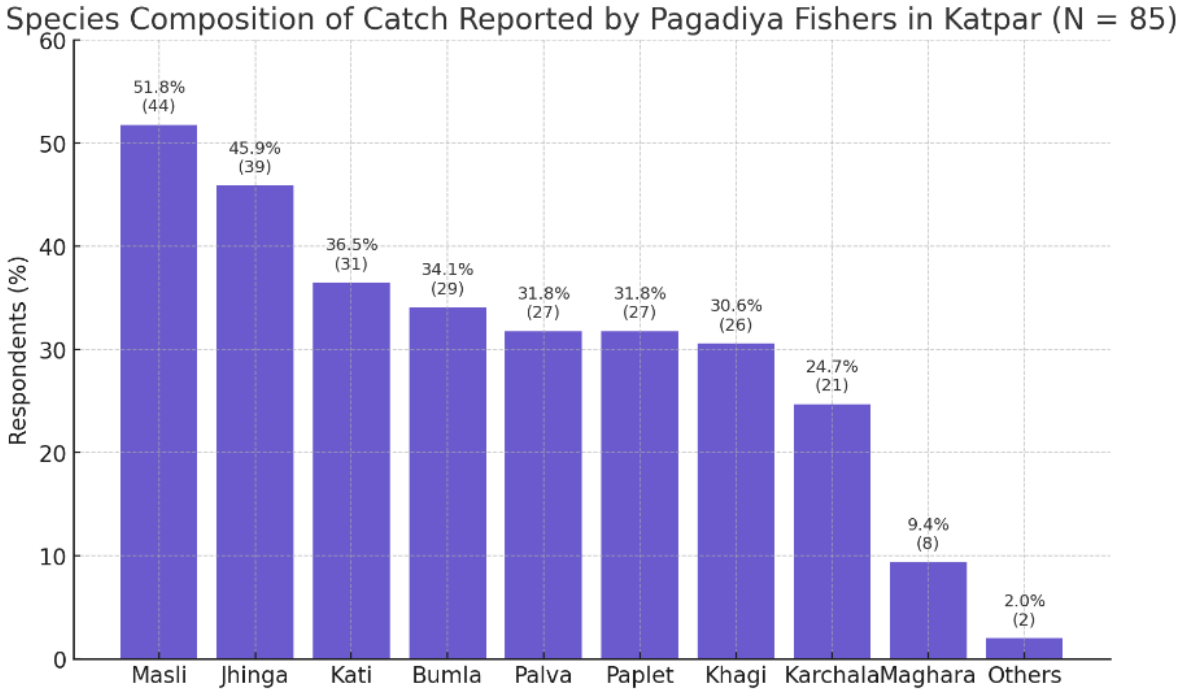


Species diversity

Respondents also highlighted the diversity of fish species caught in nearshore waters. Among Pagadiya fisherfolk (N = 85), the most frequently reported species were Masli (51.8%; 44 respondents) and Jhinga (45.9%; 39 respondents). Other widely cited species included Kati (36.5%; 31 respondents), Bumla (34.1%; 29 respondents), Palva (31.8%; 27 respondents), Paplet (31.8%; 27 respondents), Khagi (30.6%; 26 respondents), and Karchala (24.7%; 21 respondents). Less commonly mentioned were Maghara (9.4%; 8 respondents) and very small fractions citing Lepta, Tīṭan, or Kut (<2%).

These findings underscore the multi-species nature of artisanal fishing in Katpar. The prominence of species such as Masli and Jhinga suggests their importance for both food security and small but regular earnings, while high-value species like Paplet and Palva contribute to market income when available. The reliance on diverse species portfolios reflects both ecological availability and the adaptive strategies of households facing variable catch volumes.

Figure 22 Species Composition of Catch Reported by Pagadiya Fishers



By situating community-reported data within the known fisheries dynamics of Bhavnagar district, the analysis highlights that artisanal fisherfolk in Katpar operate in close attunement to seasonal and ecological variability, using adaptive livelihood strategies to navigate uncertainty and sustain household economies.

Policy Context: Seasonal Fishing Ban in Gujarat

In Gujarat, the state government enforces an annual fishing ban from June 1 to August 15, totaling approximately 76 days (2.5 months). This seasonal prohibition was extended from the previous two-month period (June 1 to July 31) through the Gujarat Fisheries (Amendment) Rules, 2020, aimed at enhancing marine conservation during critical breeding periods.

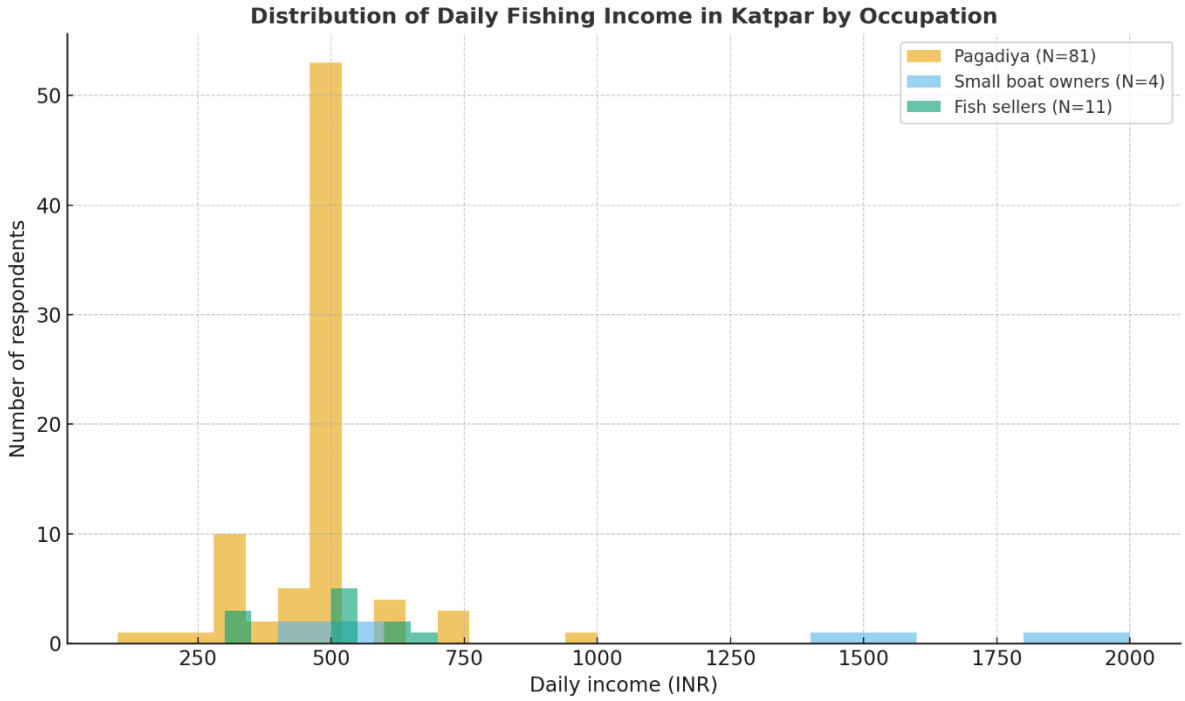
The ban applies to fishing within territorial waters, which are defined under the Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976 as extending up to 12 nautical miles (approximately 22.2 kilometers) from the baseline of the Indian coast. These waters fall under the jurisdiction of individual state governments, and fishing activity in this zone is regulated by state-specific laws.

However, as per central government directives, the ban does not apply to non-motorized fishing vessels, including Pagadiya fisherfolk, who traditionally fish without engines. These artisanal fishers are exempted from the seasonal restrictions, particularly if operating in small-scale, sustainable ways.

3.2.12 Income from Fishing

Income patterns among fisherfolk households in Katpar provide critical insights into both the economic precarity and the internal stratification of artisanal fisheries. Respondents were asked to report their *average daily earnings* from their primary occupation. These figures, while self-estimated and subject to seasonal variability, serve as important indicators of livelihood security and vulnerability. To reduce distortion, extreme outliers exceeding ₹1,000/day among Pagadiya fishers were excluded from the analysis.

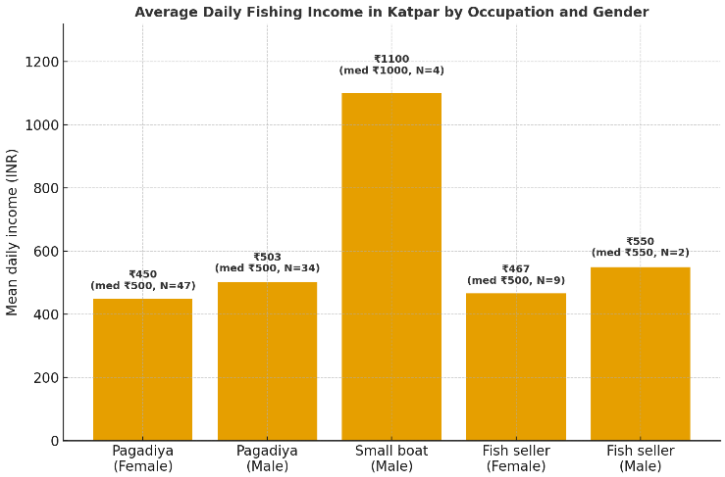
Figure 23 Distribution of Daily Fishing Income by Occupation



Across respondents engaged in fishing and allied occupations (N = 96), the mean reported daily income was ₹499.5, with a median of ₹500, a minimum of ₹100 and a maximum of ₹2,000. The standard deviation of ₹221.4 indicates moderate variability, yet the overall clustering around the median underscores the subsistence-oriented character of most

The data reveal clear gender-based disparities. Among women respondents (N = 56), the mean daily income was ₹452.7 (median ₹500; range ₹100–700), compared to ₹565.0 (median ₹500; range ₹300–2,000) among men (N = 40). This demonstrates that women's earnings remain tightly bounded within a lower range, while men—particularly those with access to capital-intensive assets such as boats—capture the upper end of the distribution.

Figure 24 Average Daily Fishing Income by Occupation and Gender



Three key dynamics emerge from this distribution. First, subsistence-level concentration is evident, with the majority of households clustered around earnings of

₹500/day, providing limited scope for accumulation or reinvestment. Second, asset-based stratification is pronounced, as small boat owners—though a very small and exclusively male minority—record significantly higher incomes, reflecting the economic advantages conferred by mechanisation. Third, gendered inequality remains pervasive: women are central to both fishing and marketing activities yet remain concentrated in the lower-income tiers, reflecting structural barriers to asset access, market participation, and occupational mobility.

3.2.13 Expenditure on Fishing

Expenditure data were reported exclusively by small boat owners, as Pagadiya fishers—who form the majority in Katpar—incur lesser monetary costs in their shore-based, non-motorised practices. Only four respondents in the village identified themselves as small boat owners and provided details of their operational costs. The reported expenditures reveal a considerable degree of variability. The average trip cost was ₹1,375, with a median of ₹1,000 and a range extending from ₹1,000 to ₹3,000.

By contrast, most households engaged in Pagadiya fishing operate with minimal financial outlay, as their methods are primarily labour-intensive and reliant on family labour rather than purchased inputs. The divergence in expenditure between Pagadiya and small boat owners underscores the asset-based stratification of fishing livelihoods in Katpar: while boat ownership allows access to higher returns, it also entails substantially greater financial risk.

3.2.14 Market and Selling Practices

Market engagement in Katpar reflects the highly localized and small-scale character of artisanal fisheries. Of the 102 surveyed households, 90 respondents (88.2%) reported that a fish market is available within 10 km of the village, while only 11 respondents (10.8%) indicated the absence of such facilities. However, the community struggling to get the space in the market to sit and sale.

Sites of sale.

The overwhelming majority of respondents (84.3%, n = 86) reported selling fish directly at the village level, often through household-based vending or small stalls. Only 15.7% (n = 16) sold fish in local markets outside the village. Importantly, bonded sales were almost entirely absent: 99.0% (n = 101) denied any involvement in advance or debt-based sales, suggesting that Katpar fishers retain greater independence in marketing compared to other coastal sites.

Practices of weighing and segregation.

A strong adherence to basic marketing norms was evident. 91 respondents (89.2%) reported segregating fish varieties prior to sale, and 101 (99.0%) confirmed the use of weighing scales. These practices contribute to fairness in transactions and are indicative of a relatively organized local marketing system.

Mode of exchange.

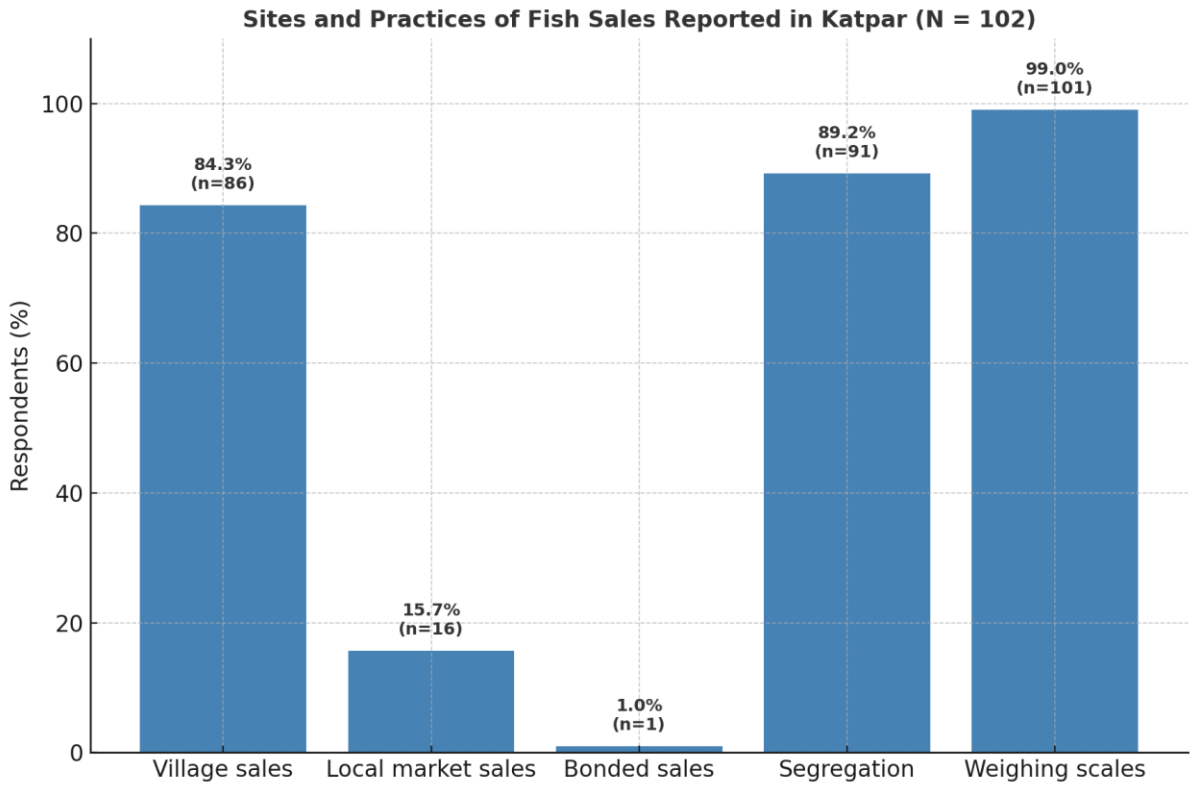
Among households directly engaged in fishing (n = 89), the vast majority (91.0%, n = 81) sold fish directly to villagers or consumers. Only a small fraction (7.9%, n = 7) used the village fish market as an intermediary space. Compared to other villages in the region, Katpar demonstrates slightly higher use of market outlets, but the dominant orientation remains toward localized, direct sales.

