

# Rebuilding Visakhapatnam Fishermen Community Post Cyclone Hudhud: A Vision for Rehabilitation and Community Restoration

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**Abstract:** *The aftermath of natural disasters often plunges communities into chaos, particularly affecting vulnerable groups with context of geographical location, economical and housing condition, which results in encountering of significant hurdles in rebuilding lives and community spaces. Visakhapatnam being one of the coastal cities of India and the most prominent urban center of the Andhra Pradesh state, possess a settlement morphology of 300 years since its inception in the late seventeenth century, has been subjected to feeble natural calamities such as cyclonic impacts at times. In the concerned regard, the HUDHUD cyclone which surfaced in October 2014 in the coastal areas of the Indian states of Odisha and Andhra Pradesh was one of its kind in terms of the vulnerable impact it caused in the livelihood of people through major devastations of habitable spaces in certain geographical locations resulting into mass evacuations and loss of lives. The consequent vulnerability was extensively witnessed in the context of Visakhapatnam too. This study delves into the situation of Visakhapatnam's fisherman community post-Cyclone Hudhud, aiming to outline a thorough strategy for their recovery and community restoration for the purpose of rehabilitating the affected families that has lost their place of habitation.*

**Keywords:** Rebuilding Habitation, Visakhapatnam Fishermen Community, Community Restoration, Cyclone Hudhud

## 1. Introduction

In the wake of Cyclone Hudhud, the coastal city of Vishakhapatnam bore the brunt of devastation, with the fisherman community among the hardest hit. Now, as the community grapples with the daunting task of rebuilding their lives, homes, and livelihoods, this research emerges as a beacon of hope and resilience. With a steadfast commitment to addressing the unique challenges faced by the fisherman community, this research sets out on a visionary path towards rehabilitation and restoration. By blending innovative architectural design, sustainable development practices, and community engagement, this research aims to craft a comprehensive blueprint for rebuilding Vishakhapatnam's fisherman community. Through this holistic approach, we aspire not only to reconstruct physical structures but also to nurture social cohesion, economic opportunity, and cultural heritage. As this embark on this journey of renewal, our goal is to empower the fisherman community to reclaim their dignity, agency, and sense of belonging in a revitalized Vishakhapatnam.

## 2. The Fishermen Community

More than a 20 million fishermen in India and fish farmers depend on the fisheries industries for their livelihoods fishermen in India and aquaculture plays a significant role in the food production, dietary security, employment and income. It generates INR 1.75 trillion in gross value added annually for Indians Economy. Fishing and Aqua Culture are essential in India. After China, India is second largest country for aqua culture and the third largest for fisheries. The Indian Blue Revolution showed how crucial these industries are, fishing in India is a growing industry and is

expected to boost the economy significantly soon, providing jobs to millions and ensuring food security. Indian fisheries have recently seen a paradigm change from inland to marine-dominated fisheries, with the latter becoming a major contributor to fish output, from 36% in the middle of the 1980's to 70% in the recent past. Switching from catching wild fish to raising fish in farms within inland has set the stage for a long-lasting, sustainable blue economy. (Fisheries in India – Current Status, Initiatives Related to Fishermen, Challenges and More, 2023)

### 2.1 Existing Conditions

The global pandemic devastated India's fish industry, impacting millions and stranding over 15,000 migrant workers. When fishing resumed, disrupted supply chains and low consumer demand, coupled with high COVID-19 risks, severely harmed mechanized fisheries dependent on migrant labour. The annual fishing ban on the East Coast began on April 15th, 2020, causing licensed fisheries to struggle to rebuild. While states like Kerala and Maharashtra have made progress in reintroducing seafood most fishing activities still happen in other states. Despite the ban extension only until 2020, ongoing issues still need to be addressed. With eased government restrictions on mechanized fishing, vulnerable small-scale fishermen and migrant workers now face more significant challenges, including the increased risk of being forced into bonded labour due to dangerous working conditions and non-existent markets. (Fishermen in India - Current Status, Initiatives Related to Fishermen, Challenges and More, 2023)

#### 2.1.1 Jalaripeta & Chepalupada Fishermen Community

The Fishermen Communities of Visakhapatnam have 245

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fishing days and a 120-day ban on fishing in a year. The day of men starts at 4 Am by gathering and leaving for the sea to catch fish again. They will return by 7: 30 in the evening. Women's Day starts at 8 Am, leaving the markets to sell fish, and will end by 6 P.m. Women are involved in activities like Fish vendors, Sweepers, Shop Keepers, and

Housewives. Men are involved in activities like Fishermen (deep sea and nonmotorized), Shop Keepers, and Cleaners. Other occupations during fish ban days are Flower Traders, Rythu bazar Workers, Coastal Guards, and Lifeguards are performed.



