

Vulnerability to Disasters: A Gendered Analysis on Water Availability and Livelihoods in Nadu Colony, Kovalam, Chennai, India



Group No: 02

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Introduction



- What is Disaster vulnerability?

“Vulnerability is the inability to resist a hazard or to respond when a disaster has occurred” (www.unisdr.org)

- Gender and Disaster vulnerability

“Both women and men are part of the same society. However, they do not have the same rights, education and options to manage, when a disaster strikes.”

(UNISDR Secretariat, 2003)”

- Livelihoods and Disasters

“The concept of livelihood reflects the ability of people to sustain their daily needs on a combination of resources which are natural, physical, human, social, financial, and political in nature. These resources strongly interplay with the ability of people to face the threat of and recover from the impact of natural hazards” (<https://link.springer.com>)

General Research Question

- How natural disasters and climate variability contribute to vulnerability of men and women in the context of water availability and use in Nadu Colony, Kovalam?

Research Sub Questions

- How are the climate extremes linked to people's livelihoods?
- How changes triggered by climate variability are affecting local people in the Nadu Colony?
- How class, caste, religion and gender interplay in accessing water?

Objectives

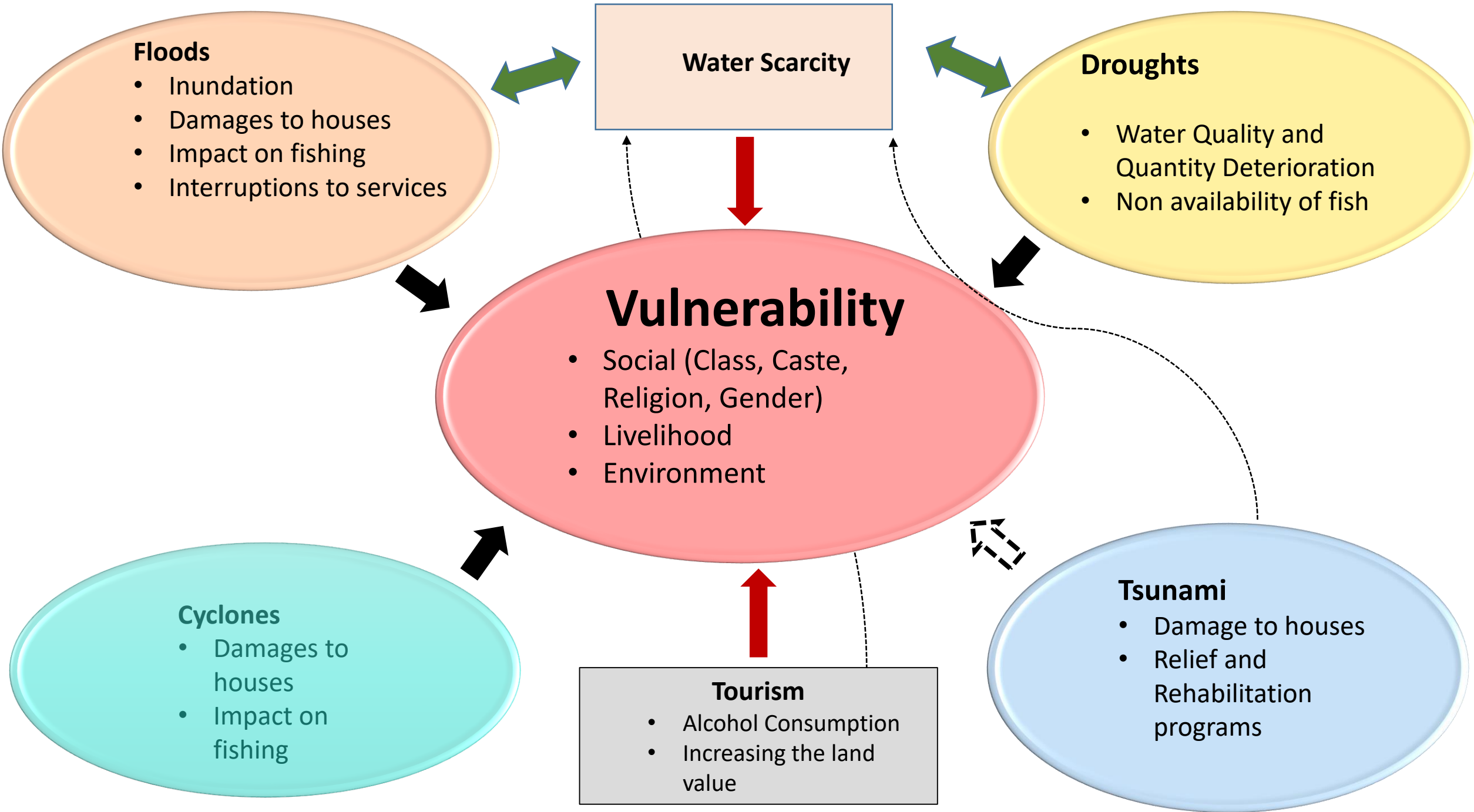
Primary Objective

- To explore the social, economical and environmental vulnerability of the Nadu Colony in Chennai to natural and human induced disasters.

Secondary Objectives

- To identify what kinds of natural disasters occurring in the area and their impacts on water resources
- To assess the vulnerability of men and women to such disasters.

Conceptual Framework



Floods

- Inundation
- Damages to houses
- Impact on fishing
- Interruptions to services

Water Scarcity

Droughts

- Water Quality and Quantity Deterioration
- Non availability of fish

Vulnerability

- Social (Class, Caste, Religion, Gender)
- Livelihood
- Environment

Cyclones

- Damages to houses
- Impact on fishing

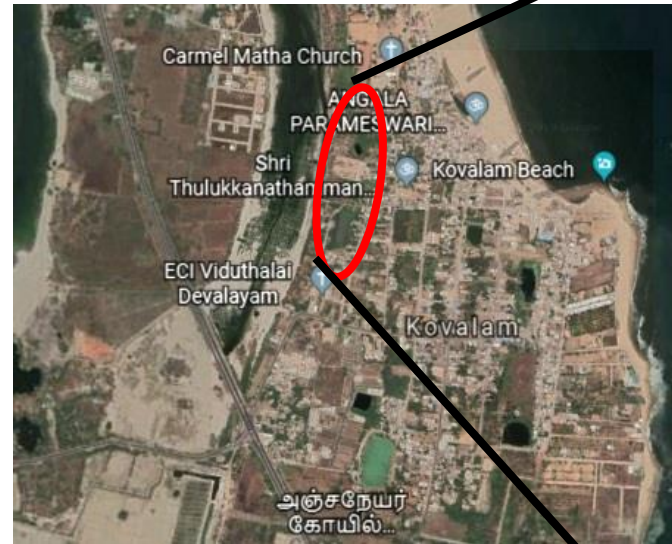
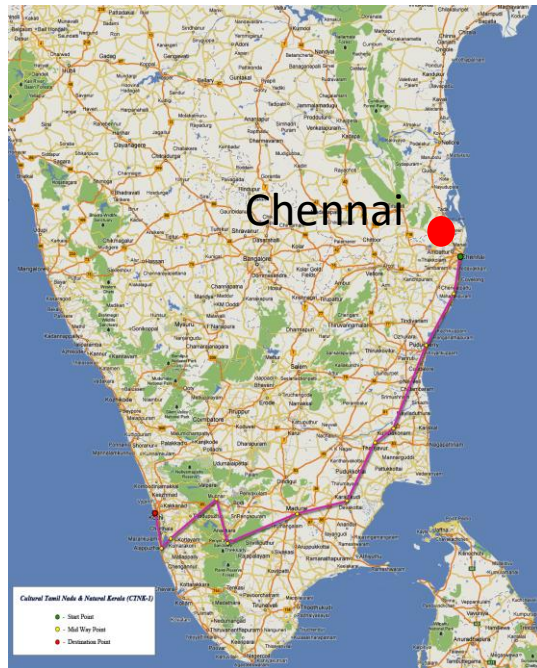
Tourism