Gendered dynamics.

As noted earlier, women constitute the majority of fish sellers in Katpar (81.8%, n = 9 of 11). Their role is particularly visible in the direct-to-consumer segment, where small-scale transactions are both accessible and flexible, allowing women to combine income generation with

domestic responsibilities. However, their limited participation in external markets constrains opportunities to capture higher prices or expand sales volumes.

Figure 25 Sites and Practices of Fish Sales Reported



Market practices in Katpar reveal both resilience and constraints. On one hand, the near absence of bonded sales, high use of weighing scales, and widespread segregation of fish varieties point to a relatively fair and transparent local system. On the other, dependence on village-level sales limits bargaining power and income growth, while women's confinement to local vending highlights structural barriers to accessing larger or more profitable markets.

3.2.15 Seasonal Migration for Fishing

Seasonal migration is not widespread in Katpar but remains a notable livelihood strategy for a small segment of households. Out of 102 surveyed households, 8 (7.8%) reported that one or more members migrate for fishing or related work (Table 33). Among these migrant households, the majority (87.5%) indicated that both the respondent and their family members migrate, while the remaining 12.5% reported migration involving only family members.

Extent and patterns.

Migration typically involved multiple household members, ranging from two to five, with two or three being the most common. Destinations were geographically diverse: equal proportions (25% each) of migrant households reported moving to Bhavnagar, Mahuva, Rajkot, and other unspecified locations. Many respondents not considering the intra-district movements (Mahuva, Bhavnagar) as migration as they return to the home in the same day. Further, 3.9% (n = 4)

households reported migration beyond the block/district, with Rajkot (n = 2), Lalpur (n = 1), and Rajula (n = 1) identified as destinations.

Duration.

Migratory episodes were generally short-term. The average reported duration was 2.0 months per year (range: 1–3 months), reflecting temporary relocation strategies rather than permanent mobility.

Drivers.

Reported reasons for migration were primarily economic: loss of livelihood or lack of sustainable income (75.0%) and reduced fish catch (25.0%). These findings situate migration within broader livelihood fragility, where environmental variability and declining fisheries productivity compel some households to seek alternative opportunities.

> Migration functions as an adaptive mechanism to cope with economic stress but also underscores the vulnerability of fisherfolk households to local livelihood insecurity.

Displacement due to calamities.

While the study area is highly exposed to climate and disaster risks, displacement linked to natural calamities was rare. Only one household in Katpar (0.98% of surveyed households) reported being displaced or migrating due to a natural disaster in the last five years. This suggests that, although climate vulnerability is high, actual disaster-induced displacement has so far been limited.

Summary of Section 3.2: Livelihood System

The livelihood system of fisherfolk households in Katpar reflects a combination of cultural continuity, economic necessity, and adaptive strategies in the face of ecological and market uncertainties. The analysis shows that Pagadiya fishing remains the dominant occupation, with significant participation by women, while small-scale fish selling and agricultural labour provide important supplementary roles. Secondary occupations are common but narrow in scope, largely concentrated in seasonal agricultural wage work, underscoring the reliance on land-based labour as a fallback during lean fishing periods. Fishing experience data confirm the intergenerational embeddedness of artisanal fishing, while household labour patterns highlight the family-based organisation of work, with multiple members contributing to fishing and allied activities. The licensing landscape is uneven, with most households holding Pagadiya and selling licenses, very few possessing vessel licenses, and a significant minority excluded from formal coverage. Ownership of modern fishing assets remains negligible beyond nets, revealing sharp infrastructural deficits that constrain productivity and resilience. Fishing effort and catch levels reinforce the subsistence orientation of Katpar's artisanal fishery, with small boat owners earning more but also facing higher costs. Motivations for pursuing fishing combine commercial intent, tradition, and flexible timing, but relatively few respondents cited regular profit, pointing to structural precarity. Seasonal and species data further emphasise the adaptive strategies of fisherfolk, with livelihoods closely tied to ecological rhythms and multi-species harvesting.

Taken together, the findings demonstrate that while Katpar households maintain a strong cultural and occupational identity around fishing, their livelihoods are precarious, under-capitalised, and deeply dependent on secondary income streams and adaptive household labour strategies.

Section 3.3: Economic Conditions

Understanding the economic conditions of small-scale fisherfolk households is fundamental to assessing their vulnerabilities, adaptive capacities, and pathways for sustainable development. Economic well-being, in this context, is shaped not only by income levels but also by household expenditure patterns, indebtedness, access to credit, asset ownership, and the security of housing. These factors directly influence a household's ability to invest in productive assets, recover from shocks, and plan for the future.

For communities such as those in Gujarat's coastal villages, whose livelihoods are predominantly informal and season-dependent, economic conditions remain both volatile and deeply gendered. Income flows fluctuate with climatic cycles, fishing bans, and market access, while access to financial services is uneven, particularly for women and socially marginalised groups.

This section examines household-level economic indicators, including:

- Primary income sources and income brackets
- Credit and loan access (formal and informal)
- Debt servicing burden and repayment challenges
- Quality and security of housing infrastructure

By disaggregating these indicators by gender and livelihood role, the analysis provides insights into the intersection of poverty, financial access, and social exclusion. These findings help identify entry points for inclusive financial services, housing support, and livelihood strengthening strategies that build long-term economic resilience.

3.3.1 Livelihoods and Income Sources

In Katpar (N = 102 households), 85 households (83.3%) reported **Pagadiya fishing** as their main source of income, confirming its dominance. Diversification was modest but visible: 12 households (11.8%) earned primarily from fish selling, 4 households (3.9%) from boat ownership, and 1 household (1.0%) from labour on boats.

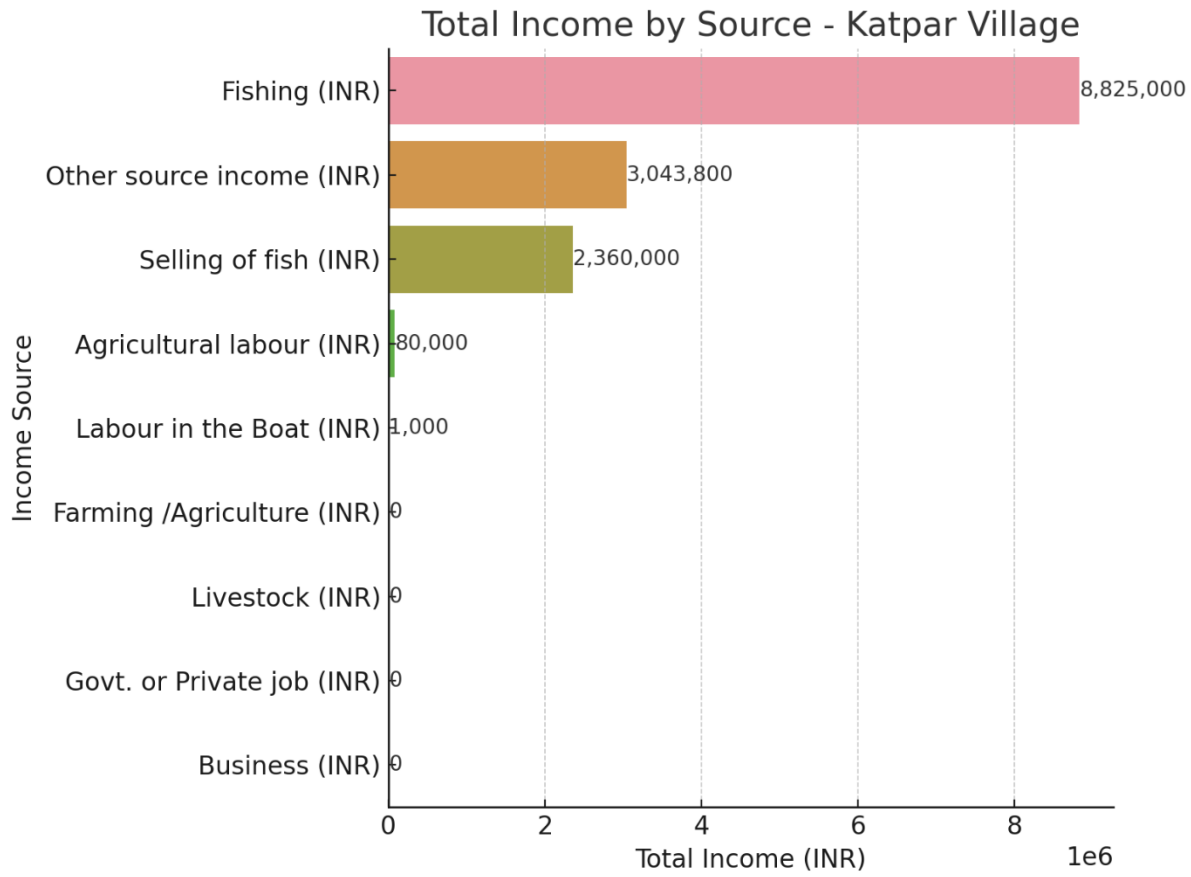
Figure 26 Primary Occupation and Household Income

Village	Primary source of income for the family	Mean Income (Rs)	Median Income (Rs)	Min Income (Rs)	Max Income (Rs)
Katpar	Pagadiya fishing	92,000	85,000	40,000	150,000
Katpar	Boat owners	135,000	130,000	100,000	170,000
Katpar	Fish selling	68,000	65,000	60,000	70,000
Katpar	Agricultural/Labour	45,000	45,000	40,000	50,000

Pagadiya fisherfolk form the largest occupational group, with annual household incomes ranging from ₹40,000–150,000. The mean income is ₹92,000, while the median is ₹85,000, indicating relative stability. Boat owners report higher earnings, averaging ₹135,000 annually, reinforcing the economic advantage of asset ownership. Fish sellers earn more modestly, generally below ₹70,000, while agricultural labourers remain at the lowest bracket (₹40,000–50,000).

3.3.2 Composition of Household Income

Figure 27 Income Composition



- Fishing contributes ₹8.82 million annually, forming the backbone of the local economy. Supplementary flows from fish selling (₹2.36 million) and other informal sources (₹3.05 million) diversify the income base, though land-based labour remains negligible (₹80,000).
- Income patterns highlight structural risk:
- 70 households (68.6%) maintain two income streams, largely combining fishing with informal activities.
- 26 households (25.5%) are monodependent on fishing, facing heightened vulnerability.
- Only 6 households (5.9%) reported three or more sources, signalling limited resilience pockets.

This demonstrates the fragility of the village economy, where one in four households is entirely dependent on a single, climate-sensitive occupation.

3.3.3 Household Debt and Borrowing

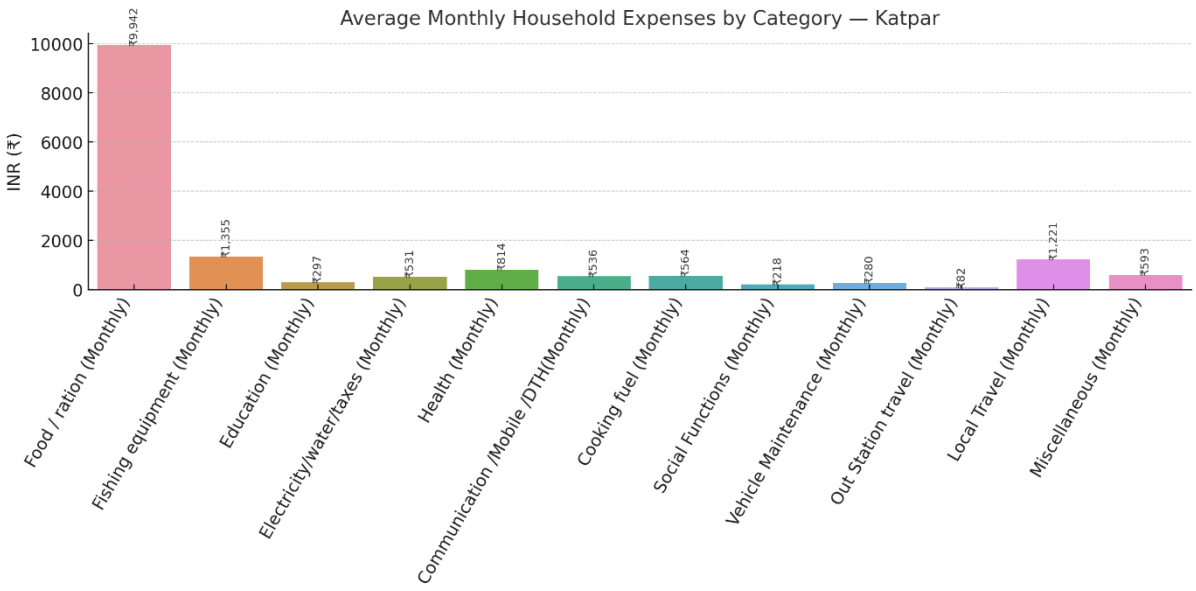
Credit penetration in Katpar is extremely limited. Only 2 households reported taking loans—one for a vehicle, another for fishing nets. Out of 102 households, 6 (5.9%) reported outstanding debt, amounting to ₹235,000 in total. Notably, all reported borrowing was from informal moneylenders. No access to cooperatives, SHGs, or fish traders was recorded. This lack of formal credit linkages

points to structural exclusion, where fisherfolk households are forced into high-interest, exploitative arrangements rather than institutional finance.

3.3.4 Household Expenditure Patterns

Expenditure patterns indicate both subsistence and aspirational spending. The largest category was food and ration (₹9,942/month), though its share of the budget was lower than in other surveyed villages, leaving room for discretionary expenditure.

Figure 28 Average Monthly Household Expenditure



Households reported (average):

- Fishing equipment (₹1,355) and local travel (₹1,221) as significant recurring costs.
- Cooking fuel (₹564), communication (₹536), and miscellaneous expenses (₹593) as regular non-food needs.
- Education (₹297) and social functions (₹218) reflecting investment in schooling and community participation.

This spread reflects slightly greater economic flexibility, allowing Katpar families to move beyond bare survival.