**Figure 1:** Showing Fishermen of Visakhapatnam Working (Boat Repairs, Nets mending, Boat Engine Cleaning, are performed in the Sea Coast.



**Figure 2:** Fishermen of Visakhapatnam store their thing related fishing in the shore after fishing



**Figure 3:** Engines of the boats are placed inshore after fishing

## 2.2 Housing Conditions of Fishermen of Visakhapatnam

The types and conditions of housing show how well-off people are. Most houses are in fishing harbor areas, with

65% owned by their residents, 27.5% rented, and 7.5% other types. Among these, 45% are semi-permanent, 20% permanent, 15% temporary, and 20% tents. (ISMAL, 2014)

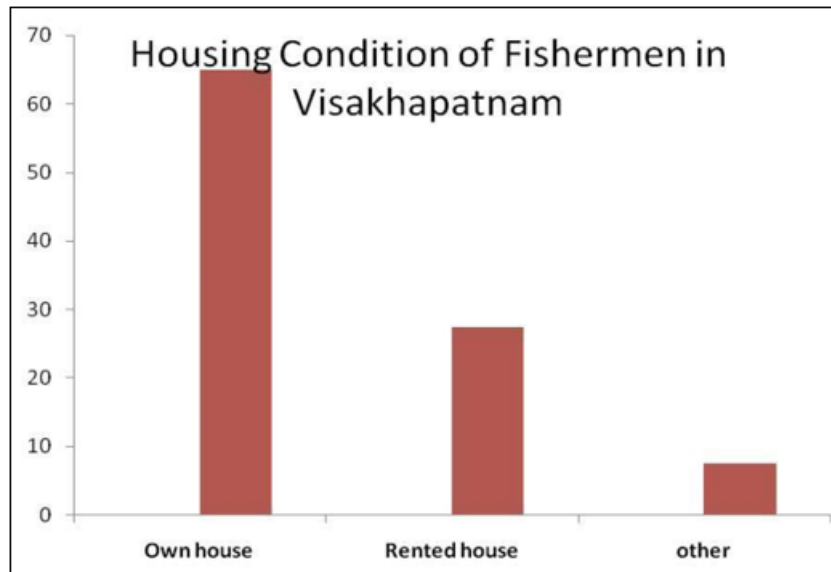


Figure 4: Graph Indicating Housing Conditions of Fishermen in Visakhapatnam

### 2.2.1 Typologies of Houses

Over the decades, the housing morphology of fishermen in Visakhapatnam has undergone significant changes due to factors like fire accidents, natural disasters, deteriorating structures, undefined boundaries, and ownership disputes. Presently, although many fishermen have built solid houses primarily for sleeping and spending time with their families, they often prefer their traditional shelters where they have lived for years. The evolution of housing planning reflects this shift: in the 1990s, houses typically consisted of one room and outdoor toilets; later, they expanded to include multiple rooms, verandas, corridors, and storage areas. By the 2000s, more permanent structures were established, yet these developments have not always aligned well with the

fishermen's traditional way of life and livelihood needs.

In the 1980s, both the Jalaripeta and Chepaluppada communities had similar models for planning and constructing houses. However, over time, their housing planning diverged due to factors such as land costs, proximity to the shore and city, and family size considerations. These aspects influenced how each community adapted their housing designs to meet their specific needs and circumstances. As a result, the morphology of housing in Jalaripeta and Chepaluppada reflects distinct approaches shaped by these local conditions and community priorities.



Figure 5: Typical Thatch Roof Constructions of Visakhapatnam Fishermen



Figure 6: Kitchen Separated from Part of the House



Figure 7: Recent Typologies of Fishermen Houses with Flat roofs



Figure 8: Showing the Planning of Fishermen Houses from 1980's to Present Model at Jalaripeta Fishermen Community

### 3. Research Objectives

- Understanding the livelihood and vulnerability of the fishermen community based in Visakhapatnam post the impact of cyclone HUDHUD.
- To understand the contextuality of the site as proposed by the statutory body of the state for the concerned purpose of rehabilitation.
- To propose rehabilitation for the affected and yet to be settled individual and families of the fishermen community with contextual aspects.
- To delineate a site apt for the purpose stated in Objective 3.

- To derive optimum space standards for the habitable space proposal.
- Providing the community with the amenities, that they are in need of, with the perspective of community restoration.

### 4. Literature Study

#### 4.1 Coastal Area

As per the CRZ notification, 2011, coastal land up to 500 m from the High Tide Line (HTL) landward side and a stage of 100 m along banks of creeks, estuaries, backwater and rivers subject to tidal fluctuations is called the Coastal

Regulation Zone (CRZ). For regulation of developmental activities, the coastal stretches within 500 m of HTL on the landward side are classified into four categories and restrictions have been imposed on construction activities in these zones.