- Alcohol Consumption
- Increasing the land value

Tsunami

- Damage to houses
- Relief and Rehabilitation programs

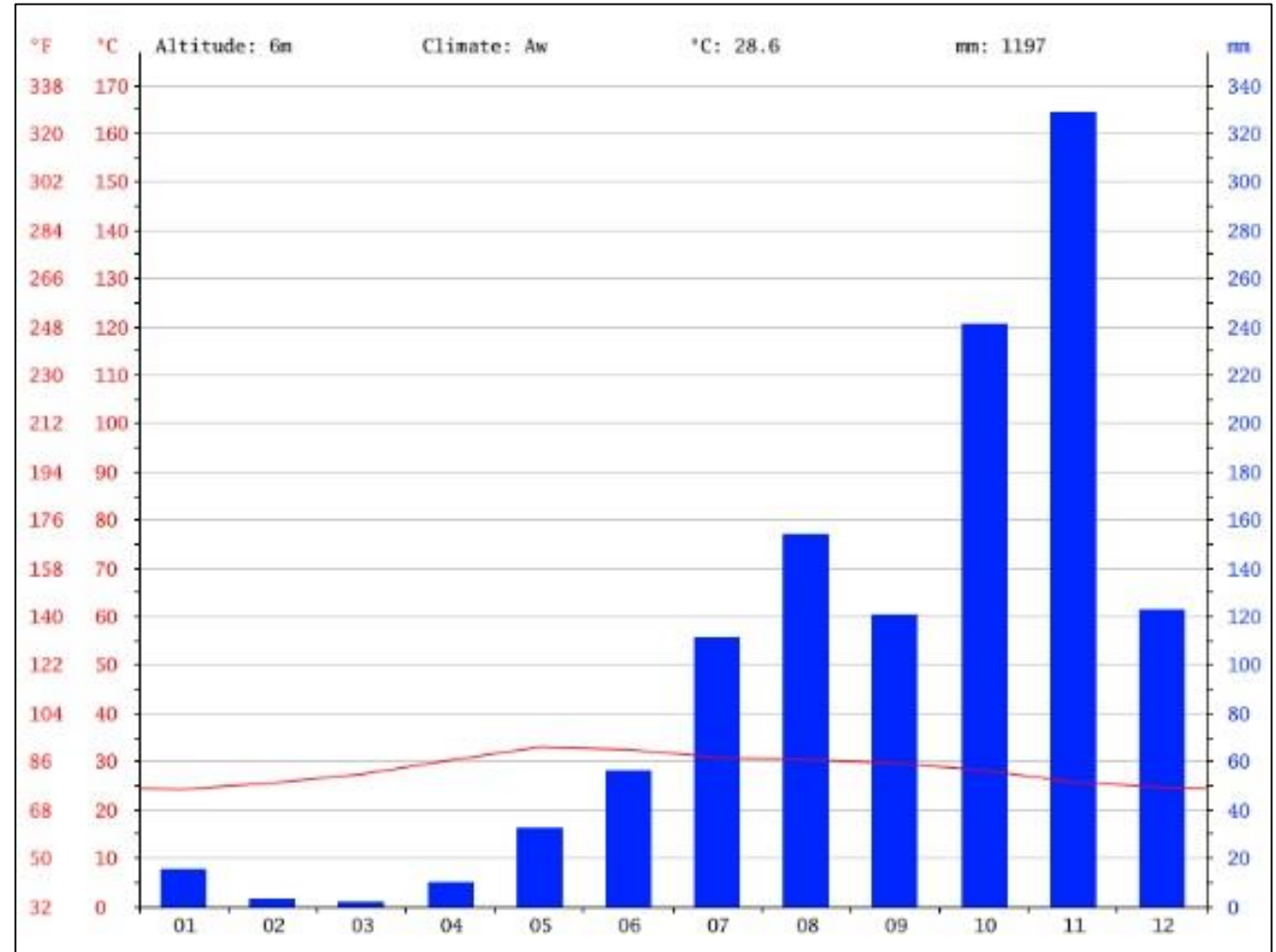
The Study Area



Source: Google Earth Imagery, 2019

Climatic Characteristics of Study Area

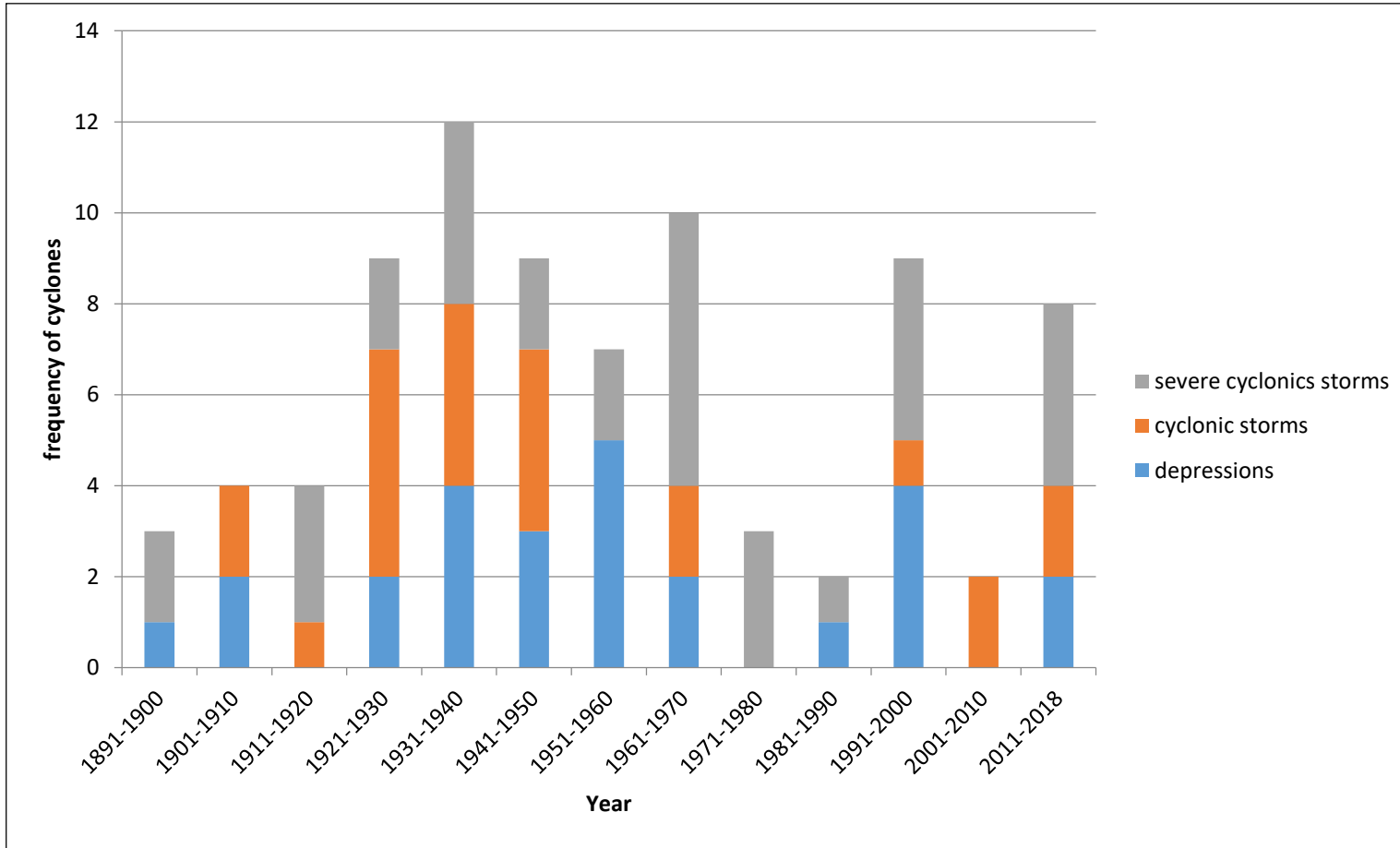
- A Tropical Climate.
- Major rainfall season is from October to December.
- Dry season is from February to April.
- Unimodal pattern of rainfall.
- Average annual temperature is 28.6 °C.
- Average annual rainfall is 1197 mm.



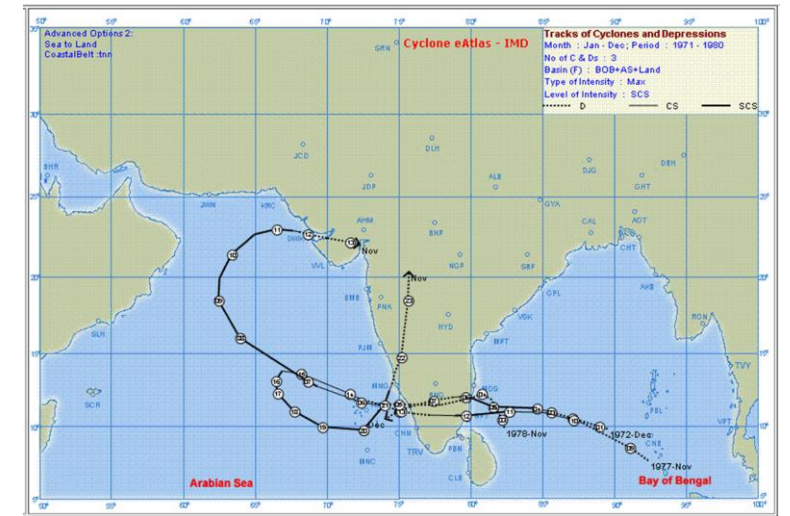
Source: en.climate-data.org

Vulnerability to Disasters....