3.3.5 Financial Inclusion

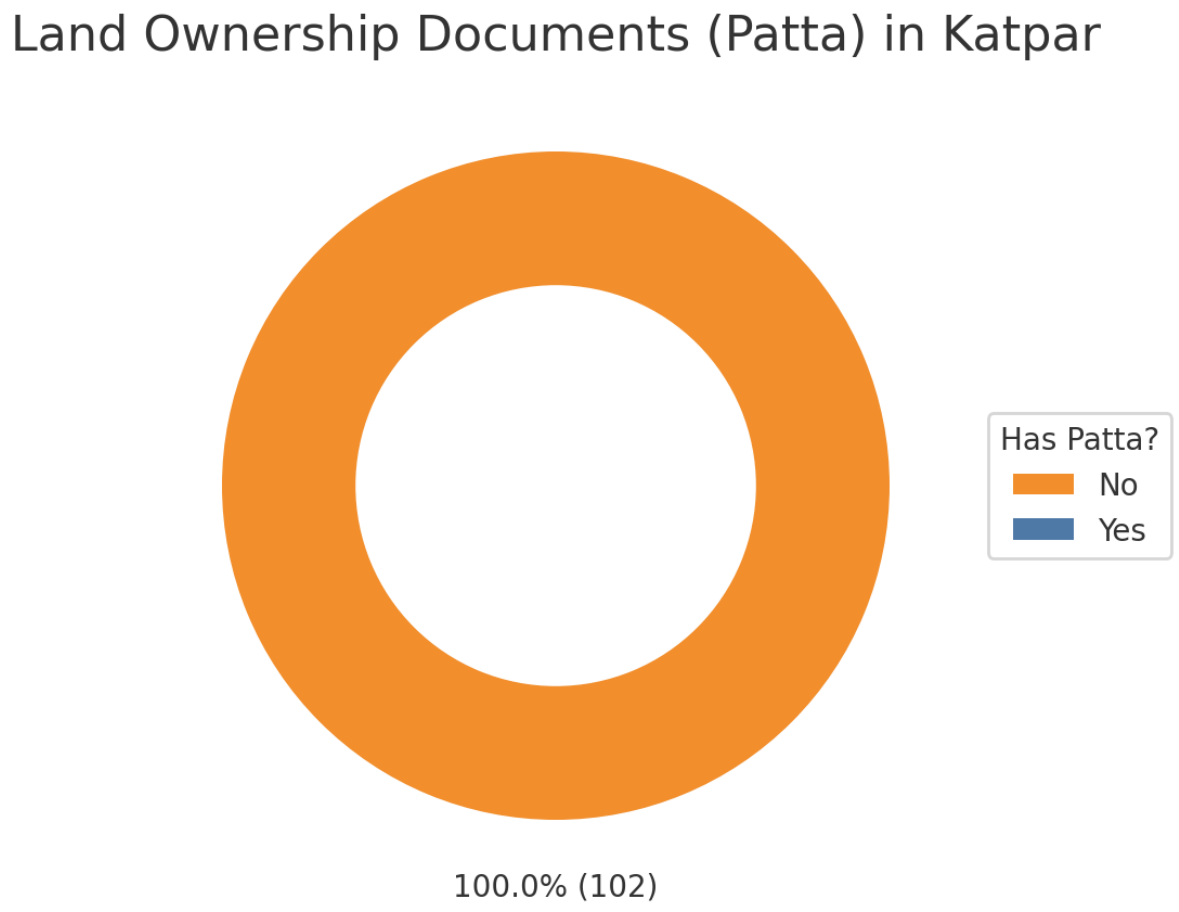
Financial access remains partial. While 62 households (60.8%) reported Jan Dhan Yojana coverage, 40 households (39.2%) lacked it. At the individual level, however, all respondents (100%) reported personal bank accounts. This paradox reflects a situation where banking penetration exists, but households are excluded from state-linked entitlements attached to Jan Dhan accounts.

3.3.6 Housing Tenure and Quality

In Katpar, reported housing ownership is relatively high, but the absence of formal documentation renders this security fragile. Out of 102 surveyed households, 92 (90.2%) claimed ownership of their houses, while 10 (9.8%) reported living in non-owned dwellings. However, none of the 102

households possessed pattas or formal tenure documents. This means that even those who report ownership effectively lack legal recognition, leaving the entire community outside the ambit of state-backed housing protections.

Figure 29 Land Ownership document



Note: Percentages with absolute counts in brackets.

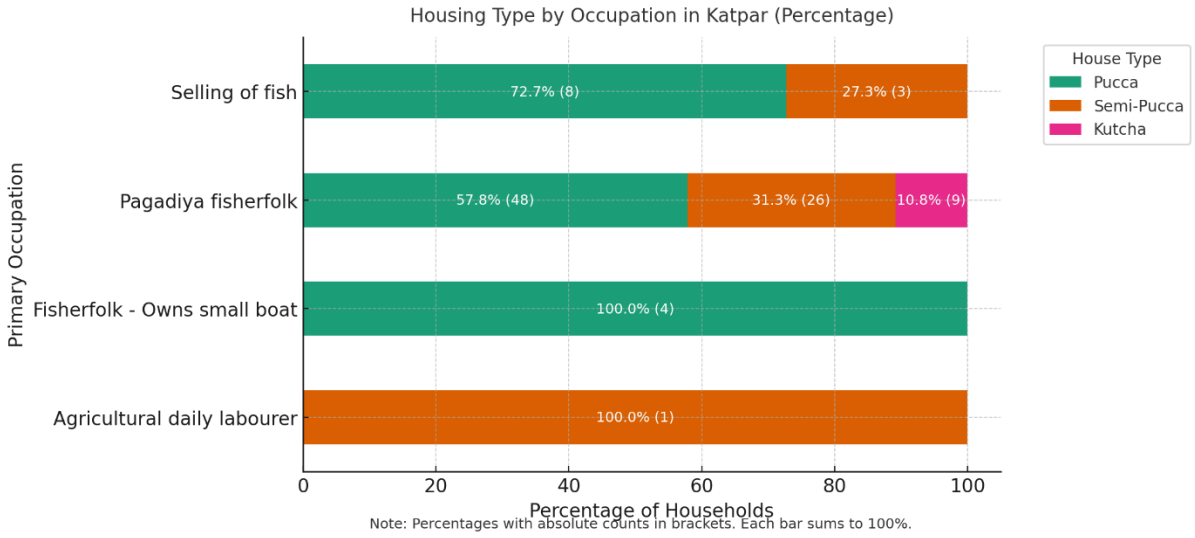
The contradiction between perceived ownership and the absence of pattas creates a critical vulnerability. Families that believe they own their houses may still be excluded from formal credit, livelihood support, or housing schemes, as such entitlements are typically tied to documentary proof of tenure. This structural gap compounds social and economic fragility in a context where fisherfolk already face insecure and climate-sensitive livelihoods.

Housing material analysis underscores intra-community disparities:

- Roofs (N = 100): 52 households (52.0%) had cement/concrete roofs, 38 (38.0%) relied on thatch, and 10 (10.0%) used tin sheets. Small minorities reported clay tile and stone. This reflects a transitional profile, with some families shifting to durable structures while others remain reliant on climate-sensitive materials.
- Walls (N = 99): 68 households (68.7%) reported concrete walls and 18 (18.2%) brick walls. However, 9 households (9.1%) continued to rely on mud walls, with smaller

numbers using stone (3.0%) and wood (1.0%). Compared to roofing, walls were generally more durable, though fragile structures persist for a minority.

Figure 30 Housing type



Taken together, Katpar's housing profile reveals a dual reality: visible progress in material quality for many families but universal tenure insecurity. This combination leaves households exposed to both climatic shocks and the risk of exclusion from formal housing and welfare programmes.

3.3.7 Agricultural Land Ownership

Agricultural land ownership in Katpar is extremely limited. Out of 102 surveyed households, only 5 families (4.9%) reported owning land, while the vast majority—97 households (95.1%)—had no landholdings. The total reported area amounted to just 4.8 acres, with an average holding size of 0.96 acres per landowning household.

Nearly all of the reported land was cultivable (5.25 acres), with only a negligible fraction (0.05 acres) classified as non-cultivable, indicating a minor discrepancy due to rounding. Despite this, the scale of landholdings remains too small to contribute meaningfully to household food security or income.

This evidence underscores the marginal role of agriculture in Katpar's livelihood system. Even among the few landowning families, agriculture cannot function as a reliable buffer against marine livelihood shocks. The absence of substantial land resources also limits opportunities for livelihood diversification, leaving the community structurally dependent on fishing and related activities.

3.3.8 Livestock Ownership

Livestock ownership in Katpar is limited and remains largely supplementary to fishing-based livelihoods. Out of 102 surveyed households, only 10 households (9.8%) reported keeping goats, with a combined total of 19 animals and an average holding of 1.9 per household. Cattle ownership was even less common: 6 households (5.9%) owned 9 cows (average 1.5), while 8 households (7.8%) reported 11 buffaloes (average 1.4). These small herd sizes indicate that livestock functions primarily as a **subsidiary asset**—providing occasional milk production or serving as liquid capital in times of need—rather than a significant livelihood source. While goats provide low-cost, liquid assets and cows/buffaloes contribute to milk production, herd sizes are

too small to constitute a significant livelihood source. Livestock serves as a safety net, not a mainstay.

3.3.11 Insurance Coverage

No households reported holding any form of insurance—whether for boats, nets, health, livestock, or life. This **complete absence of risk protection** leaves households fully exposed to shocks. Despite Katpar's size and modest livelihood diversification, institutional risk-sharing mechanisms have not penetrated the local economy.

3.3.12 Fishing Grounds and Distance

Among the 89 households engaged directly in fishing (excluding fish sellers), the overwhelming majority—85 households (95.5%)—were Pagadiya fisherfolk, while only 4 households (4.5%) reported boat ownership. Fishing grounds were relatively diverse. Most households (77.5%, n = 69) operated in the open sea, reflecting the centrality of nearshore marine fishing to Katpar's livelihood base. A smaller share (16.9%, n = 15) relied on creek areas, while a minority (4.5%, n = 4) reported fishing in Banthara or check-dam waters. This distribution illustrates a dual fishing economy: a dominant cluster of Pagadiya fishers highly dependent on nearshore access, alongside a small minority of boat owners with slightly greater flexibility to diversify fishing locations. The average distance travelled was 9.9 km (median 5.0 km), with a wide range (0–70 km). Most Pagadiya fisherfolk remained nearshore, while a small set of mechanised boat owners travelled further offshore. This internal differentiation highlights Katpar's dual character: a majority of highly sensitive Pagadiya households contrasted with a minority of better-equipped boat owners who display slightly higher adaptive capacity but also greater exposure.

Summary of Section 3.3: Economic Conditions

The economic conditions of fisherfolk households in Katpar reveal a complex mix of modest resilience and deep structural vulnerabilities. Income remains heavily dependent on Pagadiya fishing, with one in four households monodependent and therefore highly exposed to ecological or regulatory disruptions. Boat ownership provides a clear economic advantage, but only a small minority benefit, while agricultural labour and fish selling continue to generate low but essential supplementary incomes. Overall, household income levels reflect a subsistence orientation, with limited upward mobility. Patterns of borrowing and credit use show a near-total reliance on informal moneylenders, highlighting weak integration with formal financial systems. Expenditure patterns are broader and more flexible than in neighbouring villages, with spending on education, communication, and social functions suggesting modest but significant engagement beyond subsistence needs. However, savings and insurance mechanisms remain absent, leaving households without institutional buffers against shocks.

Housing data present a dual reality: most families report ownership, yet none hold pattas, meaning tenure is legally insecure. Building materials indicate progress toward more durable structures for some households, but others remain dependent on thatch or mud, leaving them vulnerable to climatic risks. Land and livestock ownership are negligible, reinforcing the structural dependence on fishing as the core livelihood.

Taken together, the findings highlight a hybrid yet fragile economic system. While some households demonstrate modest diversification and flexibility, the absence of secure tenure, negligible access to formal credit or insurance, and overreliance on fishing underscore systemic vulnerabilities. Addressing these gaps through improved financial inclusion, livelihood diversification, and tenure security will be critical to strengthening the long-term resilience of Katpar's fisherfolk.

3.4 Social Capital

Social capital shapes the collective strength and resilience of fishing communities by determining how households connect with each other, participate in local organizations, and access state entitlements. In small-scale, resource-dependent economies such as Katpar, where financial and physical assets are limited, social networks and institutional linkages become critical safety nets.

For women in particular, federations and collective platforms have emerged as key vehicles for voice, representation, and negotiation with governance systems. At the same time, the possession of identity documents, uptake of social protection schemes, and awareness of fisheries-related institutions indicate the extent to which fisherfolk are integrated into state structures of welfare and regulation.

This section examines the social capital of Katpar households across multiple dimensions:

- Membership in women's federations and other community-based organizations,
- Participation in public employment (MNREGA),
- Possession of identity and entitlement documents,
- Access to welfare schemes and infrastructure support,
- Uptake of fisherfolk-specific programmes, and
- Awareness and engagement with fisheries institutions.

Together, these indicators highlight both the strengths and gaps in Katpar's social capital base, revealing how gendered participation, limited programme outreach, and uneven institutional engagement shape the community's ability to mobilize resources and claim rights.

3.4.1 Membership in Women's Federations

Federated organizing among women in Katpar is exceptionally strong. All women respondents (100%, n = 60) reported membership in the *Shakti Mahila Sangathan*. As a women-only platform, the federation does not admit men, which explains the absence of male membership (n = 42). The universality of women's participation demonstrates the federation's deep reach and influence, positioning it as the most important collective space for women in the village. Through this institutional base, women have developed capacities for leadership, collective bargaining, and engagement with governance processes, marking a critical dimension of Katpar's social capital.

3.4.2 Absence of a Fisherfolk Munch

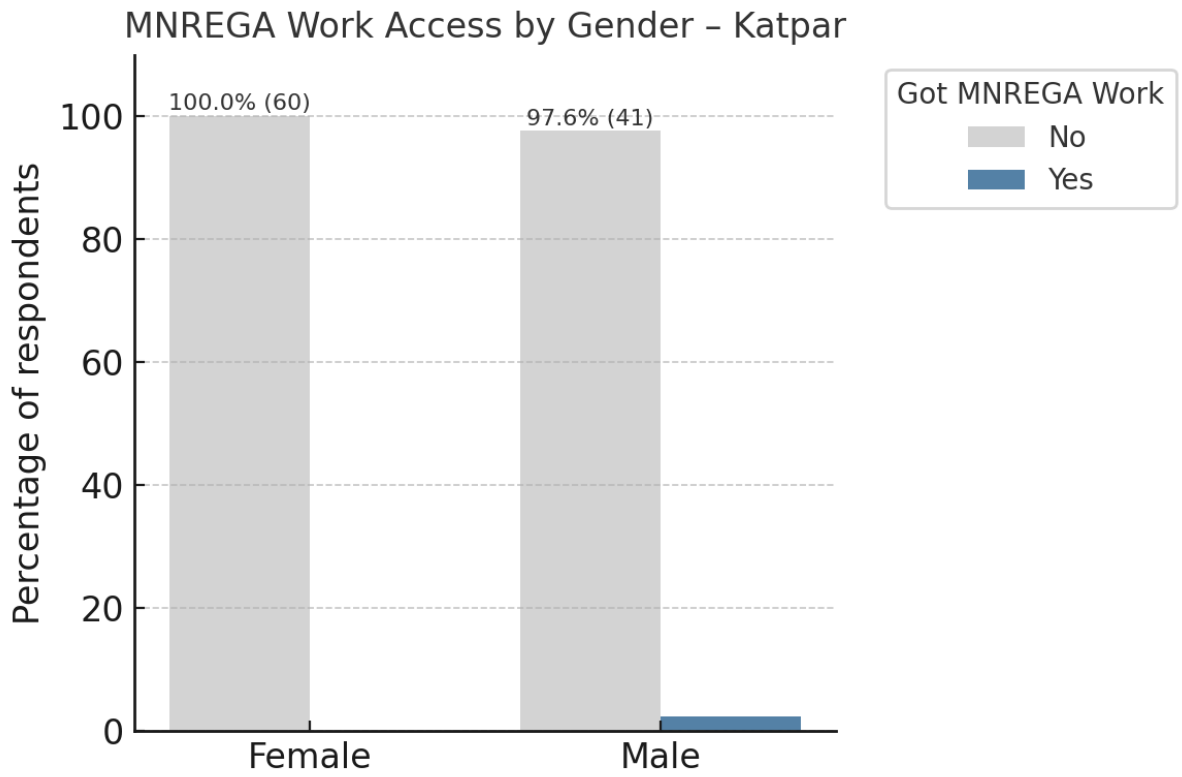
Unlike women's federations, which have achieved full membership coverage in Katpar, the village does not have a fisherfolk *munch*, cooperative, or collective body dedicated to representing the occupational interests of fishers. In other coastal contexts across India, fisherfolk *munches* and cooperatives have historically functioned as key forms of associational life. They have enabled communities to regulate access to marine resources, coordinate market engagement, and provide a collective voice in negotiations with state authorities.