The following activities are prohibited within the CRZ:

The establishment of new industries and the expansion of existing ones, except for those directly associated with waterfront activities or requiring foreshore facilities, are regulated. Additionally, the manufacture, handling, and disposal of hazardous substances are controlled. The setup and enlargement of fish processing units, including warehousing—excluding hatcheries and natural fish drying in permitted areas—are also subject to restrictions. Similarly, the development and expansion of facilities or mechanisms for waste and effluent disposal into watercourses are regulated to protect water quality. The discharge of untreated waters and effluents from industries, cities, towns, and other human settlements into water bodies is prohibited.

Furthermore, the dumping of city or town waste for landfilling or other purposes is restricted, with existing practices required to be phased out within a reasonable timeframe, not exceeding three years from the date of notification.

#### 4.2 History of Cyclones in Andhra Pradesh

In peninsular India, cyclones frequently hit the West Coast (Arabian Sea) and East Coast (Bay of Bengal). However, the East Coast is known as one of the world's most cyclone-prone areas. From 1891 to 1990, about 262 cyclones (92 severe) struck a 50 km wide zone on the East Coast, while the West Coast saw only 33 cyclones in the same period. Around 80 tropical cyclones form globally each year, with 6.5% originating in the Bay of Bengal and Arabian Sea. Cyclones from the Bay of Bengal typically move westward or northward, affecting coastal regions of India and Bangladesh with strong winds and heavy rainfall, causing significant damage and loss of life. (Kolli Ramuje, 2014)

**Table 1:** Distribution of cyclones district wise crossing the AP coast till 2009

S. No	District	No cyclones crossing the state	
		Severe Cyclone	Medium/ Normal Cyclone
1	Nellore	11	21
2	Krishna	8	15
3	East Godavari	4	11
4	Srikakulam	4	10
5	Vishakhapatnam	3	7
6	Prakasam	2	4
7	Guntur	1	2
8	West Godavari	0	0
9	Vijayanagaram	0	0

Source: APSDMP

The Indian Meteorological Department classifies low-pressure systems in the Bay of Bengal and Arabian Sea based on criteria set by the World Meteorological

Organization (WMO).

Classifications are as given in the following table.2

**Table 2:** Classification of cyclones

S. No.	Category	Wind Speed in km/h
1	Super Cyclonic Storm	≥ 222
2	Very Severe Cyclonic Storm	119 to 221
3	Severe Cyclonic Storm	89 to 118
4	Cyclonic Storm	62 to 88
5	Deep Depression	50 to 61
6	Depression	31 to 49
7	Low Pressure Area	< 31

Source: APSDMP

#### 4.3 History of HUDHUD Cyclone

Hudhud was the second strongest tropical cyclone of 2014 in the North Indian Ocean, and the most destructive since Nargis in 2008. It started as a low-pressure system in the Andaman Sea on October 6, strengthened into a cyclonic storm by October 8, and became a Severe Cyclonic Storm by October 9. It rapidly intensified before making landfall near Visakhapatnam, Andhra Pradesh, on October 12, with winds of 175 km/h (109 mph) and a central pressure of 960 mbar (28.35 in Hg). Hudhud then moved northward affecting Uttar Pradesh and Nepal, causing heavy rains and snowfall. It caused extensive damage in Visakhapatnam and nearby districts, with estimated losses of at least 70,000 crores and over 100 confirmed deaths in Andhra Pradesh and Nepal. (Kolli Ramuje, 2014)

#### 4.4 Effects of HUDHUD Cyclone

The cyclone, which landed in Port City around noon, witnessed the following.

Cyclone Hudhud caused extensive destruction, with hoardings and tin roofs flying like saucers, shattered windows littering the streets with glass, and toppled statues and landmarks, such as the navy airplane replica on RK Beach. Scores of electricity and telephone poles were knocked down, and thousands of trees were uprooted as solid gales and heavy rainfall battered the city. Paddy fields, fruit orchards across thousands of acres, and long roads in the north coastal Andhra and East Godavari districts were damaged. Almost every household in the four affected districts experienced some level of damage. The heavy destruction of basic infrastructure severely impacted industrial production and business activities, with officials fearing more losses due to electricity being unlikely to be restored in the next few days. The total loss is estimated to be at least Rs 10,000 crore. Hundreds of fishing boats in Srikakulam, Vizianagaram, Visakhapatnam, and East Godavari districts were reported damaged. Strong winds also uprooted many communication towers, disrupting telephone and mobile networks. Restoration efforts have been initiated on a war footing. Hudhud's landfall on Sunday morning caused anxious moments as mobile and landline phone lines went dead or could only send SOS messages. Power was shut off early Sunday in Visakhapatnam, Srikakulam, and Vizianagaram districts, causing downtime for most telecom towers. In response, 436 villages across 64

mandals in five districts were identified as at risk, with 370 relief camps set up for evacuees. The government evacuated 35,000 people in Srikakulam, 6,000 in Vizianagaram, 15,000 in Visakhapatnam, 50,000 in East Godavari, and 5,000 in West Godavari districts. (Kolli Ramuje, 2014)