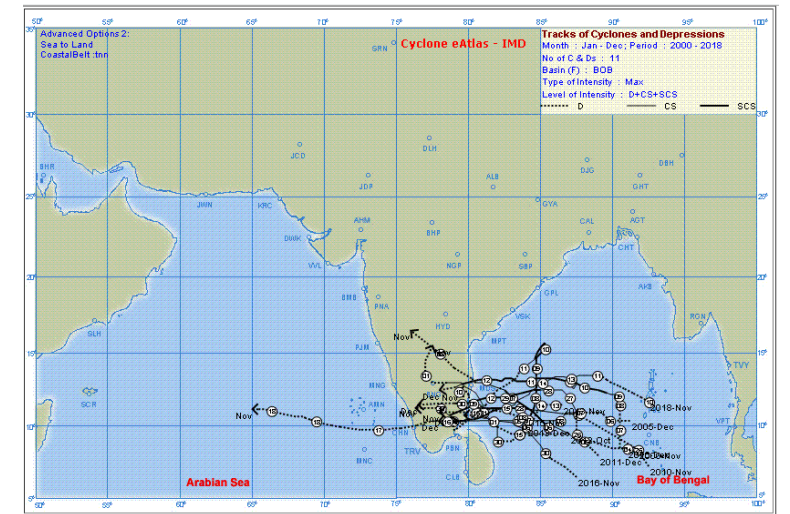
Frequency of Cyclone occurrence from 1891-2018



Source: IMD Cyclone Atlas

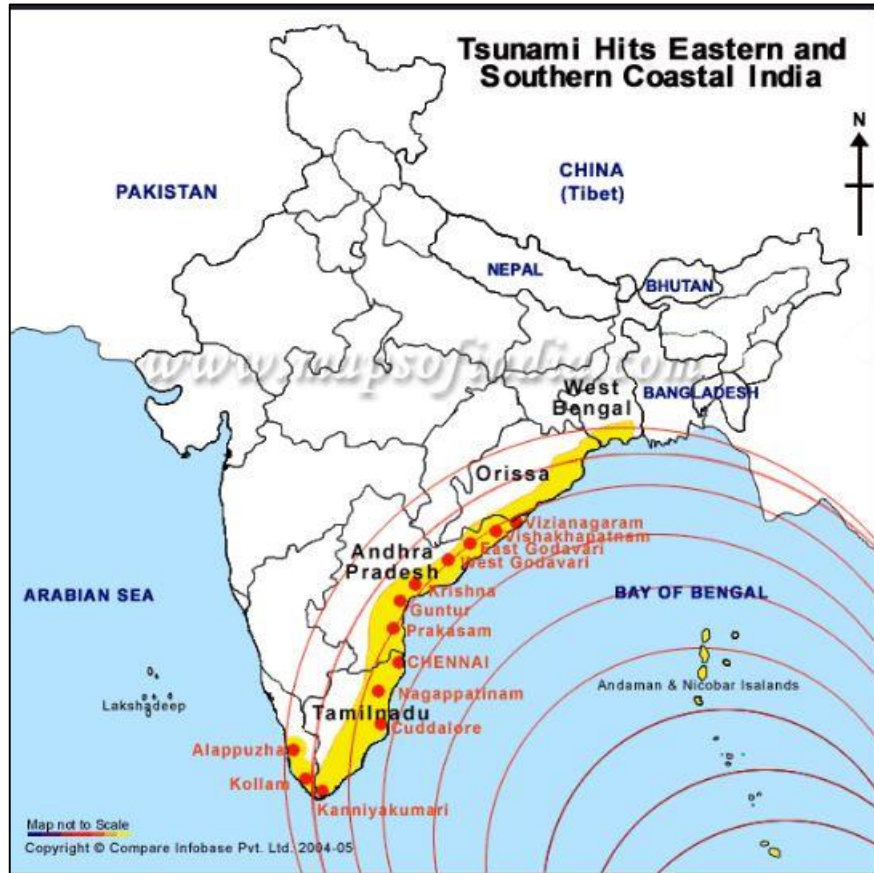


a) Tracks of cyclones and depressions 1971-1980



b) Tracks of cyclones and depressions 2000-2018

Impact of Tsunami - 2004

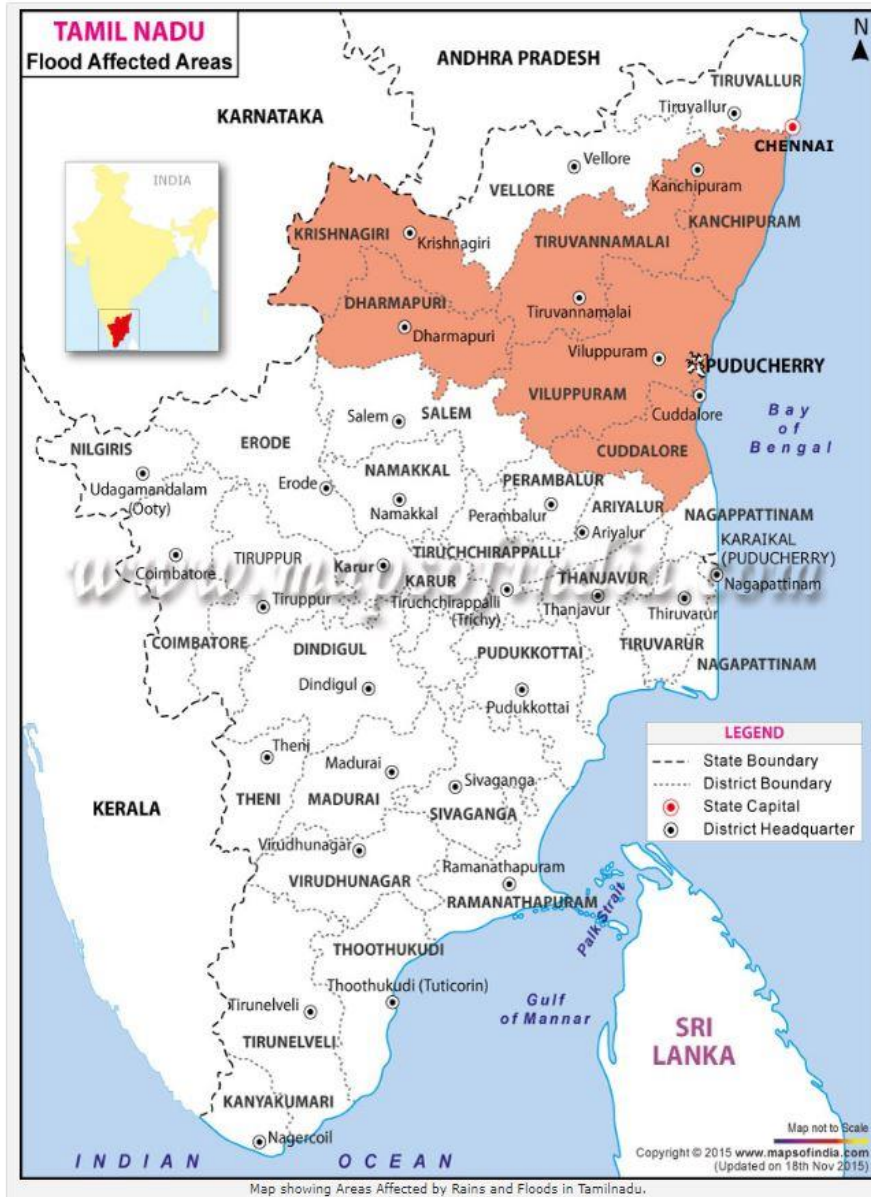


- Along India's southeastern coast, several villages were swept away, and thousands of fishermen at sea were missing.
- India's mainland, hardest hit was the state of Tamil Nadu. The southern peninsular region comprising Kerala and part of Tamil Nadu on the west coast and the rest of Tamil Nadu.
- The 9.0 magnitude (for 5 minutes) quake created a series of tsunamis that caused great destruction and loss of life throughout the Indian Ocean basin, within several hours of the initial event.