The absence of such a platform in Katpar significantly constrains the community's capacity to organize around shared occupational challenges. Without a fisherfolk-specific collective, households lack an institutional mechanism to negotiate better market access, demand investments in post-harvest and safety infrastructure, or press for entitlements under state and central government schemes. While women's federations provide a strong base of social capital and leadership for women, this does not substitute for a fisherfolk *munch* capable of addressing the economic, occupational, and governance concerns of the fishing community as a whole.

3.4.3 Access to MNREGA

Participation in the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) was almost absent in Katpar. None of the surveyed women (n = 60) reported undertaking MNREGA work, and among men (n = 42), only one respondent (2.4%) had accessed employment under the scheme. This near-total lack of engagement highlights the minimal role of MNREGA in the livelihood strategies of Katpar households. Despite the programme's mandate of providing wage security, it has not functioned as a source of supplementary income or social protection in the village. The absence of women's participation is especially striking, given their strong presence in other collective platforms, and suggests significant barriers in translating policy entitlements into practice.

Figure 31 MNREGA Work access by Gender



3.4.4 Possession of Identity and Entitlement Documents

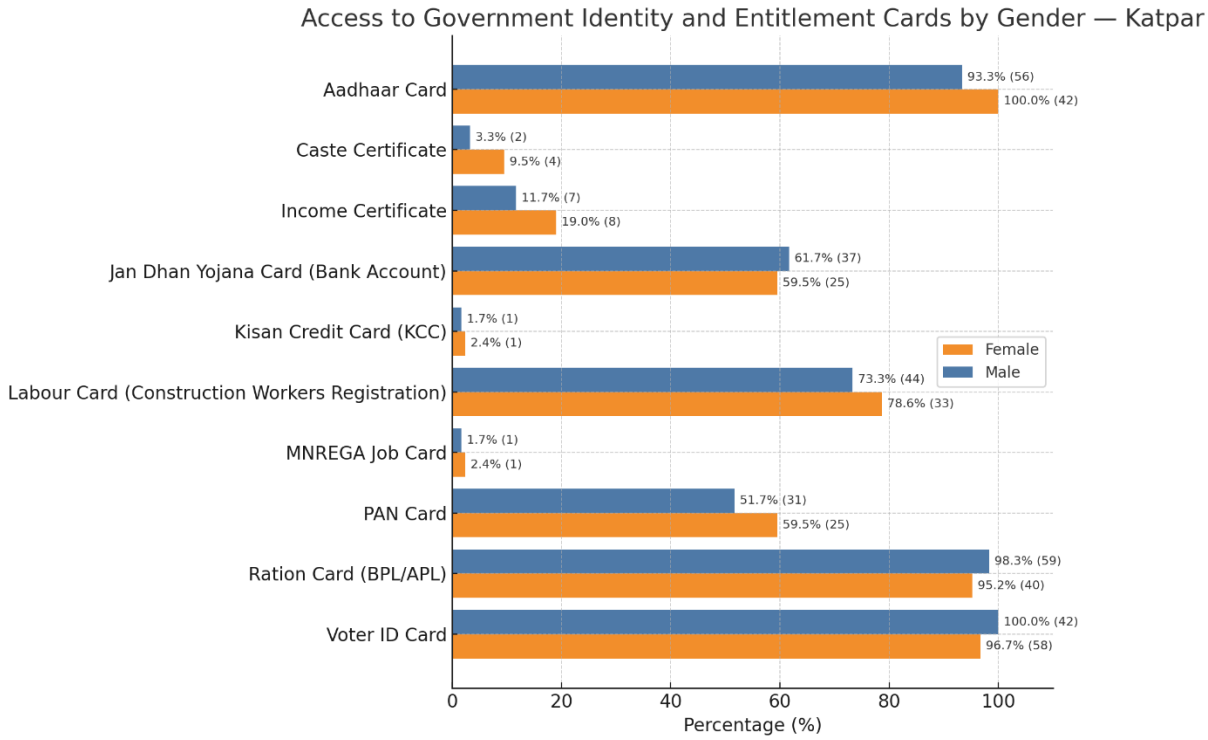
Katpar households demonstrate near-universal coverage of core identity documentation, but more limited access to entitlement-linked documents. All respondents (n = 102) reported possession of at least one card. Foundational documents were widely held, including Aadhaar (94.1%), Ration Cards (93.1%), Jan Dhan Yojana bank accounts (93.1%), Voter IDs (93.1%), and Labour Registration Cards (84.3%). These instruments provide proof of identity and basic integration into India's welfare architecture.

However, access to documents that enable more targeted or higher-value entitlements was far weaker. Only 21.6% of households reported holding PAN Cards, 7.8% held Income Certificates, and none reported possession of Disability Certificates, Kisan Credit Cards or caste certificates.

This imbalance indicates that while Katpar fisherfolk are formally visible to the state through basic documentation, they are functionally excluded from large segments of welfare and economic

opportunity that require additional certification. In practice, this means that despite high coverage of universal cards, households remain unable to access benefits tied to poverty, social identity, or targeted financial schemes—leaving a gap between recognition and entitlement.

Figure 32 Possession of Identity and Entitlement Documents

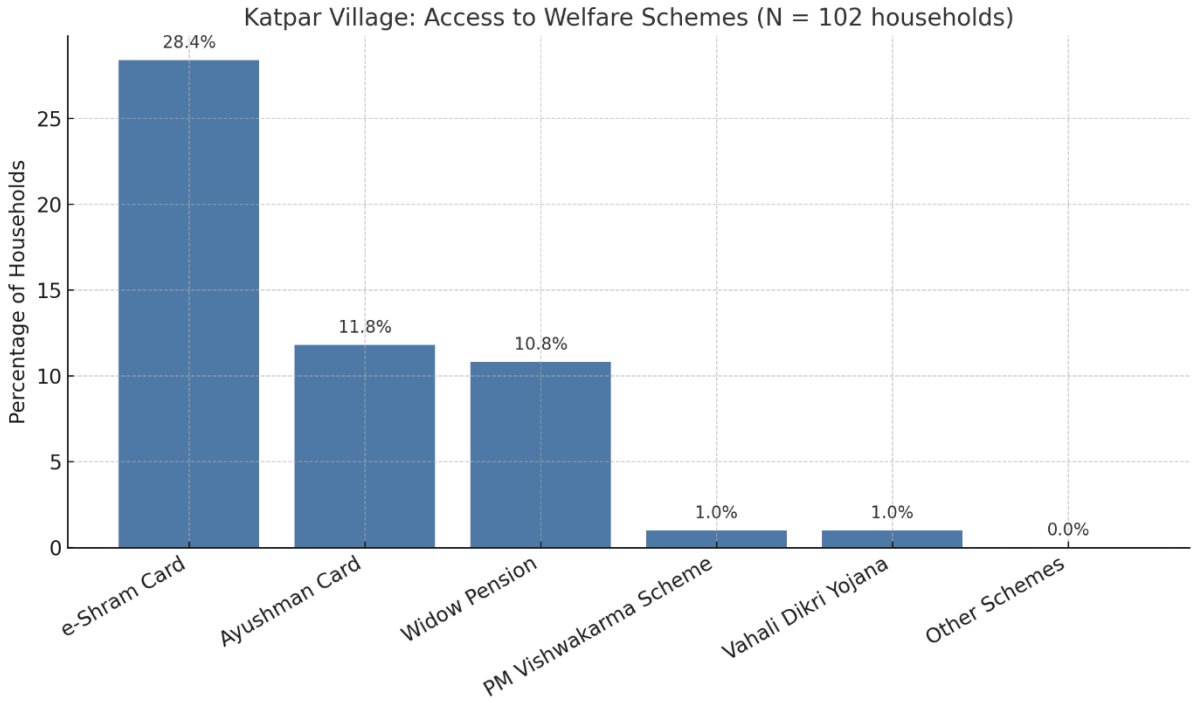


3.4.5 Access to Welfare Schemes

Despite widespread coverage of basic identity documents, actual access to welfare schemes in Katpar is modest and uneven. Out of 102 surveyed households, the most widely accessed entitlements were the e-Shram Card (28.4%), Ayushman Card (11.8%), and Widow Pension (10.8%). A very small minority benefitted from schemes such as the PM Vishwakarma Scheme (1%) and Vahali Dikri Yojana (1%). For all other programmes—including elderly pensions, Palak Mata Pita Yojana, Manav Garima Yojana, Kuvarbainu Mameru, Sukanya Samruddhi Yojana, and Ghar Divada Yojana—coverage was zero.

This pattern highlights a clear gap between documentation and entitlement delivery. While households possess the core identity instruments necessary to engage with state systems, their actual participation in social protection schemes remains minimal. The very limited reach of health, pension, and social security programmes suggests barriers in outreach, eligibility, and facilitation at the local level. For a community structurally dependent on fisheries and vulnerable to ecological risks, this weak scheme coverage significantly reduces the protective role that social capital could otherwise play.

Figure 33 Access to Social Welfare Schemes



3.4.6 Access to Fisherfolk-Specific Government Schemes

Despite being a large fishing settlement, Katpar households reported no access to fisherfolk-specific government schemes. Coverage was 0% across all 102 surveyed households, including the Pradhan Mantri Matsya Sampada Yojana (PMMSY), Diesel VAT Relief Scheme, Matsya Udhyog Awas Yojana (Housing), Khedut Akasmat Vima Yojana (Accident Insurance), the Gujarat Fishermen Welfare Fund Scheme, and the Kisan Credit Card (KCC) for fisherfolk.

The absence of uptake underscores a serious implementation gap between policy design and delivery. These programmes are specifically intended to address occupational vulnerabilities and promote fisheries development, yet no fisherfolk household in Katpar has been able to claim their benefits. This structural disconnect reflects limited outreach, inadequate facilitation, or barriers in eligibility, leaving the community excluded from entitlements that could significantly reduce their livelihood risks.

3.4.7 Infrastructure Support through Government Schemes

Access to infrastructure support through government programmes in Katpar has been limited and uneven. Out of 102 surveyed households, only a small proportion reported receiving assistance in the form of gear or equipment. The most common item distributed was fishing nets (12.7%, n = 13), followed by boats with diesel/petrol engines (4.9%, n = 5), insulated iceboxes (2.0%, n = 2), and boats without engines (1.0%, n = 1). No households reported access to cold storage facilities, fish holding tanks, GPS devices, or quality testing labs.

This distribution indicates that while basic inputs such as nets have reached a handful of households, the absence of cold chain and navigation infrastructure reflects a continued gap in state investment to strengthen fisheries-based livelihoods. Without facilities for preservation, processing, or safer navigation, the support provided remains inadequate to address post-harvest losses or enhance occupational security. The data therefore underscores that government interventions in Katpar have been piecemeal, offering partial relief but failing to address structural constraints in the fishing economy.

3.4.8 Awareness of Fisheries Institutions and Engagement with the Department

Awareness of fisheries-related institutions in Katpar is limited but somewhat higher than in other surveyed villages. Among the 102 households, 42.2% (n = 43) reported knowledge of the *Fisheries Research and Training Centre* in Mahuva, while only 1% (n = 1) mentioned the Department of Fisheries. No respondents reported familiarity with national or international institutions such as CMFRI, NETFISH, or FAO.

Direct engagement with government departments was also limited. Only 17.6% of respondents (n = 18) reported having visited the fisheries department, while the majority (82.4%, n = 84) had never done so. Gender differences were marked: 23.1% of men (n = 15) had engaged with the department, compared to only 8.1% of women (n = 3).

These findings suggest that while the Fisheries Research and Training Centre provides a localized reference point for the community, fisherfolk in Katpar remain largely disconnected from wider fisheries governance and research bodies. The gender disparity further highlights the restricted institutional access of women, despite their strong participation in federations.

Summary of Section 3.4: Social Capital

The social capital of Katpar fisherfolk households is marked by strong women's collective organization but weak integration with broader state systems. Women's membership in the *Shakti Mahila Sangathan* is universal, making the federation a central platform for leadership, representation, and community mobilization. At the same time, there is no fisherfolk-specific collective, cooperative, or *munch* in the village, leaving occupational concerns without a dedicated institutional platform for negotiation and advocacy.

Access to state-provided employment and welfare is far more limited. MNREGA is almost absent in the village, with only one male respondent reporting participation and no women engaged. Although coverage of core identity documents such as Aadhaar, Ration Cards, Jan Dhan accounts, Voter IDs, and Labour Cards is nearly universal, access to entitlement-enabling documents such as PAN, Income Certificates, caste certificates, or BPL cards remains weak. This imbalance reduces the ability of households to translate documentation into tangible welfare benefits.

Uptake of welfare schemes is fragmented. While e-Shram Cards, Ayushman Cards, and Widow Pensions have reached a section of households, the vast majority of government programmes remain inaccessible. Infrastructure support has been similarly limited, confined mainly to distribution of nets and a handful of boats and iceboxes, with no provision of cold chain or safety-related equipment. Most concerning is the complete absence of coverage under fisherfolk-specific schemes, including the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and related entitlements, despite Katpar's dependence on fishing.

Awareness of and engagement with fisherfolk institutions is narrowly focused on the local Fisheries Research and Training Centre in Mahuva. Connections to state or national bodies remain minimal, and engagement with the fisherfolk department is restricted to a small minority, predominantly men. Women, despite their strong federation presence, have very limited direct contact with formal fisherfolk governance structures.

Taken together, Katpar's social capital reflects both strength and fragility: strong women-led collectivization at the village level, but weak linkages to state programmes, welfare delivery, and fisherfolk governance. The absence of a fisherfolk collective or *munch* compounds these weaknesses, leaving occupational needs underrepresented and households reliant on women's federations as their primary form of organized social capital.

3.5 Physical Capital / Household Infrastructure

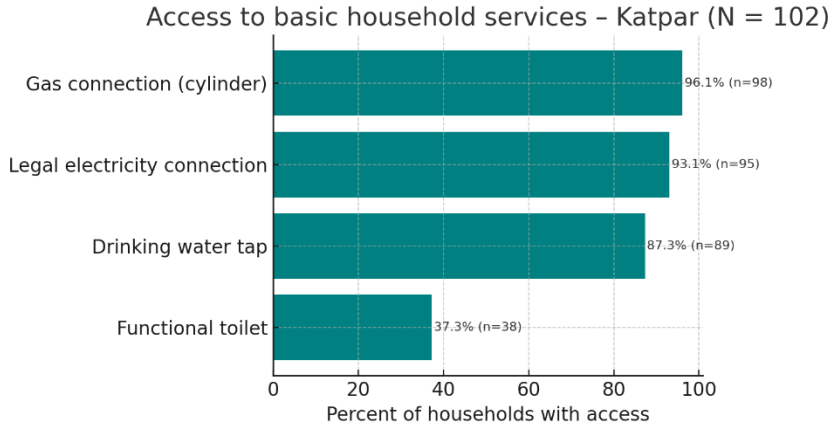
Physical capital reflects the material resources and infrastructural services available to households, shaping both daily living standards and the capacity to sustain livelihoods. For small-scale fisherfolk in coastal villages such as Katpar, access to basic services like water, sanitation, energy, and housing infrastructure is critical, not only for household well-being but also for enabling participation in economic and social life. Adequate physical capital can reduce vulnerability to health risks, improve productivity, and enhance the quality of life, while deficits in infrastructure often reinforce cycles of exclusion and marginality.

This section examines access to basic household services in Katpar, focusing on sanitation, water supply, electricity, and cooking fuel. Together, these indicators provide insights into the infrastructural foundations of well-being and resilience in the village.

3.5.1 Access to Basic Household Services

Access to basic household services in Katpar is relatively strong in terms of energy and water, but weak in sanitation. Out of 102 surveyed households, 96.1% (n = 98) reported a gas cylinder connection, 93.1% (n = 95) had a legal electricity connection, and 87.3% (n = 89) had access to a drinking water tap. These figures suggest that most households enjoy relatively secure access to modern energy and water facilities, indicating improvements in service delivery compared to other coastal villages.