5. Methodology

5.1 Site Selection

Table 3: Comparative analysis of site selection

COMPARITIVE ANALYSIS OF SITE SELECTION				
S.NO	CONSIDERATION	BHEEMUNIPATNAM	CHEPPALLAPUDDA	PEDA JALARIPETA
1	SITE AREA	25463 Sqm (6.3 acre)	24400 Sqm ( 6 acre)	26000 Sqm ( 6.4 acre)
2	MANDAL	Bheemunipatnam Urban	Bheemunipatnam Rural	Visakhapatnam Urban
3	PROXIMITY TO FISHERMEN COMMUNITY	900m	40m	80m
4	LAND USE AS PER 2041 MASTER PLAN	Mixed Use Zone -2	Mixed Use Zone -2	Residential
5	ROAD ACCESS	Beach Road	Beach Road	Narrow Street
6	CRZ ZONE	CRZ - III	CRZ - III	CRZ - III
7	FULLY DAMAGED HOUSES(MANDAL)	38	57	161
8	PARTIALLY DAMAGED(MANDAL)	1504	3444	7649
9	DISTANCE FROM SEA	1200 M	300M	100M



The sites are taken from the 3 fishing communities of Vishakapatnam. One is from Bheemunipatnam, Chepalappada, Jalaripeta. Among this site, the comparison is made within aspects of Site areas, Mandals, Proximity to fishermen's community, Land use as per the 2041 Master plan, Road access, CRZ zone which it is falling, Damaged houses in Cyclone Hudhud, and Distance from the Sea, after the comparison the site from Chepalappada which is having more favorable among the three sites as shown in Table 3.

traditional fishing villages is permitted under local town and country planning rules. Structures should not exceed 9 meters in height with a maximum of two floors. Additionally, local communities, including fishermen, are allowed to promote tourism through 'homestays' without altering existing house dimensions or designs. Within the NDZ of CRZ-III, no new construction is permitted except for repairs or reconstruction of existing authorized structures, adhering to existing Floor Space Index, plinth area, and density limitations. Essential facilities for local fishing communities are allowed, including fish drying yards, auction halls, and other specified amenities, aimed at supporting traditional coastal activities. (CRZ NOTIFICATION, 2019)

5.2 CRZ III

CRZ-III areas, classified into two zones based on population density, have specific regulations governing development. In areas beyond the No Development Zone (NDZ), construction or reconstruction of dwelling units within

5.3 Study Area



Figure 9: Location of Chepaluppada

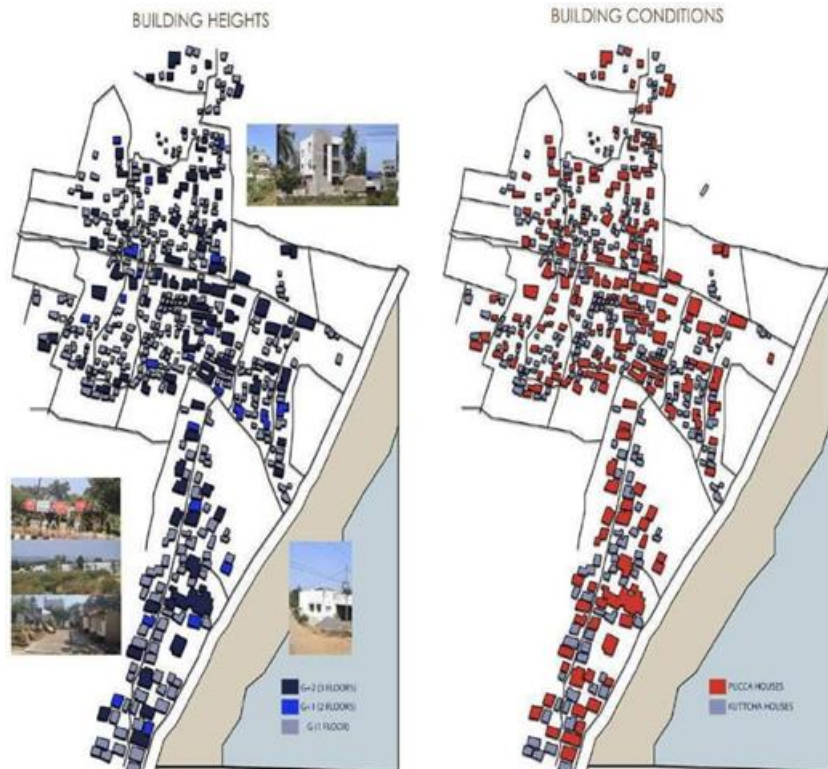
Chepaluppada is a Fishermen's Village in Bheemunipatnam Mandal Visakhapatnam District of Andhra Pradesh State, India. Belongs to the Andhra region. It is 34 KM towards the north of the district headquarters in Vishakhapatnam. Chepaluppada is a gram panchayat with a population of 4545 (census 201 1), located in Bheemunipatnam mandal.