The study area which is located south of Chennai has hardly hit by Tsunami in 2004

Tamil Nadu Flood Affected Areas Map



Impact of Floods



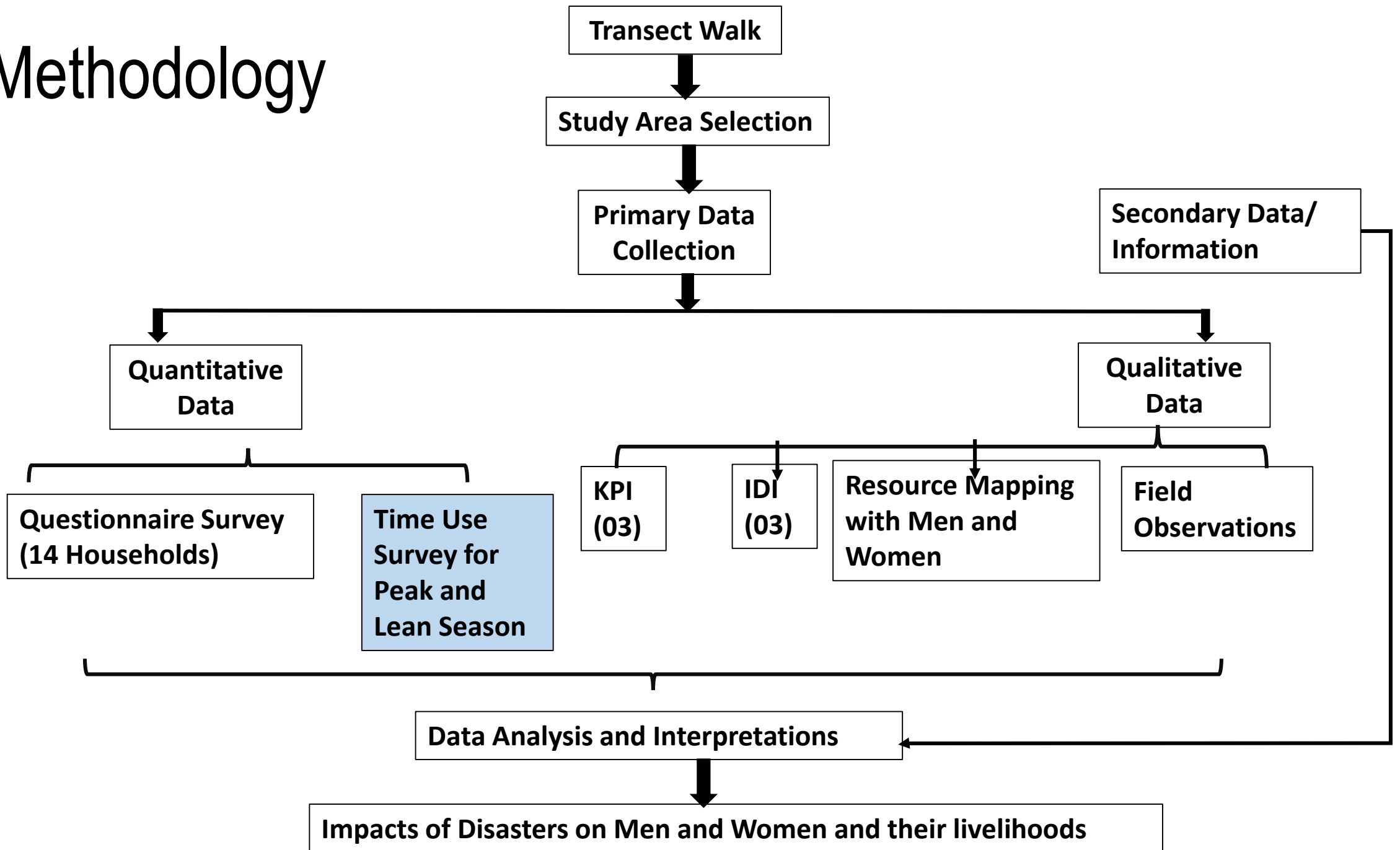
<https://www.thehindu.com>



Methodology



Methodology



Types of Activities

Economic Activities

Non-Economic Activities

SNA Works

Non-SNA Works

Livelihood Activity

Water

Child Care

Domestic Activities

Water

- **Prawn Catching**
- **Labor Works**
 - **Carpentering**
 - **Garden Keeper**
 - **Welders**
 - **Painters**

- **Selling of canned water**
- **Pump Operator**

- **Preparing Child**
- **Feeding child**
- **Lifting Child to School**
- **Gossiping with children**

- **Cooking**
- **Washing Houses**
- **Washing Clothes**

- **Collecting Water**

Personal Care

Free Time

Recreation

Social & Cultural Activities

- **Waking-up**
- **Sleeping**
- **Having Food**
- **Bathing**

- **Chatting with neighbors**
- **Relaxing**

- **Watching TV**

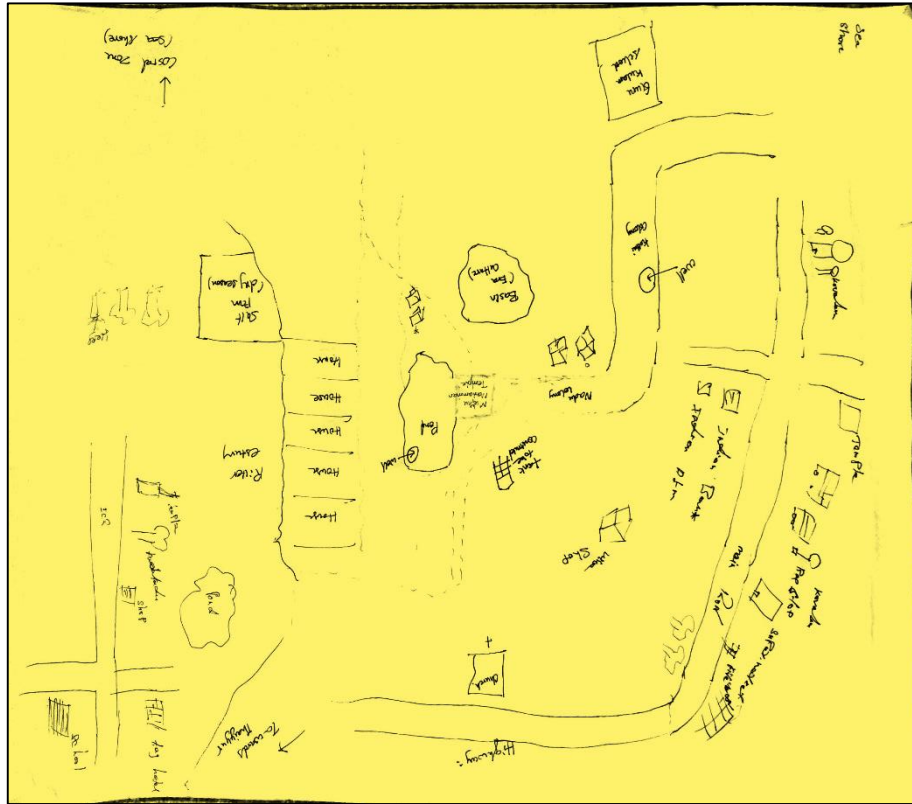
- **Religious Festivals**
- **Praying**

Results and Discussion

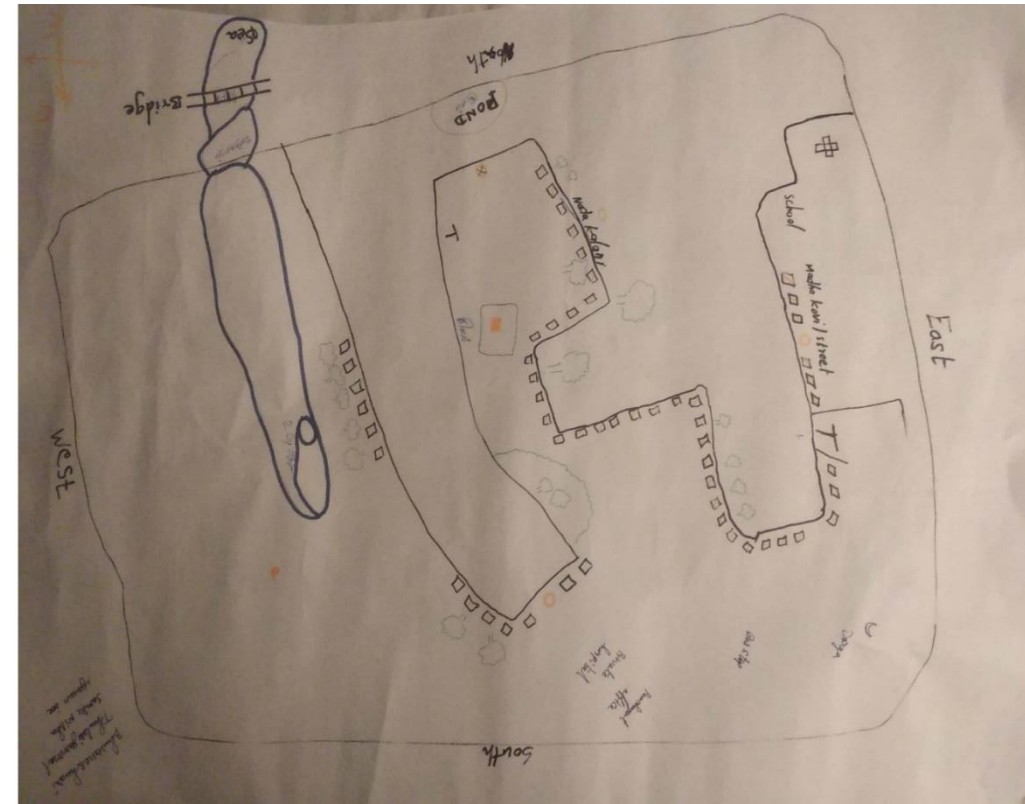
General characteristics and water sources of the study
area