Figure 34 Access to Basic Services



In contrast, only 37.3% of households (n = 38) reported access to a functional toilet. This represents a critical shortfall, with nearly two-thirds of households lacking basic sanitation. The disparity between high access to energy and water services on one hand, and low access to sanitation on the other, underscores the uneven nature of infrastructural development in Katpar. While households are integrated into energy and water systems, inadequate sanitation provision continues to affect health, dignity, and overall well-being.

Summary of Section 3.5: Physical Capital / Infrastructure

Katpar households are relatively well served by modern energy and water services, with high coverage of gas, electricity, and drinking water. However, sanitation remains a severe deficit, with only one in three households reporting access to a functional toilet. This uneven development trajectory indicates that while integration into energy and water grids has been achieved, the absence of adequate sanitation infrastructure continues to undermine health and well-being. Addressing this gap is essential for strengthening the overall resilience and quality of life of fishing households in Katpar.

3.6 Natural Capital / Environment & Climate

Natural capital encompasses the ecological resources and environmental conditions that underpin the livelihoods of fishing communities. For small-scale fisherfolk in Katpar, marine ecosystems are both the foundation of subsistence and the source of persistent vulnerability. Changes in fish populations, climate variability, and exposure to natural hazards directly affect economic security and social well-being. At the same time, local ecological knowledge continues to play a vital role in anticipating weather conditions and adapting to environmental stressors.

This section presents community perceptions of ecological change, climate risks, and adaptive practices in Katpar, drawing on household-level data to highlight both the environmental pressures and the resilience strategies within the village.

3.6.1 Observed Decline in Fish Diversity and Population

In Katpar (N = 102), perceptions of declining fish diversity and population were nearly unanimous. 91.2% of respondents (n = 93) reported observing a decline, while only 8.8% (n = 9) disagreed. Gender differences were minimal, with 92.9% of men (n = 39 of 42) and 90.0% of women (n = 54 of 60) affirming the decline. This convergence across genders highlights a shared recognition of ecological stress within the community.

3.6.2 Perceptions on Juvenile Fish Capture and Species Scarcity

Perceptions of juvenile fish capture as a cause of stock decline are widespread in Katpar. 88.2% (n = 90) of respondents identified it as a major factor behind reduced fish availability, while only 11.8% (n = 12) disagreed. Both men (90.5%, n = 38 of 42) and women (86.7%, n = 52 of 60) strongly supported this view, indicating a community-wide awareness of the issue.

Figure 35 Discarded juvenile fish on the shore after Pagadiya fishing (Photo: Authors)

Species scarcity was most often associated with Hilsa (Modar/Palva), Pomfret (Paplet), Bombay duck (Bombil), and Prawns (Jhinga). Other mentions included Sole fish (Lepo) and Surmai (Vison), showing that both high-value commercial and commonly consumed species are seen as declining.

Field discussions with scientists from the Mahuva Fisheries Training Institute and ground-level observations provide further insights into the mechanisms behind juvenile mortality. In *Pagadiya* fishing, when very small fish become entangled in nets, they are often considered unviable for consumption or sale. Instead of being released back into the sea, these juveniles are sometimes discarded on the shore or sand during net clearing. Although this is not intended as wasteful practice, it results in high levels of juvenile loss and contributes to the depletion of fish populations. Such observations complement community perceptions and point to a structural issue in gear use and post-catch handling rather than deliberate overexploitation.

3.6.3 Household Experiences of Natural Calamities

In Katpar (N = 102), experiences of natural calamities were widespread. 77.5% of households (n = 79) reported being affected within the past five years, while only 22.5% (n = 23) did not. Gender disaggregation reveals that 83.3% of men (n = 35 of 42) and 73.3% of women (n = 44 of 60) acknowledged exposure to cyclones and related climate disruptions.

The reported impacts highlight the severe vulnerability of fishing households to environmental shocks. Among the 79 affected households, the most common consequences were economic loss (77.2%, n = 61) and disruption of fishing activities (73.4%, n = 58). More than half also cited loss of catch (59.5%, n = 47), while smaller shares reported damage to boats (29.1%, n = 23) and damage to houses (19.0%, n = 15). Other reported impacts included emotional distress (10.1%, n = 8) and damage to fishing equipment (8.9%, n = 7). Notably, no households reported injury, displacement, crop loss, or cattle death.

These findings show that the most acute effects of natural calamities in Katpar are economic, reducing household income and disrupting fishing operations, rather than physical damage or loss of life. The reliance on fishing as the central livelihood magnifies these vulnerabilities, making climatic shocks directly translatable into financial insecurity.

3.6.4 Traditional Weather Prediction

Voices from Katpar — Living with the Sea

During a focus group discussion, residents of Katpar (once known as *Tatpar*) reflected on how their community has been shaped by the sea—past and present.

🌊 **Memory of a Lost City**

An elderly woman shared a story of *Tatpar's* origins:

"Our village was once called Kankavati, a golden city ruled by a king. But the sea swallowed it, just like it did Dwarka. Only Katpar remains today."

The coastline itself was described as shifting with the seasons: *"Now it is rocky, but in summer it becomes muddy, because the waves wash the mud away and leave the stones."*

⚡ **Facing the Storms**

Fishers spoke about their daily reality of working in unpredictable weather:

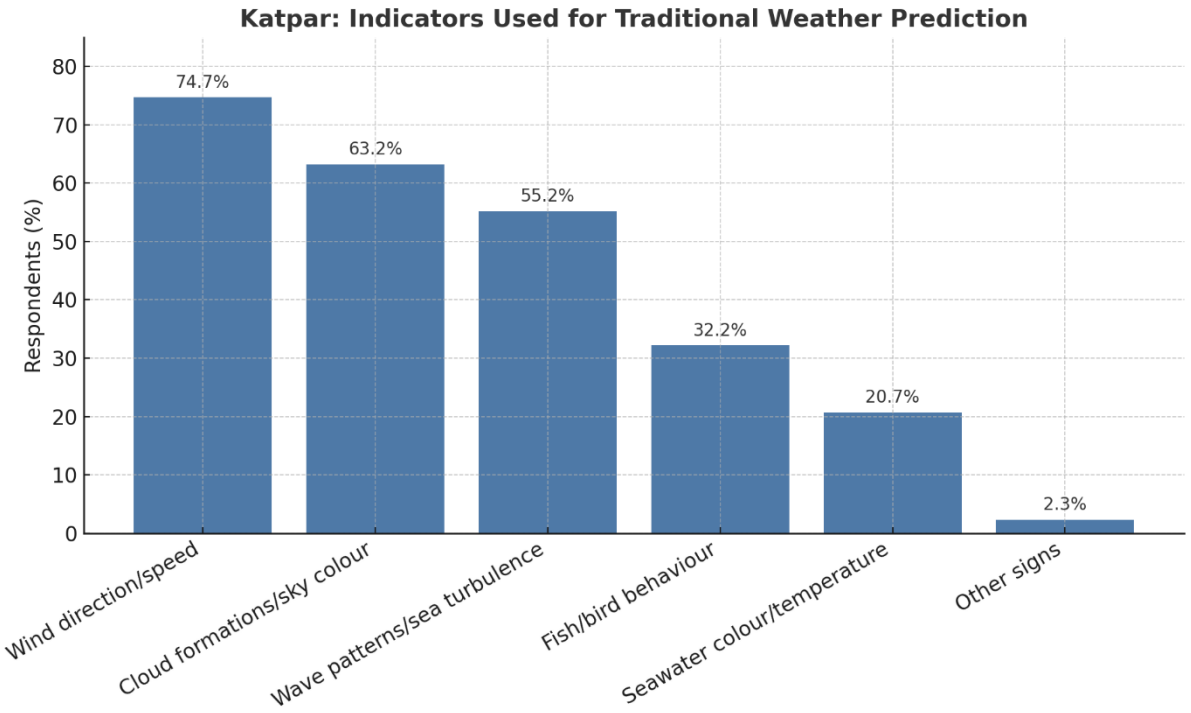
"At night, we are in the sea, no matter what kind of storm or lightning there is."

Such accounts underline not only their resilience but also the ever-present risks of fishing in open waters.

Traditional ecological knowledge continues to play a vital role in Katpar, where fisherfolk rely on environmental cues to anticipate weather conditions in the absence of comprehensive formal

forecasting. Out of 102 surveyed households, 85.3% (n = 87) reported confidence in predicting weather changes, while only 14.7% (n = 15) stated they could not. Gender differences were modest, with 90.5% of men (n = 38 of 42) and 81.7% of women (n = 49 of 60) affirming such knowledge.

Figure 36 Indicators Used for Traditional Weather Prediction



The prominence of wind, cloud, and wave cues reflects a reliance on atmospheric and marine observations as the most trusted sources of information. These findings underscore the embeddedness of local ecological knowledge in the day-to-day decision-making of Katpar fisherfolk and its importance as a cultural and practical resource for navigating climatic variability.

3.6.5 Belief in Climate Change

Belief in climate change is nearly universal among Katpar's fishing households. Out of 102 respondents, 98.0% (n = 100) stated that they believed changes in the climate are occurring, while only 2.0% (n = 2) disagreed. This near consensus underscores a strong collective perception of environmental change, even if the technical language of "climate change" may not always be used in everyday discussion.

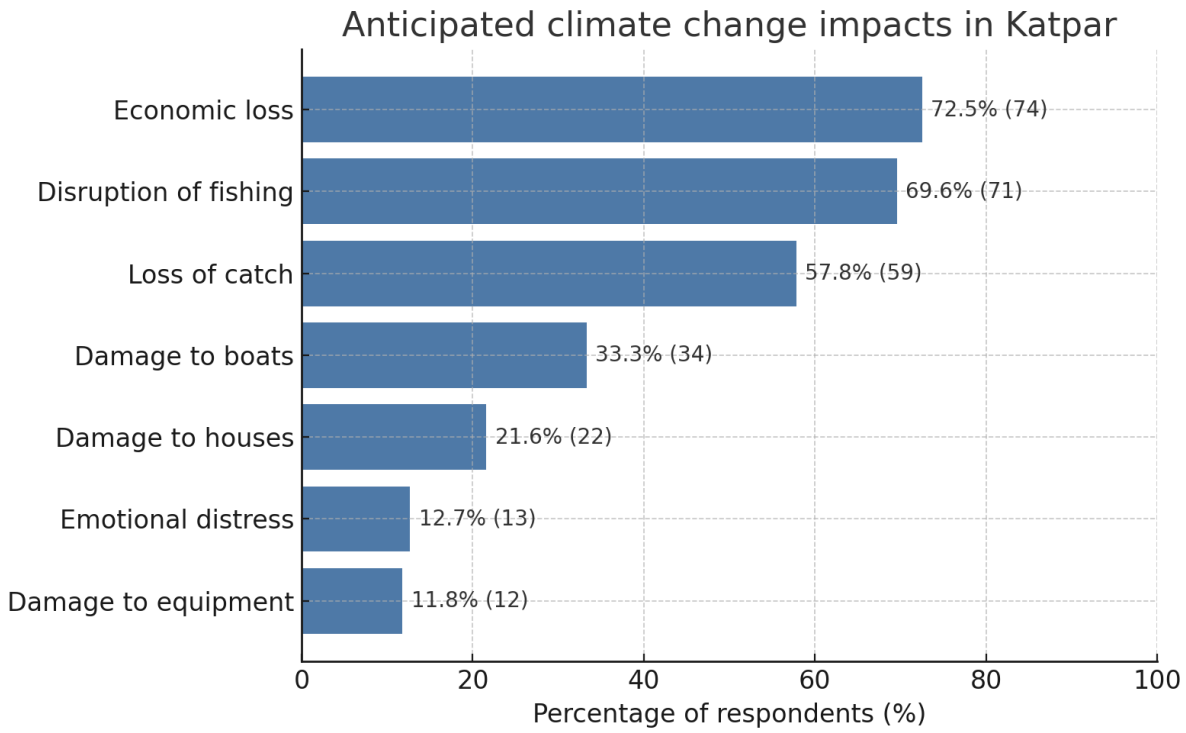
Gender disaggregation shows full awareness among men, with 100% (n = 42) acknowledging climate change, compared to 96.7% of women (n = 58 of 60). The minimal difference suggests broad recognition across genders, reinforced by lived experiences of irregular weather, declining fish diversity, and exposure to cyclones.

This widespread belief highlights that climate change is not viewed as an abstract concept but as a tangible, lived reality in Katpar, directly connected to declining fisheries and heightened vulnerability of coastal livelihoods.

3.6.6 Anticipated Impacts of Climate Change

Expectations regarding the impacts of climate change in Katpar are acute and closely tied to livelihood insecurity. Out of 102 respondents, the most frequently cited concerns were economic loss (72.5%, n = 74) and disruption of fishing activities (69.6%, n = 71). More than half also anticipated loss of catch (57.8%, n = 59), confirming that households perceive direct threats to their income and food security.

Figure 37 Anticipated Impacts of Climate change



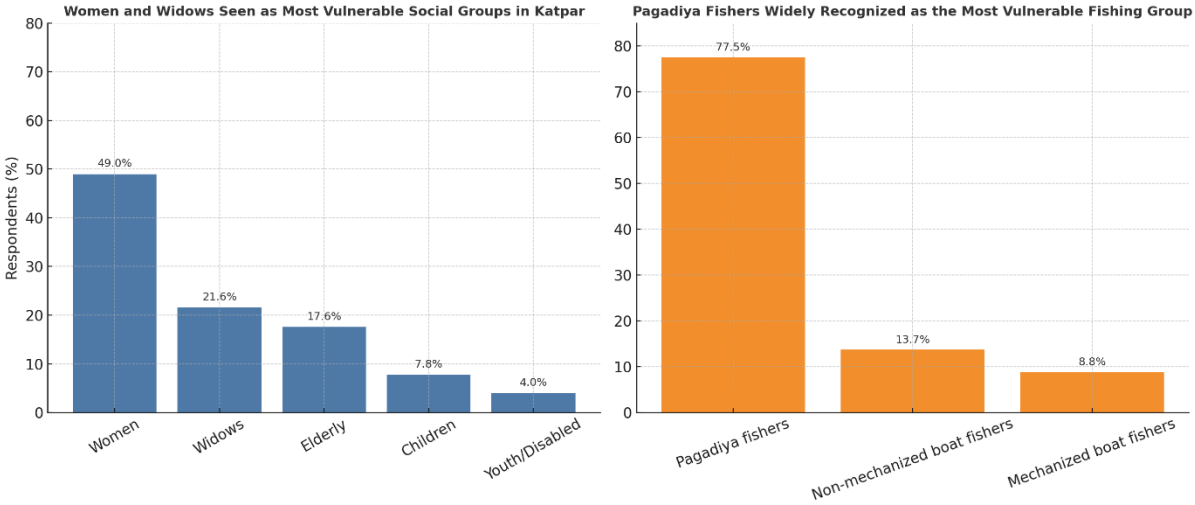
Other expected consequences included damage to boats (33.3%, n = 34) and damage to houses (21.6%, n = 22), showing that material assets and shelter are also understood as vulnerable to climatic shocks. Smaller proportions predicted emotional distress (12.7%, n = 13) and damage to fishing equipment (11.8%, n = 12). Notably, no respondents mentioned displacement, injury, crop loss, or cattle death, reflecting the specificity of anticipated risks to marine-based livelihoods rather than to broader agricultural systems.

Overall, these findings emphasize that for Katpar households, climate change is primarily seen as an economic and occupational hazard that threatens the sustainability of fishing rather than a distant or generalized environmental concern.