amount fluctuates with the types of catch and varies each year. The fisherman's wife earns around 400 Rs daily by selling the fish in the market. The inhabitants of the settlement have several local goddesses. Gangamma Pandaga & Jathara is a festival celebrated at the end of fish ban day and starting the new fish season. Polamamba, Paradesamma, Nukamma, Marinamma, Sattammatalli, Suthammatalli jatharas celebrated.

5.3.1 Economy

Fishermen who own mechanical boats and fish for 10-12 days twice in one month make around Rs 300 per day. This

5.3.2 Housing Conditions



**Figure 10:** Showing the Building heights and Building conditions of Chepaluppada village

The Chepaluppada Village is one of the fishing villages of Visakhapatnam. The Housing Conditions of Chepaluppada firstly, building height; since Chepaluppada is a village, there are no high-rise structures; the maximum height in the Chepaluppada building is G+2, which is three floors. 20 percent is G+2, 20 percent are G+1, and the remaining 60 percent of the houses are on the Ground floor. Regarding the Conditions of the buildings in Chepaluppada, 50 percent are pucca, and the remaining 50 percent are Kutcha houses. All the G +2 and G+1 houses are pucca, and the remaining

maximum percentage of G floors are Kutcha houses.

### 5.3.3 Site Study

The site is located at 17°50'31.94"N and 83°24'27.14" E latitude and longitude, respectively. The total site area is 7.3 Acres (29570 SQM). The highest contour is 7M, and the lowest contour is around 5 M. Gambhiram Gadda surrounds the site to the South Bay of Bengal towards the East and Naala towards the North-East side, as shown in the figure below.



**Figure 11:** Site Layout and Surroundings

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5.3.4 SWOT Analysis

- 1) The site's strengths are that it is very near to the sea, which a fishermen's community very much requires; it is also approached by the beach road, which is a state highway. The site, also attacked by a boat halt, has good transportation facilities and rich connectivity with electricity and water resources.
- 2) The site's weaknesses are that there is no alternative public transport to the bus, the site is only accessible from one side, and odor from Nala. The street may act as a barrier for the people to connect to the road.
- 3) The site's opportunities are that the water boundaries of the sea can be used as boat half- stations, and they can even have a market facility to sell live fish at the site's entrance. The households' drains can directly be left in

the Nala.

- 4) The Site's Threats are that Children need to be careful regarding the Nala, which is on the northeast boundary of the site. Humidity levels are higher since it is near the sea, and there is a high chance of snakes and other reptiles from the Nala.

5.3.5 Cohort Survey

A cohort survey is conducted among the fishing communities of Visakhapatnam to learn about the community's requirements, lifestyle, and livelihood. Questions are framed on their family conditions, sizes, community requirements status, ratings, and housing conditions. The questions asked and answers given by them are shown in the figure below.





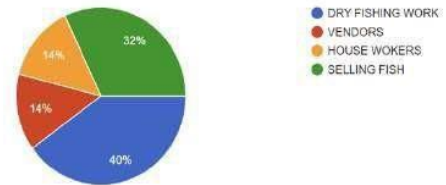
How far is your children travel to school from your community?

50 responses



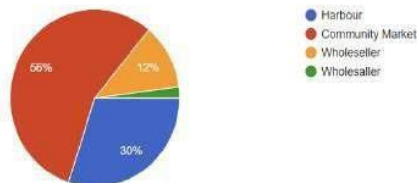
What income generating activities are women carrying out in your community ?

50 responses



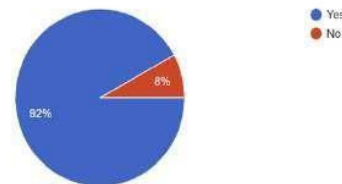
Where do you sell your stock?