Resource Map

Resource Map Male



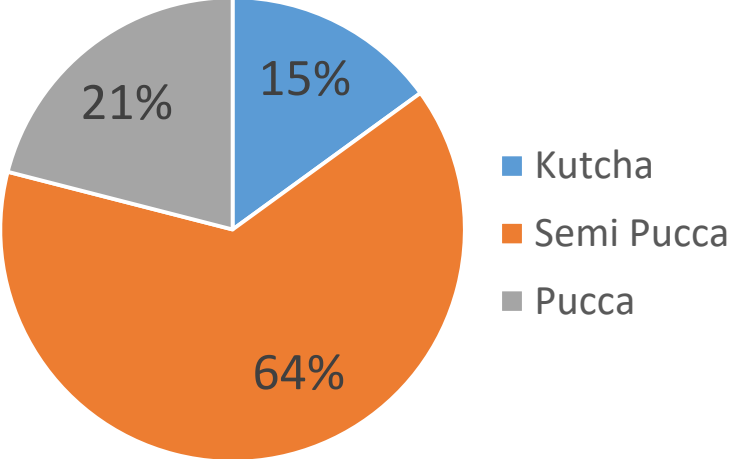
Resource Map- Female



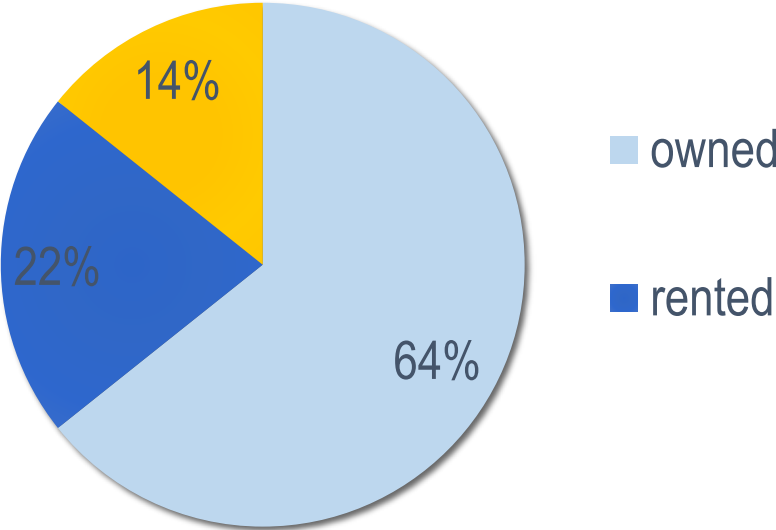
Resource maps clearly show the differences in perception of males and females on resources around them

Housing Condition

Housing Type



Ownership of House



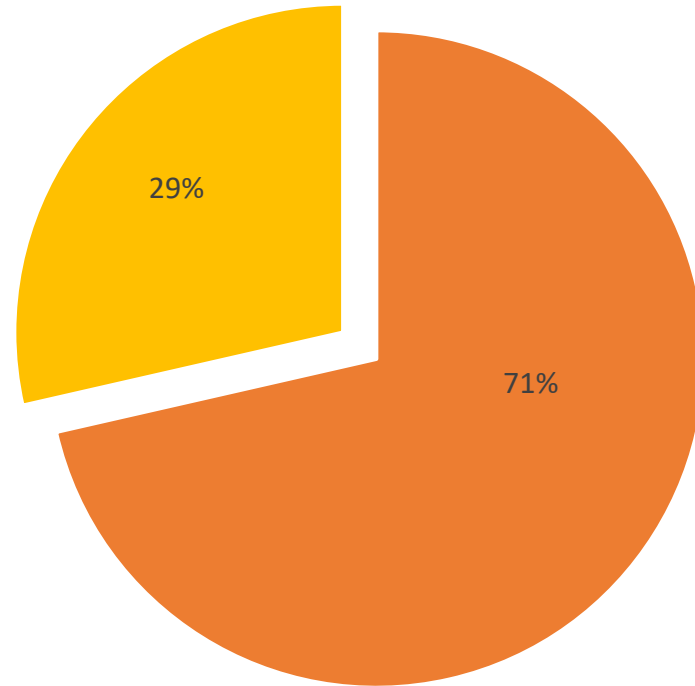
House Hold Type * House Hold Ownership Crosstabulation

Count		House Hold Ownership			Total
		owned	rented	donated	
House Hold Type	kutcha	2	0	0	2
	semi pucca	6	1	2	9
	pucca	1	2	0	3
Total		9	3	2	14



Family Type

Family type

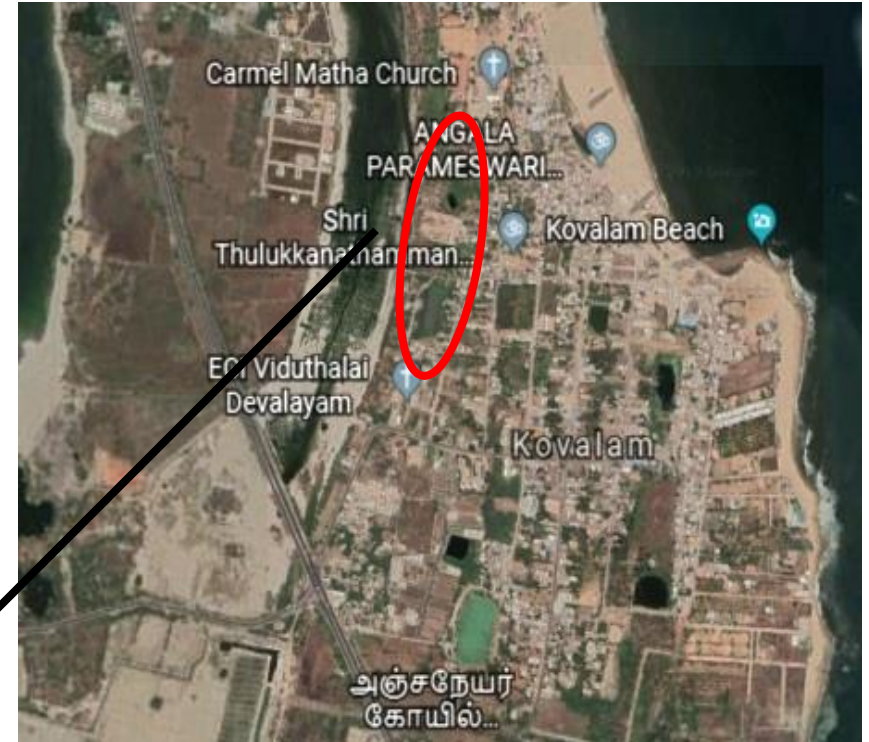


■ Man-headed

■ Women-headed

How Disaster Impacts the Area

- The locality is near to the backwater of the sea.
- Over time period, it is getting polluted day by day.
- Again disconnection with the sea during drought & dry period has made the water totally saline.
- So people are shifted from their occupation, fishing.
- Again with the exploitation of groundwater rather than recharge, the waterbodies in the area got dried and became saline.
- For this they have to face two climatic extremities
Peak period(highest rainfall period)
Lean period(Driest Period)