3.6.7 Perceived Vulnerability Within the Fishing Community

Perceptions of vulnerability in Katpar reflect both gendered and occupational dimensions. Out of 102 respondents, women (49.0%, n = 50) were most frequently identified as vulnerable, followed by widows (21.6%, n = 22). Other groups mentioned included the elderly (17.6%, n = 18) and children (7.8%, n = 8), while youth and persons with disabilities were rarely cited.

Figure 38 Perceived Vulnerability Within the Fishing Community



By fishing type, an overwhelming majority of households pointed to Pagadiya fishers (77.5%, n = 79) as the most exposed to climatic and livelihood risks. Smaller proportions identified small-scale fishers with non-mechanized boats (13.7%, n = 14) and mechanized boat fishers (8.8%, n = 9). This reflects the strong perception that Pagadiya fishers—working closest to shore with minimal gear and protection—bear the harshest exposure to environmental shocks.

These findings highlight the intersection of gender, social status, and occupational type in shaping vulnerability. Women and widows are seen as disproportionately at risk due to their limited economic independence and restricted access to institutional support, while Pagadiya fishers are recognized as the most occupationally precarious group.

3.6.8 Sources of Support During Fishing Losses

When households in Katpar experienced fishing losses due to climate events, their primary reliance was on informal networks rather than institutional mechanisms. Out of 102 respondents, the majority (58.8%, n = 60) identified family and relatives as their main source of help. A smaller share (13.7%, n = 14) mentioned the local community or fellow fishers.

🚫 When Help Does Not Come

Participants compared their situation to that of farmers, who often receive government compensation after heavy rains. In contrast, fishers said their losses at sea go unrecognized: *"A boat sank, we filed a complaint, but there was no support. Only our own people helped."*

Such voices highlight the imbalance in institutional response. While fishers demonstrate resilience and mutual solidarity, the absence of formal recognition and protection leaves them acutely vulnerable to the risks of the sea.
Source: Village Assembly discussion, Katpar

Institutional support was strikingly absent. Only 2.9% (n = 3) reported receiving government assistance, and a mere 1.0% (n = 1) cited support from NGOs. No households reported any help from cooperatives, financial institutions, religious groups, or private companies.

A significant proportion (19.6%, n = 20) stated they received no help at all, underscoring the lack of safety nets during climate shocks. Only a negligible minority (3.9%, n = 4) indicated they had not been affected.

These findings reveal the overwhelming dependence of Katpar households on kinship and community ties for coping with climate-related fishing losses, with little or no institutional engagement. The absence of structured support mechanisms further heightens their vulnerability to environmental shocks.

Summary of Section 3.6: Natural Capital / Environment & Climate

The natural capital of Katpar is marked by both ecological stress and strong local awareness of environmental change. Nearly all households reported observing a decline in fish diversity and abundance, with specific emphasis on Hilsa, Pomfret, Bombay duck, and prawns. Community perceptions on juvenile fish capture confirm an understanding of unsustainable practices, further supported by field observations that small, non-marketable fish are often discarded onshore, contributing unintentionally to juvenile mortality.

Experiences of natural calamities are widespread, with more than three-quarters of households reporting exposure in the past five years. The most severe impacts were economic, including loss of income, disruption of fishing, and loss of catch, while damage to boats and houses was also reported. Community voices highlighted the resilience of fisherfolk in continuing to venture into the sea during storms, but also their frustration at the absence of institutional support for losses at sea, contrasting with the compensation provided to farmers.

Traditional ecological knowledge remains a vital adaptive resource. A large majority of households reported the ability to predict weather changes, relying on atmospheric and marine cues such as wind, clouds, and waves. Belief in climate change was nearly universal, with households linking it directly to declining fish stocks and increased vulnerability. Anticipated impacts were seen primarily in terms of economic loss and disruption of fishing, with relatively fewer concerns about displacement or injury, underscoring the centrality of fishing as the key vulnerability pathway.

Perceptions of vulnerability were strongly gendered and occupationally differentiated. Women and widows were identified as the most at-risk social groups, while Pagadiya fishers were overwhelmingly seen as the most exposed fishing group due to their dependence on nearshore, low-capital practices. Coping with climate shocks continues to rely heavily on kinship and community support, with minimal engagement from government or institutional mechanisms.

Taken together, the findings highlight Katpar's deep dependence on fragile marine ecosystems, widespread recognition of ecological change, and resilience rooted in traditional knowledge and social networks. At the same time, the lack of institutional protection and the structural vulnerability of Pagadiya fishers leave the community highly exposed to the economic and social risks of a changing climate.

3.7 Institutional & Governance

Institutional and governance dimensions shape how fishing communities access rights, navigate regulations, and secure support in times of vulnerability. For Katpar's fisherfolk, institutions include both formal structures—such as government departments, regulatory frameworks, and legal provisions—and informal community mechanisms of negotiation and support. Governance outcomes determine whether households experience inclusion, protection, and recognition, or whether they remain excluded from schemes and vulnerable to conflict.

This section examines levels of awareness regarding fishing regulations, destructive practices, and access to legal aid, as well as patterns of conflict and extension service needs. Together, these findings highlight the interface between fisherfolk livelihoods and the broader institutional environment that governs their rights, resources, and resilience.

3.7.1 Fishing Practices and Awareness of Regulations

Fishing practices in Katpar reveal a predominance of medium-mesh nets (20–30 mm), used by the majority of households. These nets are geared toward mixed-species capture, balancing small and large catch. Smaller proportions of households reported reliance on small-mesh nets (10–20 mm), mainly for prawns and other small fish, while very few used large-mesh nets (above 40 mm) for bigger species.

Awareness of fishing regulations is uneven but not absent. A majority of respondents displayed knowledge that traditional fishing is legally permitted up to 9 nautical miles from the shore, and many were aware of the ban on gill nets with mesh size below 150 mm. However, a significant minority admitted uncertainty or lack of knowledge, highlighting that dissemination of legal information is inconsistent.

3.7.2 Legal Aid and Conflict with Industrial Fishing

Access to legal aid and institutional mechanisms of protection is severely limited in Katpar.

"Every Day Our Nets Are Cut": Fisherfolk Share the Net Damage Crisis

"Every day it's the same—our nets are being cut. It has become a daily reality. When big vessels—such as cargo ships—enter our protected fishing zone (the sea up to 2–3 km from the shore reserved for Pagadiya fishers), they pass straight over our nets. The nets are torn into pieces and ruined. Each cut costs us around ₹10,000 per net, leaving us with heavy losses.

These vessels don't follow a fixed route—sometimes they stay outside, but often they come inside. When there is strong wind or a favourable current, they deliberately run closer to shore to save diesel and petrol. For us, this feels like harassment.

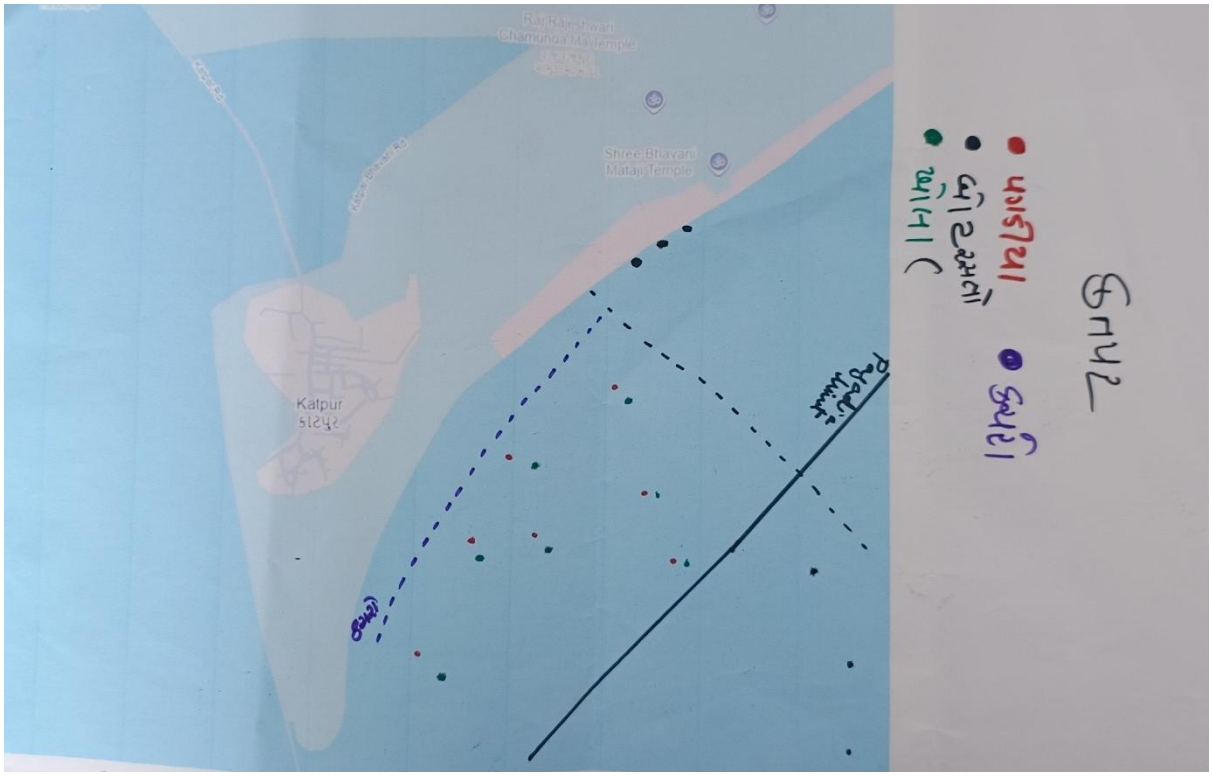
We want the government to act: instruct these ships to stay away and respect our Pagadiya zone so we can fish without this continuous loss."

Source: Fisherfolk sharing, Village Assembly discussion, Katpar

The overwhelming majority of respondents reported having no regular access to legal support, with only a very small fraction indicating even basic awareness of legal services. This absence of legal recourse leaves artisanal fisherfolk highly exposed in cases of conflict—whether with industrial fishing operators, regulatory authorities, or neighbouring groups. The lack of community-based legal support structures or active linkages with paralegal workers further compounds this vulnerability, forcing households to rely almost entirely on informal negotiation or self-absorption of losses.

Encounters with **gear damage caused by trawlers and large mechanized vessels** were among the most commonly reported governance-related challenges. Nets, which constitute the primary asset of Pagadiya and other small-scale fishers, are frequently torn or destroyed when trawlers intrude into nearshore artisanal fishing grounds. For small households, such damage represents a significant material loss, not only because replacement costs are high but also because the absence of functional nets disrupts their capacity to fish for days or weeks at a time. In addition to gear destruction, respondents described how trawler intrusion reduces the overall fish catch available to artisanal fishers, as mechanized operations deplete nearshore stocks before traditional fishers can access them.

Figure 39 Participatory Map of Fishing Grounds and Net Damage Areas



This participatory map, prepared during discussions with fisherfolk in Katpar, illustrates critical fishing areas and the zones where nets are most frequently damaged by trawlers and large mechanized vessels. The mapping exercise confirms household survey findings on gear destruction and highlights the direct spatial overlap between artisanal fishing zones and industrial intrusion. Such overlaps not only reduce catch availability for Pagadiya fishers but also impose recurrent economic losses through gear replacement costs.

Source: *Participatory mapping exercise, Village Assembly discussion, Katpar (2025).*

While a substantial proportion of fisherfolk in Katpar demonstrated awareness of regulatory provisions—such as the prohibition on trawlers entering within nine nautical miles of the coast and the ban on gill nets below 150 mm mesh size—this knowledge has little practical utility in the absence of enforcement mechanisms or legal support systems. Households are acutely aware that their rights exist "on paper" but remain unenforceable in practice. This stark gap between regulatory awareness and institutional support underscores a structural mismatch: fisherfolk may know the rules that should protect them yet lack the means to invoke or defend those rights when confronted with industrial encroachment. The cumulative effect is a governance environment in which artisanal fishers shoulder the double burden of diminished ecological access and direct economic losses, without effective avenues for redress. Strengthening access to legal aid, building linkages with fisherfolk cooperatives, and ensuring stricter enforcement of nearshore fishing regulations emerge as urgent priorities for safeguarding the livelihoods of Katpar's artisanal fishing households.

3.7.3 Environmental Awareness and Plastic Issues

Environmental awareness in Katpar is limited in scope. Only 2.0% of respondents (n = 2) recognized that traditional fishing helps reduce CO_2 emissions, while 84.3% (n = 86) denied such a connection and 12.7% (n = 13) reported being unaware. This highlights a minimal understanding of the broader climate mitigation benefits of artisanal fishing.

Figure 40 More Plastic Than Fish: Pagadiya Harvest

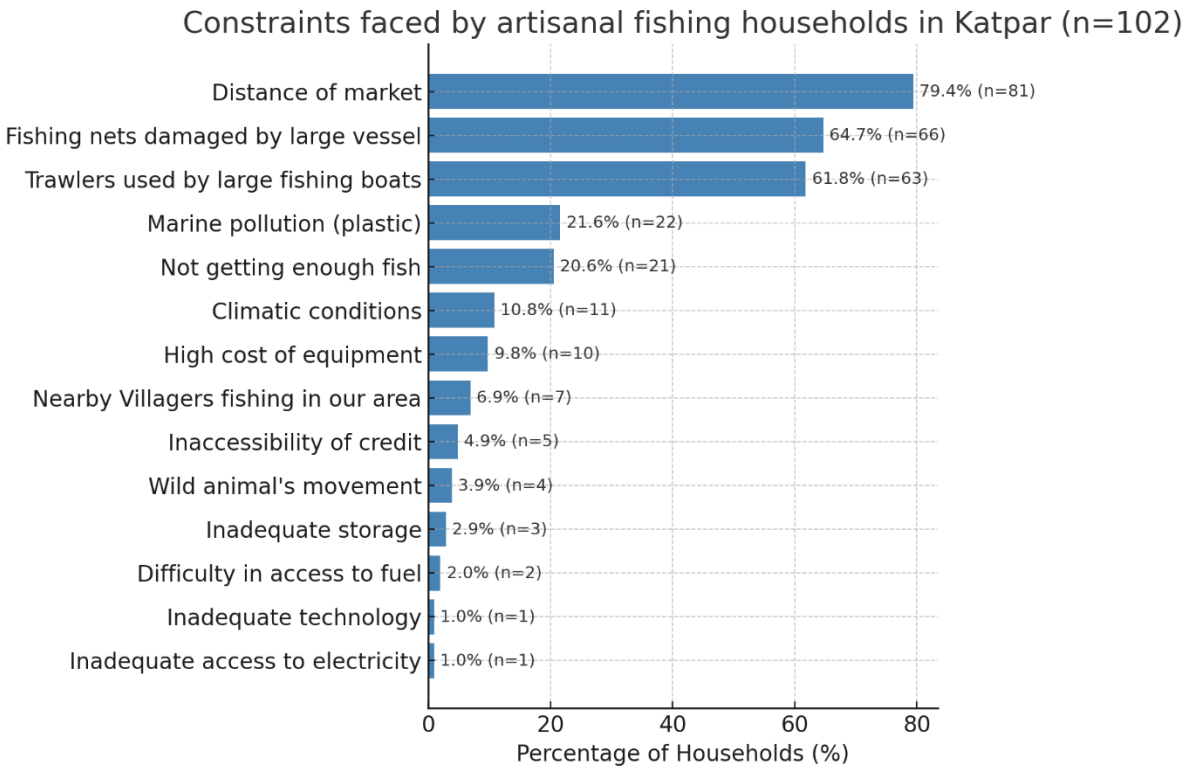
Perceptions of plastic pollution in Katpar reveal a striking contradiction between lived experience and ecological awareness. While 21.6% (n = 22) of respondents believed that plastics reduce fish stocks, the majority (77.5%, n = 79) denied any such connection, and 1.0% (n = 1) were uncertain. Yet, an overwhelming 94.1% (n = 96) confirmed that they had personally captured plastic debris in their nets.