50 responses



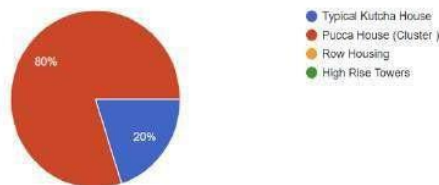
Do you have any requirement of cold storage yards ?

50 responses



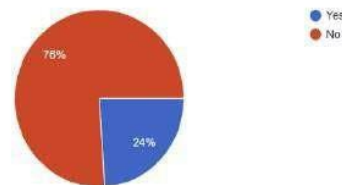
What housing conditions do you prefer to have ?

50 responses



Do your children have parks and open spaces to play?

50 responses



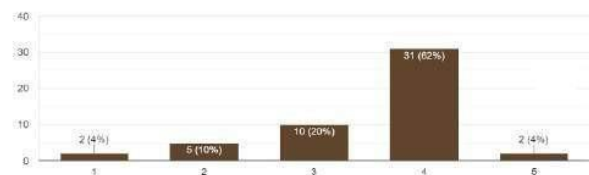
Do you have any temples near your community ?Related to your community goddess?

49 responses



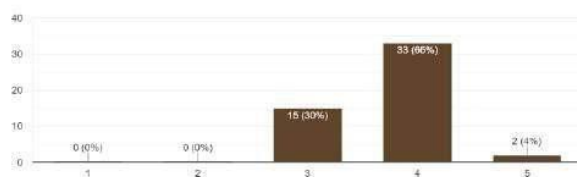
How much do you rate (in a scale of 1-5) the availability of open spaces in your community ?

50 responses



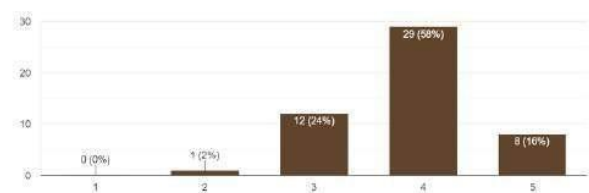
How much do you rate (in a scale of 1-5) the quality of drinking water in your community?

50 responses



How much do you rate (in a scale of 1-5) the quality of roads in your community?