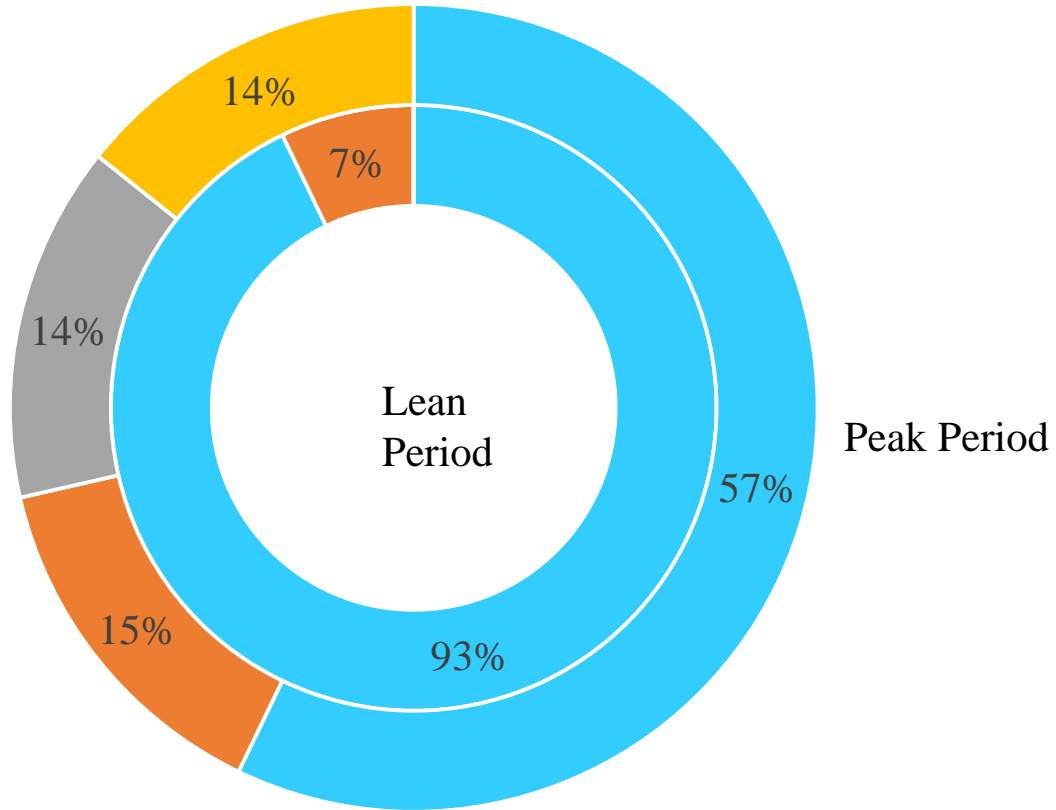
Polluted water in front of SC people



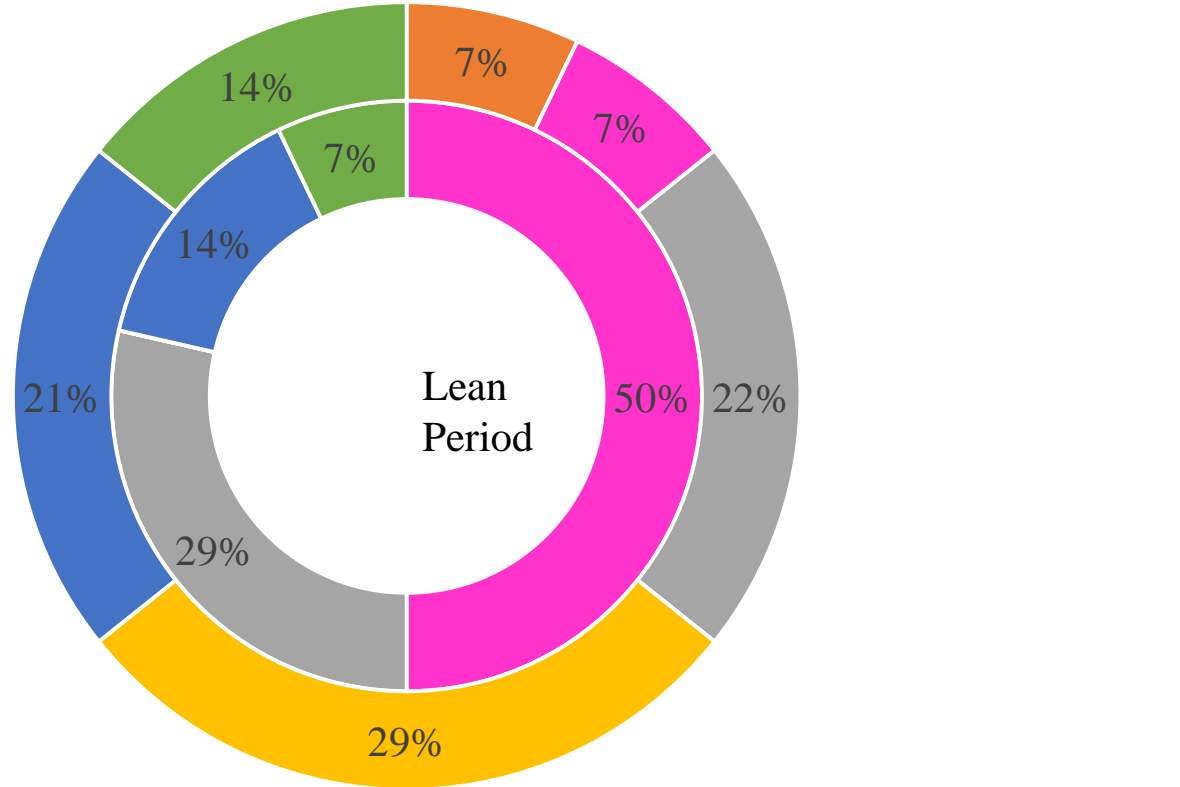
Polluted water in well

Primary sources of water

Primary Sources of Drinking Water

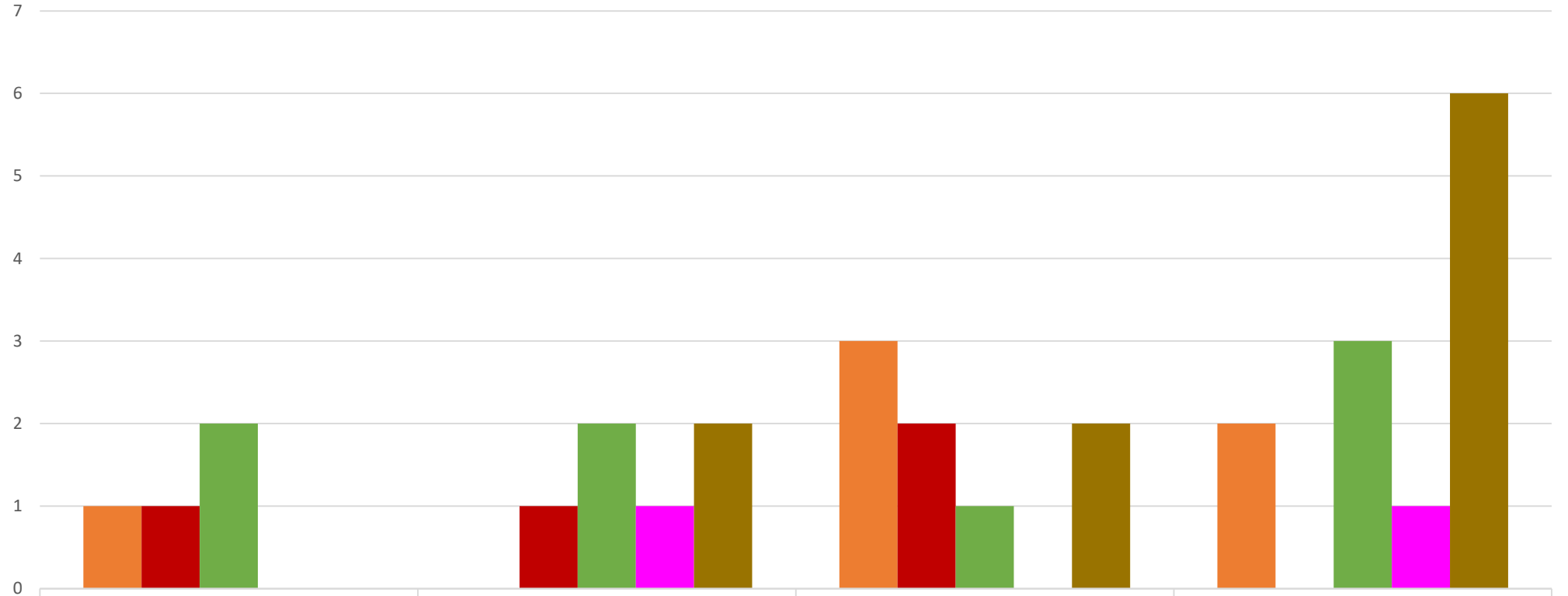


Primary Sources of Domestic Water



- Can Water
- public well
- rain water
- Tap water
- tank water
- ponds
- private wells

Secondary Sources of Water



	Lean drinking	Peak drinking	Lean Domestic	Peak Domestic
Tap water	1	0	3	2
Public well	1	1	2	0
Pond	2	2	1	3
Rain water	0	1	0	1
Tank water	0	2	2	6