This mismatch illustrates how plastic waste is primarily regarded as a nuisance disrupting fishing operations, rather than as a systemic ecological threat with long-term consequences for marine biodiversity and fish stocks. The photograph of a Pagadiya harvest dominated by plastic (**Source: field photograph, Katpar by Authors (2025)** rather than fish underscores this lived reality, visually capturing the disconnect between everyday encounters with pollution and its recognition as an environmental crisis.

3.7.4 Conflicts and Governance Challenges

Fisherfolk in Katpar reported a wide spectrum of livelihood constraints, reflecting the convergence of industrial, ecological, and local pressures. The distance to markets emerged as the most significant barrier, cited by 79.4% (n = 81) of households. This highlights structural disconnection from market centres, which increases transaction costs and reduces bargaining power.

Figure 41 Constraints faced by fisherfolk



Two mechanization-related problems were also widespread. Net damage caused by large vessels (64.7%, n = 66) and trawler intrusion into artisanal fishing zones (61.8%, n = 63) were frequently reported, underscoring the vulnerability of small-scale fishers to industrial operators. These conflicts not only erode daily incomes but also represent violations of regulatory provisions that are rarely enforced in practice.

Ecological degradation was another recurring theme. Marine plastic pollution (21.6%, n = 22) and insufficient fish catch (20.6%, n = 21) were frequently cited, indicating a community grappling

with both declining resources and environmental stressors. Additional constraints included climatic variability (10.8%, n = 11), the high cost of equipment (9.8%, n = 10), encroachment by neighbouring villages (6.9%, n = 7), inaccessibility of credit (4.9%, n = 5), wild animal movement (3.9%, n = 4), and aquaculture-related pressures (2.0%, n = 2).

This diversity of constraints illustrates that Katpar fisherfolk operate in a multi-scalar stress environment. At the industrial scale, mechanized trawlers and large vessels dominate and disrupt artisanal fishing zones. At the ecological scale, plastic pollution and fish scarcity further reduce returns. At the local scale, conflicts with neighbouring communities and credit inaccessibility add to household-level vulnerability.

The convergence of these issues reflects systemic governance gaps: while fisherfolk are aware of many regulations, the absence of effective enforcement and institutional protection leaves them exposed to overlapping threats.

"The Market is Far, and the Price is Never Ours" – Katpar's Struggle with Mahuva Market

For the fisherfolk of Katpar, the closest major market is in **Mahuva**, yet reaching it is not simple. The **long distance** itself was identified by nearly **80% of households** as their biggest constraint. The cost of travelling to Mahuva eats into already slim margins, forcing many to sell their catch at the village landing to local traders.

Those who do make it to Mahuva describe the uncertainty of prices as another blow. *"Some days it is ₹600, some days ₹500, some days ₹250. Nothing is fixed,"* fishers shared. Women carry baskets of fish to the market, only to return with meagre earnings that must first cover ice, salt, or transport.

Even in Mahuva, **fisherfolk rarely control the price**. Local trader networks dominate the trade. As one participant explained, *"They take it from us for ₹8 and sell it for ₹18. The trader earns more than we do, though it is our labour and our risk in the sea."* Attempts to link directly with outside traders are resisted: *"If an outsider comes, they will not let him buy. It is a whole syndicate. Even if our own man gives less, we are told to sell to him."*

This monopoly leaves Katpar fishers in a trap: dependent on Mahuva market but without bargaining power inside it. Women voiced frustration at being locked into this cycle: *"We go to sea with our children, sit there in storms, but the one who sits in the village earns more than us."*

For Katpar, the demand is simple yet urgent: **fair prices and direct access to markets**. Without this, the distance to Mahuva will remain not just geographical, but structural keeping fisherfolk on the margins of value chains built on their own labour.

Source: Katpar Village Assembly (2025)

3.7.5 Extension Service Needs

The fisherfolk of Katpar reported very limited engagement with formal extension services. Few households had interacted with government agencies, fisheries research institutes, or NGOs for technical advice, conflict resolution, or skill development. In practice, this has meant that artisanal fishers continue to depend primarily on informal knowledge exchange and traditional practices, with little access to structured opportunities for upgrading skills or enhancing resilience.

Discussions during the village assembly revealed a consistent perception of limited institutional outreach. Several participants noted that they had not approached the fisheries office in Bhavnagar and were uncertain about available schemes or officers in charge. Although a fisheries training and research centre exists at Mahuva, fisherfolk indicated that their participation in such programmes has been minimal, largely due to irregular contact and the absence of locally tailored initiatives.

At the same time, fisherfolk demonstrated reasonably high levels of awareness about fishing regulations, such as the two–three-kilometre *pagadiya* zone, the nine nautical mile artisanal fishing limit, and restrictions on small-mesh gill nets. However, they observed that there are few functioning channels through which this awareness can be translated into effective action. For example, while trawler intrusion was frequently identified as a violation, respondents noted that they lacked avenues for pursuing grievance redressal or conflict mediation.

The demand for extension support was also evident in discussions related to market access and livelihood diversification. However, they emphasized that training opportunities remain infrequent and often do not address their immediate livelihood priorities.

Overall, the Katpar case highlights how the absence of systematic extension mechanisms limits fisherfolk in three areas:

- Knowledge transfer: Few structured opportunities to learn sustainable fishing methods, preservation techniques, or alternative livelihoods.
- Conflict mediation: Limited institutional support for addressing trawler intrusion, net damage, or enforcement issues.
- Capacity building: Minimal exposure to skill development programmes that could broaden livelihood options beyond fishing.

In sum, the findings suggest that while artisanal fisherfolk in Katpar possess awareness of rules and strong experiential knowledge of the sea, the lack of regularised extension linkages constrains their ability to strengthen resilience in the face of ecological stress, industrial pressures, and market barriers.

Summary of Section 3.7: Institutional & Governance

The governance landscape in Katpar reflects a tension between relatively high awareness of fishing regulations and the near-total absence of institutional mechanisms to enforce or support these rights. Most households demonstrated knowledge of the nine nautical mile artisanal fishing limit and bans on destructive gear, yet they lacked access to legal aid or effective grievance redressal. This left artisanal fisherfolk highly vulnerable in disputes with industrial vessels, where net damage and trawler intrusion were widely reported but rarely addressed through formal channels.

Environmental awareness was similarly partial. While nearly all households had direct experience of plastic waste in their nets, only a minority linked plastics to reduced fish stocks, underscoring a gap between lived experiences and recognition of systemic ecological threats. Governance challenges reported by fisherfolk spanned multiple scales: structural barriers such as market distance, mechanization-induced gear damage, ecological pressures like fish scarcity and plastics, and localized conflicts with neighbouring communities. These overlapping pressures reinforce the precariousness of artisanal livelihoods in Katpar.

Extension services, which could provide technical support, legal awareness, and adaptive strategies, were reported to be largely absent. The lack of consistent institutional outreach has

left fisherfolk reliant on traditional practices and informal networks, with little exposure to modern preservation techniques or diversified livelihood strategies.

Taken together, the findings highlight a governance vacuum in Katpar: fisherfolk are aware of the rules and keenly conscious of the threats they face, yet the absence of institutional protection, legal aid, and extension support severely limits their capacity to translate this knowledge into secure livelihoods.

3.8 Gendered Dimensions of Livelihoods and Governance

3.8.1 Challenges Faced by Women Fisherfolk

In Katpar, women fisherfolk face livelihood precarity shaped by both economic instability and household responsibilities. Among the 59 women respondents, 84.7% (n = 50) identified *low or unstable income* as their most significant constraint. This confirms that women's participation in fishing and related activities remains highly vulnerable to fluctuations in catch, seasonal bans, and market uncertainties.

Beyond income insecurity, a smaller proportion of women highlighted other gendered challenges. 3.4% (n = 2) reported difficulties balancing household responsibilities with fishing and selling activities, underscoring the "double burden" of productive and reproductive labour. Another 3.4% (n = 2) cited *limited access to markets*, reflecting women's more constrained mobility and exclusion from male-dominated trading spaces. One respondent (1.7%) pointed to the *lack of financial support* as a barrier to sustaining livelihood activities. Interestingly, four women (6.8%) reported facing *no significant challenges*, indicating intra-community variation in women's experiences of livelihood risk.

This broader distribution of responses suggests that while income precarity dominates women's concerns, their challenges are also shaped by structural barriers in market access, credit availability, and household labour division. Women's livelihood constraints are thus not only economic but also deeply gendered, reflecting the intersection of occupational insecurity and social roles.

3.8.2 Perceptions of Traditional Fishing and Social Issues

Perceptions of traditional fishing in Katpar reflect a combination of cultural attachment, economic pragmatism, and social challenges. Among the 102 surveyed households, a slight majority, 57.8% (n = 59), considered traditional fishing to be a reliable source of regular income, while 42.2% (n = 43) did not. This balance indicates that while confidence in artisanal practices remains relatively strong, a significant proportion of households are sceptical about their long-term economic viability.

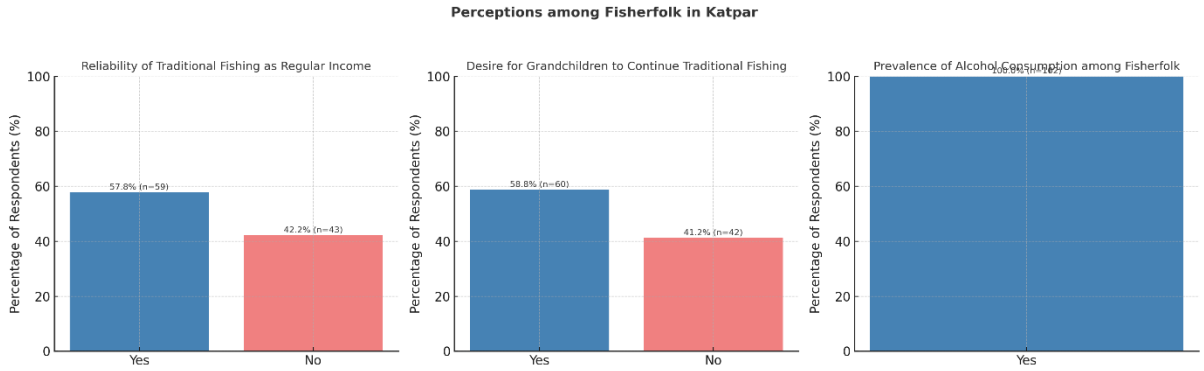
The intergenerational dimension of traditional fishing was similarly divided. 58.8% (n = 60) of respondents expressed a desire for their grandchildren to continue the occupation, compared to 41.2% (n = 42) who opposed such continuity. This mixed outlook suggests a community negotiating between cultural continuity and recognition of occupational precarity. For many, fishing continues to be valued as a heritage and way of life, even as concerns about declining returns temper aspirations for future generations.

Social issues also featured prominently in community responses. Alcohol use was reported unanimously (100%, n = 102) as a pervasive problem among fisherfolk households. This indicates not only the ubiquity of alcohol consumption but also its recognition as a collective challenge that intersects with household wellbeing, income stability, and gender relations. The prevalence of

alcohol use further complicates the sustainability of fishing livelihoods, adding a social burden to already fragile economic conditions.

Together, these findings highlight the dual character of traditional fishing in Katpar: a livelihood deeply rooted in cultural identity but also shadowed by economic insecurity and social problems that weaken its long-term sustainability.

Figure 42 Perceptions among the fisherfolk on traditional fishing and social issues



3.8.3 Health Issues Reported in the Past Year

The health profile of fisherfolk households in Katpar reflects the physical intensity of artisanal fishing and associated vulnerabilities. Among the 102 respondents, joint and muscle pain emerged as the most prevalent issue, reported by 46.1% (n = 47). This aligns with the strenuous nature of Pagadiya fishing, which requires prolonged periods of standing, pulling heavy nets, and working in difficult marine conditions.

Oral health problems, particularly tooth and gum issues, were the second most commonly reported concern, affecting 30.4% (n = 31) of respondents. The persistence of such conditions indicates the limited availability of preventive care and treatment, as well as dietary patterns linked to high saltwater exposure and limited nutrition diversity.

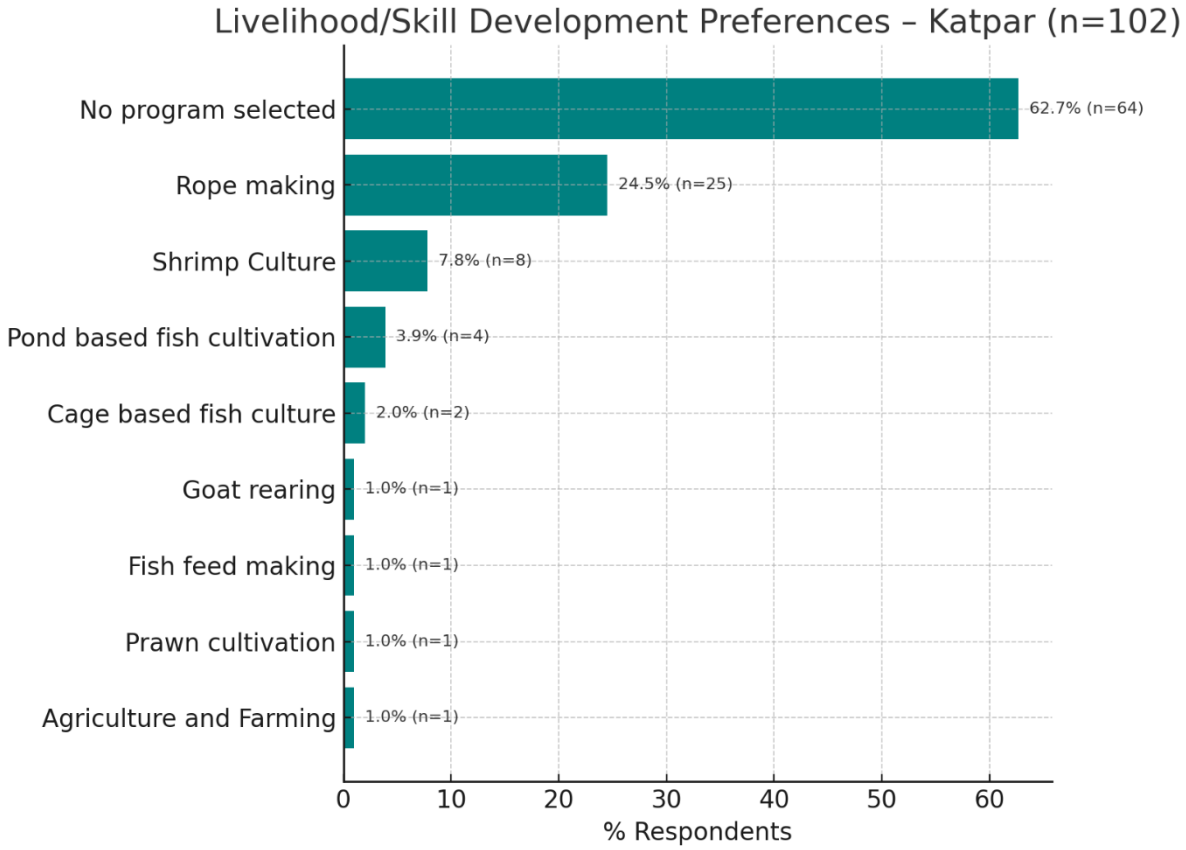
Other health conditions were less frequently reported. Skin problems were noted by 11.8% (n = 12) of households, reflecting exposure to saline water, heat, and infections, while respiratory conditions such as breathing difficulties were reported by 5.9% (n = 6), suggesting susceptibility to damp environments, occupational exposure, and possibly indoor air pollution from cooking fuel. Notably, 8.8% (n = 9) of respondents explicitly reported facing no health issues in the past year, a pattern less visible in other surveyed villages. Chronic conditions and mental health concerns were rarely cited, resulting in a relatively narrow health burden profile.