50 responses



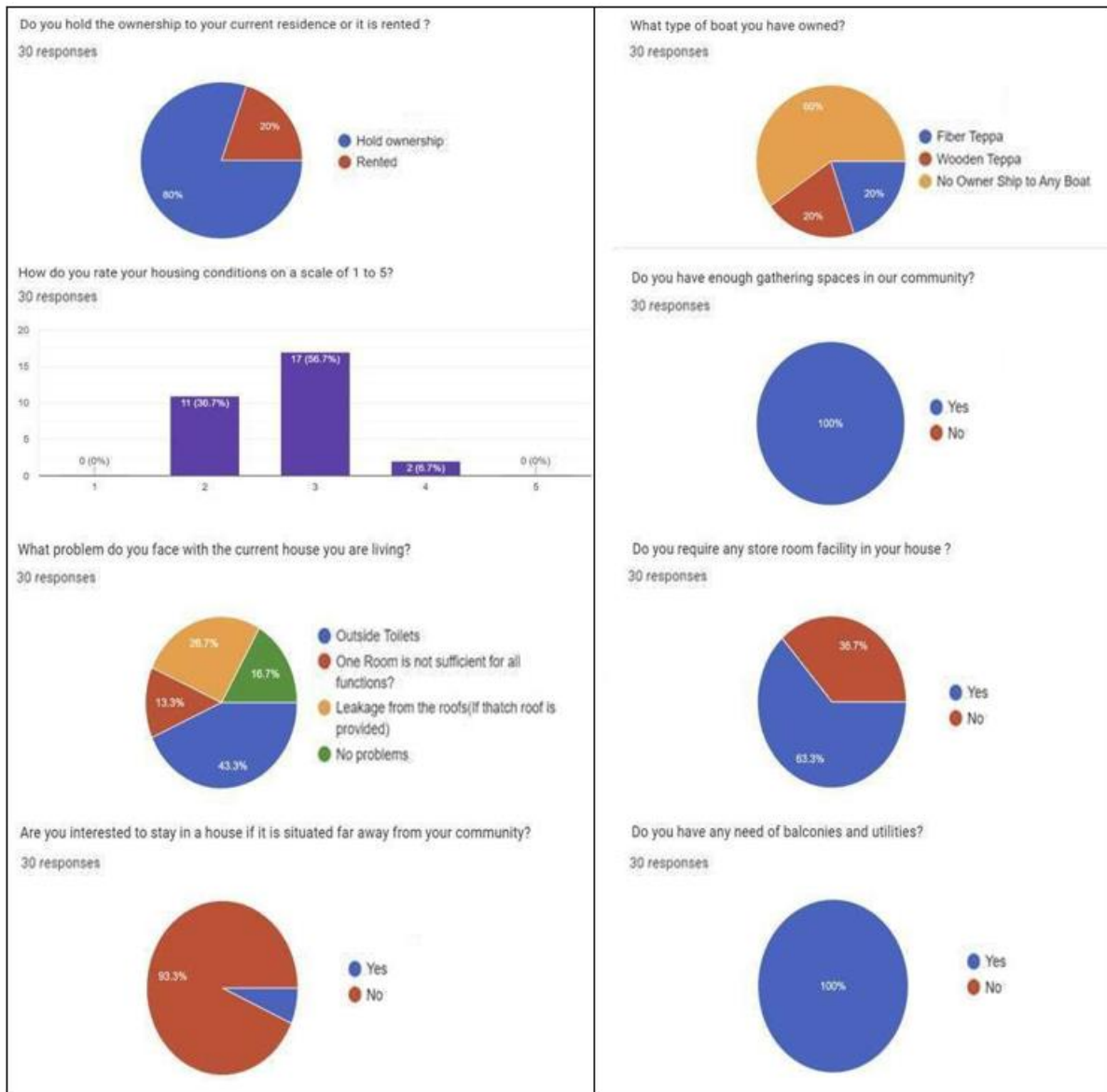
### 5.4 Division of Classification

The fishermen's community is organized into three categories based on boat ownership: No ownership, Wooden Teppa owners, and Fiber Teppa owners. Those without boat ownership typically work for Fiber and Wooden Teppa owners, engaging in day fishing and occasionally renting boats for their work, primarily selling live fish. Wooden Teppa owners operate wooden boats for near-shore fishing, returning in the evenings to prepare fish for drying and market sale, requiring space for drying racks and net storage. Fiber Teppa owners use fiber boats for deep-sea fishing, spending several days at sea before returning to sell their catch fresh, with some fish also set aside for drying. They need storage for equipment and nets.

This classification not only distinguishes their fishing methods but also guides spatial planning and resource allocation to effectively support their specific operational needs.

### 5.5 Cohort Survey

The second cohort survey was conducted among the fishing community affected by the cyclone Hudhud. It is conducted to classify the households of the different types based on the ownership of the boats they own. The questions asked and results of the questions are shown in below.



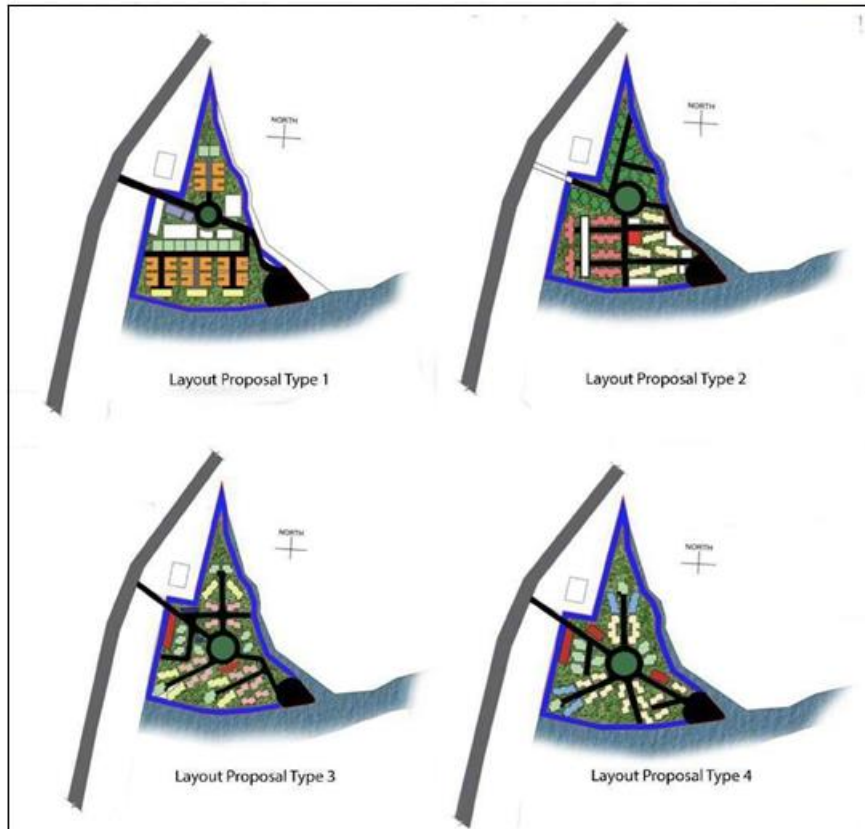
As per the cohort survey conducted among the hudhud victims (52 people).60 percent are the people who are of no ownership observed,20 percent of wooden teppa people are observed, 20 percent are the fibre theppa people observed.