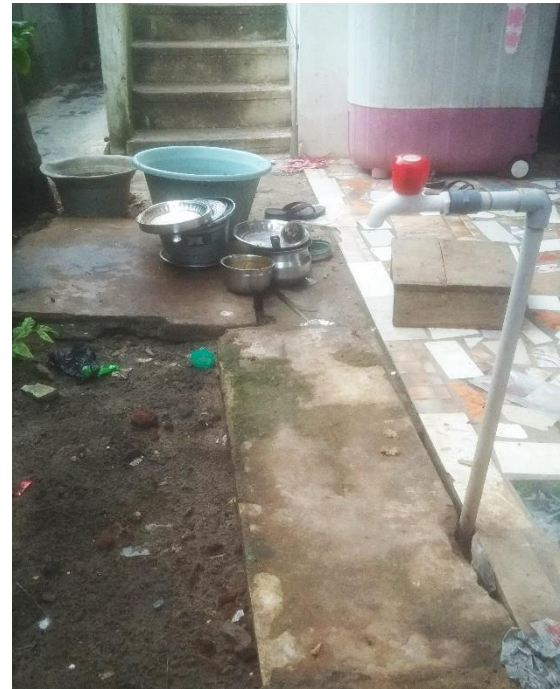
Tank Water



Well Water



Can Water

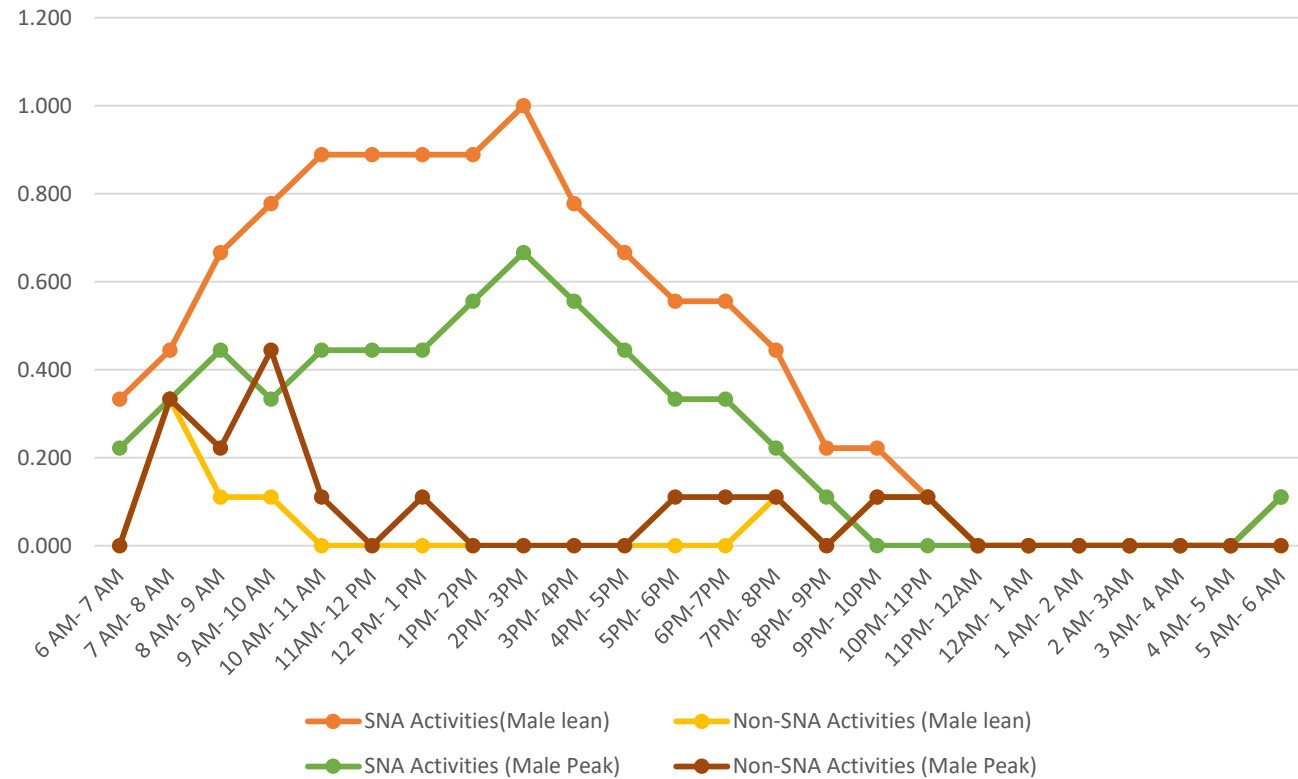


Tap Water

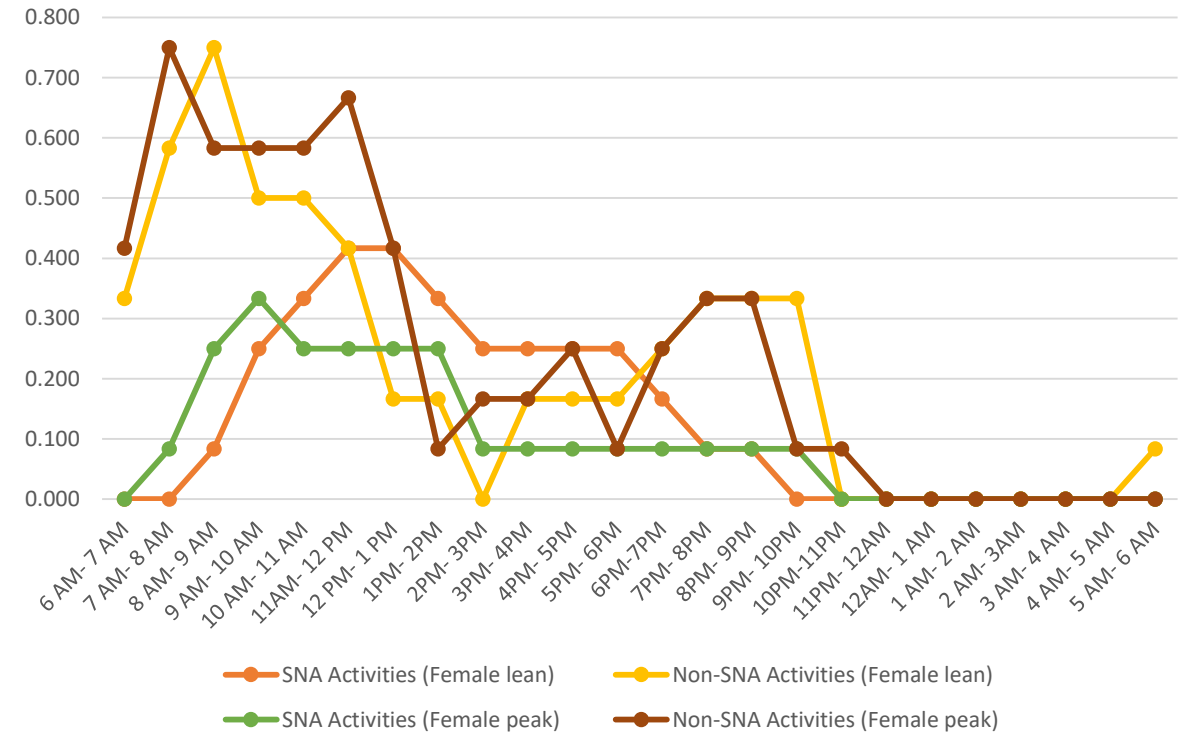
Time Use Survey

Gender Division of Labour