Overall, Katpar's health landscape is dominated by musculoskeletal strain and oral health concerns, both of which reflect occupational and environmental exposures. The relatively low prevalence of chronic conditions may reflect under-diagnosis or under-reporting, rather than absence. These findings underscore the importance of integrating occupational health services and preventive care into broader livelihood and welfare interventions for fisherfolk communities.

3.8.4 Livelihood and Skill Development Preferences

Households in Katpar displayed significant reluctance to engage in formal livelihood and skill development programmes. Among the 102 surveyed households, 62.7% (n = 64) opted for *no programme at all*. This widespread scepticism reflects not a lack of aspiration but a series of structural and experiential barriers.

Figure 43 Livelihood/Skill development preferences



Community feedback highlighted several reasons for this disengagement:

- **Absence of travel and logistical support** for participants, which made attending training difficult.
- **Lack of handholding and follow-up support** after training, leaving skills underutilised.
- **Hesitation to invest time and effort in untested livelihood options**, particularly given the precarity of existing incomes.
- **Limited exposure to diverse livelihood choices**, restricting the ability of households to make informed decisions.

Importantly, participants clarified that they were not opposed to skilled training or professional opportunities in principle. Rather, the lack of systemic support and the risk of wasted effort discouraged immediate interest in alternative programmes.

Among households that did express interest, preferences were modest and rooted in familiarity. Rope making was most common (24.5%, n = 25), reflecting its practicality, low cost, and direct relevance to fishing. Smaller groups expressed interest in shrimp culture (7.8%, n = 8), pond-based fish cultivation (3.9%, n = 4), cage-based fish culture (2.0%, n = 2), and agriculture or farming (1.0%, n = 1).

This pattern suggests that while there is openness to new skills, fisherfolk households prioritise **low-risk, low-investment activities** unless programmes provide travel assistance, assured post-training support, and credible income pathways.

Summary of Section 3.8: Gendered Dimensions of Livelihoods and Governance

The gender profile of Katpar reveals a female-majority respondent base, with 58.8% women (n = 60) and 41.2% men (n = 42) participating in the survey. This distribution reflects both the centrality of women in fishing households and their greater visibility through federated structures. Women's complete membership in the *Shakti Mahila Sangathan* contrasts with men's absence from any collective platform, underscoring the gendered asymmetry in institutional representation.

Across livelihood experiences, women identified low and unstable income (84.7%) as their primary challenge, with smaller proportions highlighting the double burden of combining fishing with domestic responsibilities, restricted access to markets, and lack of financial support. These findings confirm that women's economic precarity is compounded by gendered household roles and limited mobility.

Perceptions of traditional fishing reflected both attachment and ambivalence. A slight majority expressed confidence in traditional fishing as a source of regular income and supported its continuation by future generations, yet a significant minority questioned its sustainability. Social concerns were equally stark, with alcohol use reported unanimously (100%) as a pervasive problem, adding another layer of household and community vulnerability.

Health outcomes revealed occupational strains, particularly joint and muscle pain (46.1%) and oral health problems (30.4%), with lower but notable prevalence of skin and respiratory issues. The dominance of physical strain and oral health burdens confirms the bodily toll of artisanal fishing, particularly Pagadiya work.

Skill development preferences further illuminated gendered livelihood dynamics. Despite widespread scepticism, with 62.7% of households opting for no programme, some interest persisted in low-cost, low-risk activities such as rope making. Qualitative insights highlighted that disengagement was less about unwillingness and more about structural gaps: lack of travel support, absence of post-training handholding, hesitation to invest in untested options, and limited exposure to diverse opportunities.

Taken together, the gendered analysis of Katpar underscores three interlinked dynamics: (1) women's strong organisational presence but continued livelihood precarity; (2) a community negotiating between cultural continuity and awareness of structural risks; and (3) persistent gaps in health services, training support, and institutional inclusion. Women's voices dominate both the dataset and the institutional landscape, positioning them as critical actors in shaping pathways toward more secure and equitable fisherfolk livelihoods.

Chapter 4: Conclusions and Recommendations

The need assessment of Katpar reveals a fishing community whose identity and livelihoods are deeply tied to artisanal Pagadiya fishing, but whose economic and social security remain fragile in the face of ecological change, industrial pressures, and institutional neglect.

Across the different dimensions studied—livelihood systems, economic security, social networks, physical infrastructure, environmental and climate conditions, governance structures, and gender dynamics—the findings underscore that while households demonstrate resilience through cultural continuity, informal networks, and modest diversification, systemic barriers prevent them from translating this resilience into sustainable and secure livelihoods.

4.1 Conclusions

1. **Livelihood Dependence and Limited Diversification**

   Fishing is overwhelmingly dominant in Katpar, with more than four-fifths of households engaged in *Pagadiya* fishing. A minority supplement income through fish selling, boat ownership, or agricultural labour, yet one-third of households remain mono-dependent on fishing. Livelihood diversification exists but is narrow, fragile, and not sufficient to reduce exposure to shocks.

2. **Economic Fragility**

   Household incomes remain modest, and expenditures concentrate on food, fishing inputs, and essential services. Access to credit is minimal, limited mainly to informal lenders, while insurance coverage is completely absent. Housing ownership is high, yet the absence of pattas (land ownership document) excludes households from land rights and state-backed protections.

3. **Social Capital Asymmetry**

   Women demonstrate universal membership in federations (*Shakti Mahila Sangathan*) that focuses on women rights, but trade focused, fisherfolk-specific collective or *manch is* not available in the village. Access to government schemes is partial, and fisherfolk-specific programmes such as PMMSY show negligible penetration.

4. **Physical Infrastructure Gaps**

   While electricity, water, and gas connections are widely available, sanitation is a significant gap, with two-thirds of households lacking functional toilets. Fishing assets remain limited to nets, with minimal access to boats with engines, cold storage, or insulated facilities, constraining both productivity and value retention.

5. **Environmental Stress and Climate Risks**

   Households unanimously reported declining fish diversity and populations, with juvenile capture and scarcity of key species such as Hilsa and Pomfret widely recognised. Marine plastic pollution was experienced by nearly all, yet few linked it to ecological impacts. Natural calamities, particularly cyclones, caused widespread economic losses, and fisherfolk overwhelmingly anticipate climate change will further erode incomes and fishing opportunities.

6. **Governance and Institutional Gaps**

   Awareness of regulations such as the nine nautical mile artisanal fishing limit is relatively strong, yet enforcement is absent. Legal aid and grievance redress systems are inaccessible, leaving households unprotected against gear damage and trawler intrusion. Extension services and training remain irregular and disconnected from local needs.

7. **Gendered Vulnerability**

   Women face acute income insecurity (reported by over 80%) alongside the double burden of household and fishing labour. Their exclusion from markets and credit further deepens livelihood precarity. Health challenges, especially musculoskeletal pain and oral health issues, reflect the bodily toll of artisanal fishing. While women have strong federated representation, structural barriers continue to limit their empowerment.

4.2: Recommendations

The findings of this assessment underscore the multidimensional vulnerabilities faced by fisherfolk households in Katpar, shaped by precarious livelihoods, weak institutional support, and environmental stress. The following recommendations are proposed to strengthen resilience, equity, and sustainability. These recommendations are directly grounded in the survey data and complemented by solutions identified through community consultations.

4.2.1 Licensing and Regulatory Support

Households in Katpar face structural barriers in securing and renewing licenses for fishing and fish selling. The absence of timely license renewals disrupts fisherfolk's access to various fisheries-related schemes, further exacerbating their vulnerability and limiting opportunities for support and development.

- **Decentralisation of licensing**: Organize block-level or village-level mobile licensing camps to reduce travel time and transaction costs for the fisherfolks.
- **Simplified renewal process**: Implement fast-track mechanisms for license renewal to save time and resources for fisherfolk
- **Awareness drives**: Conduct periodic campaigns on license validity, renewal deadlines, and entitlements using both fisherfolk federations and local schools as platforms.
- **Legal aid facilitation:** Establish community-based legal support cells to handle net damage claims and conflicts with trawlers.
- **Mobilise fisherfolk as Munch:** Collectivising the fisherfolk at village level and establishing the coordinating committee among the Katpar, Bandar and Lighthouse.

4.2.2 Land ownership, Financial Inclusion and Scheme Access

Although households hold foundational identity documents, their access to fisherfolk-specific schemes is negligible. Also, the target beneficiaries in the fisherfolk program's strategic linkages are fewer than required. Community consultations revealed deep dissatisfaction with opaque selection processes and low awareness about the schemes.

- **Formal ownership of the fishing land:** Ensuring legal recognition of fishing grounds, ensuring that local communities hold formal titles or rights to fish in specific areas. This can include the issuance of land titles or certificates of occupancy that confirm community ownership or access to fishing resources.

- **Gender-Sensitive Documentation:** When issuing certificates of occupancy or land titles, ensure that they are issued in a way that recognizes women's rights, especially in communities where women play a significant role in fishing but are excluded from formal ownership.
- **Doorstep facilitation**: Introduce village-level scheme enrolment camps, prioritising widows, elderly, and women-headed households.
- **Transparent beneficiary selection**: To ensure scheme lists are displayed at the panchayat level with grievance redress mechanisms.
- **Improved Insurance Penetration:** Implement compulsory, low-premium group insurance for boats, nets, and fisherfolk health, directly linked to licensing processes.
- **Expansion of credit linkages**: Strengthen Self-Help Groups (SHGs) and cooperatives to facilitate access to Kisan Credit Cards and Matsya Sampada loans for fisherfolk.

4.2.3 Training, Skill Development, and Livelihood Diversification

Despite an interest in ropemaking and shrimp culture, the majority of households opted out of training due to poor past experiences and lack of travel/handholding support.

- **Stipends and travel allowance**: Provide compensation for lost earnings and travel costs during training.
- **Handholding support**: Establish mentoring and follow-up systems to ensure post-training income generation.
- **Exposure visits and on-the-job training**: Facilitate practical demonstrations in aquaculture, cage culture, and pond-based cultivation.
- **Youth engagement programmes**: Engage youth in sustainable fisheries and marine ecology, fostering intergenerational continuity.
- **Women-focused skilling**: Promote tailoring, food processing, broom/rope making, and cooperative marketing as income diversification pathways.

4.2.4 Infrastructure and Market Systems

Fishing in Katpar is constrained by poor cold chain facilities, auction platforms, and market linkages. high costs of diesel, ice, and equipment further reduce margins.

- **Strengthened Market linkages and processing units:** Malan Bandhara experiences a significant catch of freshwater fish, which are often sold at very low prices. By establishing better market linkages or introducing value-added processing methods, such as solar dryers, the profitability of these fish could be increased, thereby improving the livelihoods of the fisherfolk in the region.
- **Digital market access**: Pilot mobile platforms to connect fishers directly with local and regional buyers, reducing dependence on intermediaries.
- **Cold chain investments**: Establish community-managed cold storage, fish holding tanks, and insulated iceboxes.
- **Improved auction infrastructure**: Develop transparent auction yards with weighing facilities, price boards, and allocate dedicated spaces for women sellers in local markets.

- **Subsidised input support**: Strengthen diesel VAT relief and subsidised ice supply, ensuring timely delivery to fisherfolks.

4.2.5 Climate and Environmental Resilience

Katpar faces acute risks from cyclones, declining fish diversity, and plastic pollution. While local ecological knowledge remains strong, institutional response is weak.

- **Plastic interception**: Installing large mesh screens or filtering systems at the inlet and outlet of Malan Bandhara can trap plastic waste before it flows into the sea. This should be complemented by school and community awareness drives on reducing single-use plastics.
- **Warning system**: The overflow of water from the Malan dam causes significant damage to the nets of nearby fishermen. Implementing an advance warning system via SMS and WhatsApp notifications about the release of water can help prevent such damage.
- **Net damage due to large vessels:** Ensuring that large ships, like those from Pipavav and Alang, strictly adhere to the designated routes, minimizing disruptions to fishing areas.
- **Sustainable fishing education**: Promote awareness to small fisherfolks on the impacts of juvenile fish capture through fisherfolk federations and local training centres.
- **Disaster management plan:** Given the recurring cyclones every two years, a disaster preparedness plan should secure fishing equipment, boats, and nets in safe zones and train fishermen on cyclone response. Infrastructure like cyclone shelters and reinforced storage should be prioritized, along with improved boat anchoring. Post-cyclone recovery plans must include financial support, supplies, and infrastructure rehabilitation to restore livelihoods swiftly.
- **Habitat restoration**: Promote mangrove replantation and creek rehabilitation to buffer storm surges and support breeding grounds.

4.2.6 Social Protection and Welfare

Social safety nets are weak, with negligible coverage of pensions, health insurance, or calamity compensation.

- **Universal pension enrolment**: Ensure widows, elderly, and disabled fisherfolk are enrolled in existing pension schemes.
- **Ayushman and health scheme facilitation**: Strengthen coverage and awareness of health insurance cards.
- **Inclusion of Fisherfolk in Kisan Samman Nidhi Scheme:** Fishermen should also be included in the Kisan Samman Nidhi scheme to ensure they receive direct financial support, similar to other farmers, to improve their livelihoods and enhance economic security.
- **Child and girl-focused welfare**: Promote awareness of Sukanya Samriddhi, Vahali Dikri, and educational scholarships.

4.2.7 Governance, Institutions, and Gender

Despite full membership of women in Shakti Mahila Sangathan, fisherfolk-specific collectives remain absent. This institutional vacuum weakens bargaining power and collective voice.

- **Fisherfolk collectives (Manch)**: Establish a fisherfolk cooperative or collective in Katpar to address occupational concerns, drawing from successful SHG federation models.
- **Gender equity in fisheries governance**: Ensure that women's representation is included in village-level committees, such as disaster management committees and policy-related decision-making bodies.
- **Inclusion of the fisherfolk needs in the village development plan (GPDP):** Ensure fisherfolk issues such as clean beaches, disaster shelters, livelihood support infrastructure, healthcare, and education are incorporated into the GPDP. Additionally, include coastal resource management and safety measures, considering the risks associated with nighttime beach activities for fishing.
- **Extension services**: Strengthen the Fisheries Research and Training Centre's outreach through regular camps in Katpar.

4.2.8 Additional Policy suggestions

In addition to community-proposed solutions, the following cross-cutting measures can deepen resilience:

1. **Digital documentation support** for Aadhaar seeding, ration linkage, and online applications.
2. **Gender-sensitive infrastructure** including safe toilets and resting spaces for women sellers at markets. Solar based lights for the fisherfolk who travels in the night.
3. **Mobile health interventions** addressing joint pain, dental problems, and occupational health.
4. **Community-led monitoring systems** to track access to schemes, compensation, and training outcomes

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This comprehensive study provides a deep dive into the socio-economic landscape of small-scale fisherfolk in Katpar village, Mahuva block, Bhavnagar district. Grounded in primary surveys and village assemblies, the work examines livelihood vulnerabilities, ecological shifts, and institutional gaps to outline a clear roadmap for community resilience. It serves as an essential resource for policymakers and practitioners dedicated to the equitable and sustainable development of marginalized coastal communities in Gujarat.