### 5.6 Concept Development

In this community planning approach, households are classified into three typologies based on boat ownership: Fibre Teppa owners, Wooden Teppa owners, and non-boat owners, with a distribution ratio of 3:3:8 respectively in a sample of 84 households. Each typology is grouped into clusters within the neighborhood, ensuring households with similar boat ownership statuses are situated together. Open spaces are strategically maintained between these clusters,

servicing as communal areas where residents can engage in day-to-day activities and community events. These spaces are tailored to accommodate each typology's specific needs and activities, fostering interaction and promoting a sense of community cohesion. By organizing the community in this manner and encouraging the utilization of communal areas for recreational, social, and cultural purposes, the project aims to cultivate a shared identity and enhance overall community interaction. This spatial organization strategy and community engagement initiatives seek to create a vibrant and inclusive living environment that supports residents' social and cultural well-being.

### 5.7 Proposals



**Figure 12:** Proposed Layout Types of Fishermen Community

**Proposal 1:** In this proposal, fishermen are categorized into three groups based on their boat ownership: No ownership households are represented by 16 towers (accommodating 64 families) colored orange, wooden boat owners by 3 towers (accommodating 9 families) in yellow, and Fiber boat owners by 10 towers (accommodating 10 families) in light green. The site includes essential amenities such as a live fish market, park, community hall, net mending spaces, and commercial areas, designed to meet the needs of the community.

**Proposal 2:** This proposal also classifies fishermen into three types based on boat ownership: 6 towers (accommodating 48 families) of No ownership households in red, 6 towers (accommodating 18 families) of wooden boat owners in yellow, and 17 towers (accommodating 17 families) of Fiber boat owners in green. Similar to the first proposal, the site features necessary facilities like a live fish market, park, community hall, net mending spaces, and commercial spaces, providing comprehensive support for residents.

**Proposal 3:** In this version of the proposal, fishermen are grouped into No ownership households occupying 14 towers (accommodating 56 families) colored pink, wooden boat

owners in 6 towers (accommodating 18 families) in yellow, and Fiber boat owners in 10 towers (accommodating 10 families) in green. The site amenities include a live fish market, park, community hall, net mending spaces, and commercial areas, emphasizing a balanced allocation of resources across the community.

**Proposal 4:** Lastly, this proposal divides fishermen into categories: No ownership households are housed in 14 towers (accommodating 64 families) in yellow, wooden boat owners in 4 towers (accommodating 12 families) in blue, and Fibre boat owners in 8 towers (accommodating 8 families) in green. The site plan integrates essential community spaces such as a live fish market, park, community hall, net mending spaces, and commercial areas, ensuring a functional and supportive environment for all residents.

Each proposal type aims to create a well-organized living environment tailored to the specific needs and identities of fishermen based on their boat ownership, while also fostering community interaction and cohesion through thoughtful spatial planning and provision of shared amenities.

## 5.8 Final Proposal



Figure 13: Final Site Plan

In the final proposal, the houses are arranged in cluster form, each cluster having a 3:3:8 ratio of No ownership, Wooden boat ownership, and fiber boat ownership. Each cluster has been provided space in the middle for activities like

interaction, dry fishing, segregation of fish, etc., to occur. In this proposal, the total built-up area is 11851 SQM, the project's FAR is 0.40, and the total ground cover is 11000 SQM, 32.5 percent.



Figure 14: The Cluster View



Figure 15: View 1



Figure 16: View 2



Figure 17: View 3



Figure 18: View 4

## 6. Conclusions

The study focuses on designing layouts for rehabilitating fishermen affected by Cyclone Hudhud. It emphasizes critical factors like fishermen's classes (based on boat type), accessibility, movement, circulation, visual connectivity, and climatic considerations. These elements ensure that the design is tailored to support the fishermen's livelihood and community cohesiveness. Accessibility is prioritized to provide easy access to fishing areas and essential services. Efficient movement and circulation within the community are planned to facilitate the smooth flow of people and goods. Visual connectivity ensures that vital sightlines to the sea and other landmarks are maintained, while climatic considerations ensure the designs are resilient against local weather conditions and future climatic events. The housing layouts are strategically designed to promote resilience against future cyclones while fostering communal bonds. The study concludes that these thoughtful layouts rehabilitate the affected fishermen and restore and strengthen their community. The designs aim to secure a sustainable and resilient future for the fishermen by addressing their specific needs and promoting togetherness. The research highlights the importance of regular reviews and updates to the layouts to adapt to evolving needs and climatic challenges, ensuring the long-term success and well-being of the fishermen's community.

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