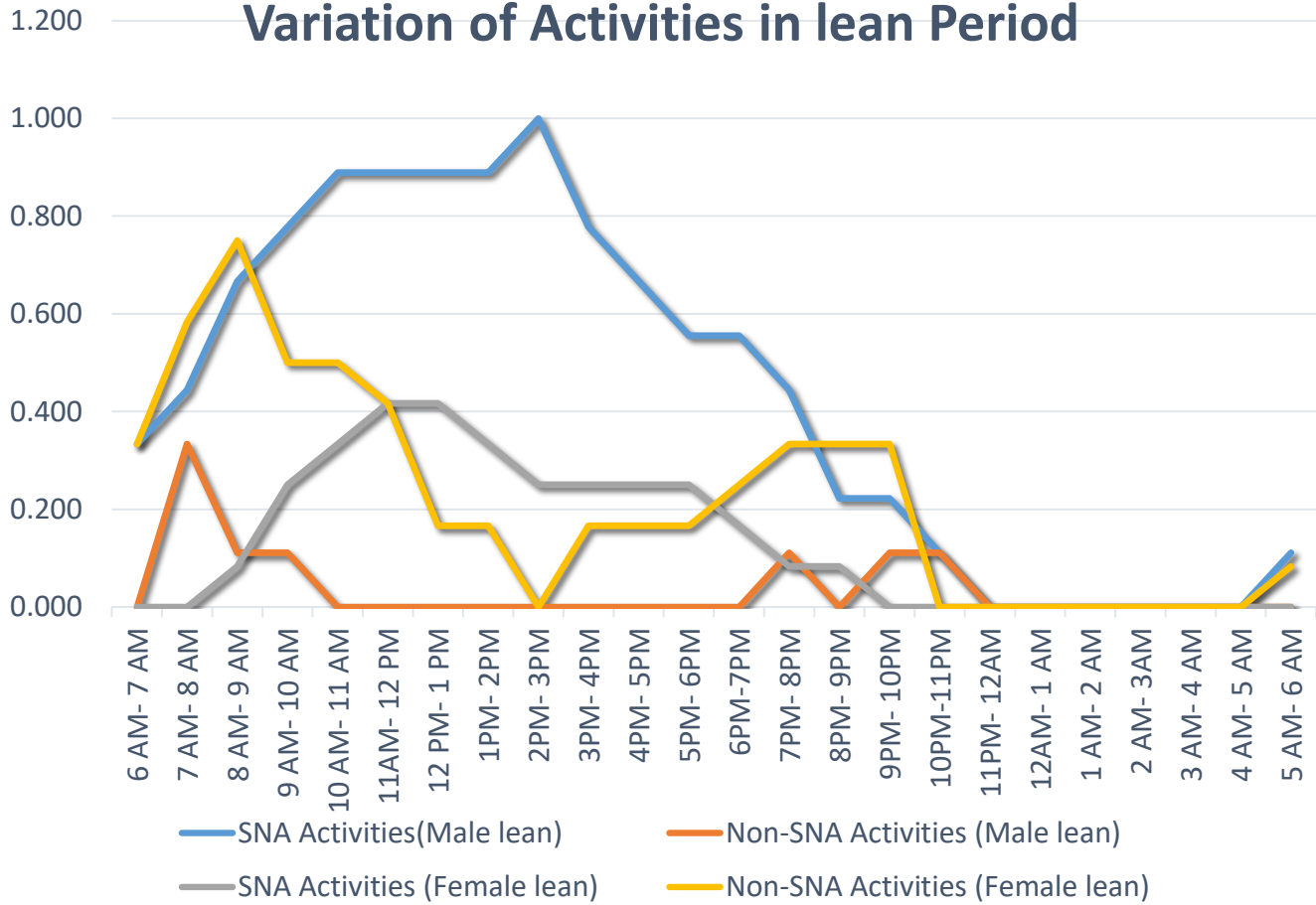
Seasonal Variation of Male Activities



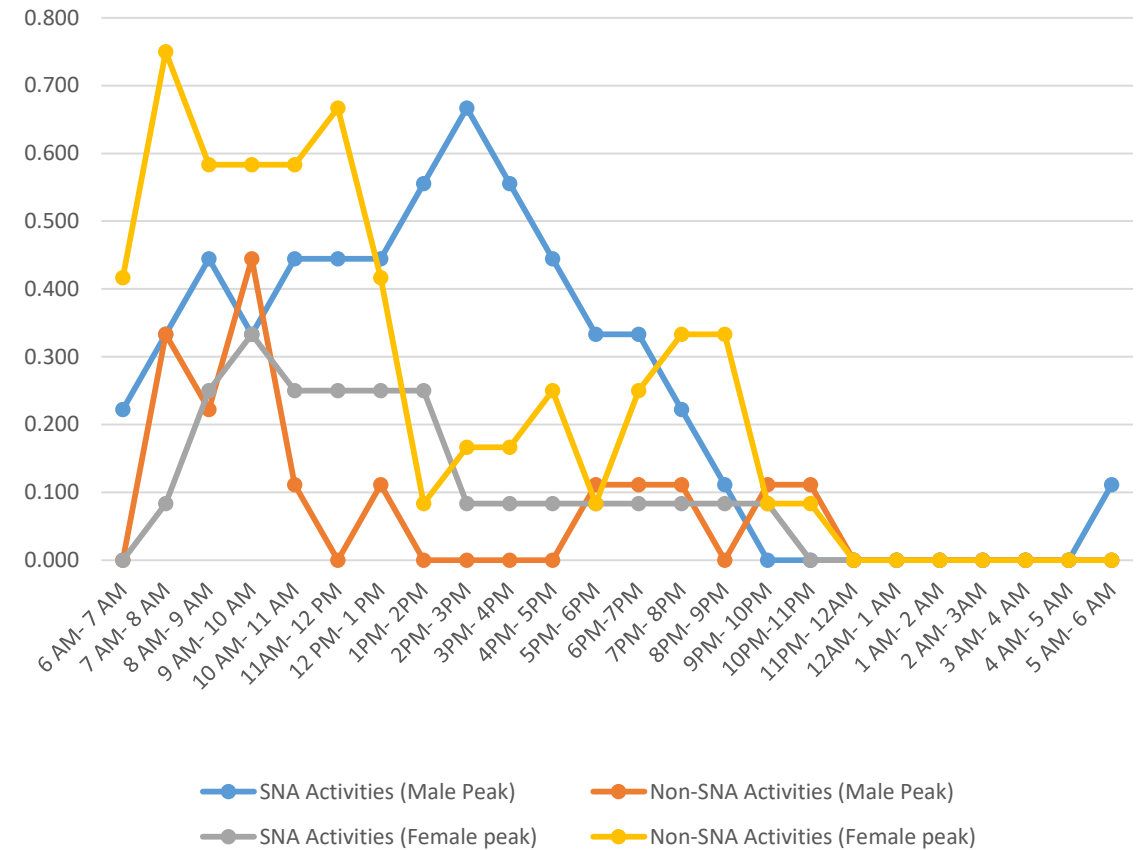
Seasonal Variation of Female Activities



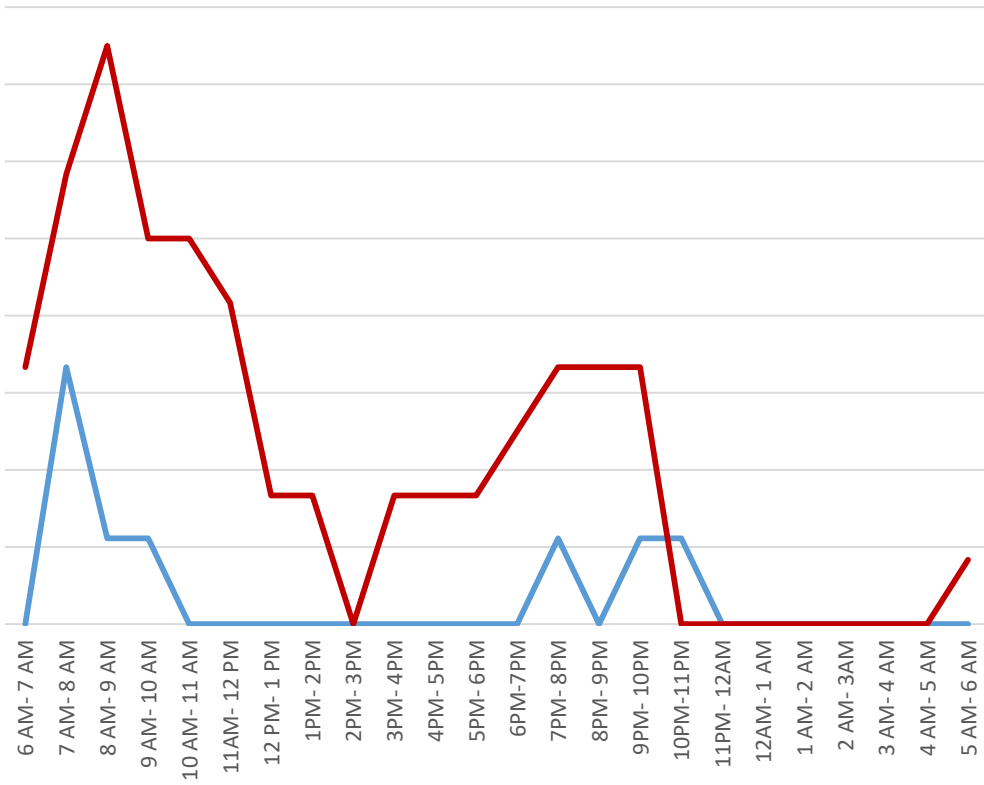
Variation of Activities in lean Period



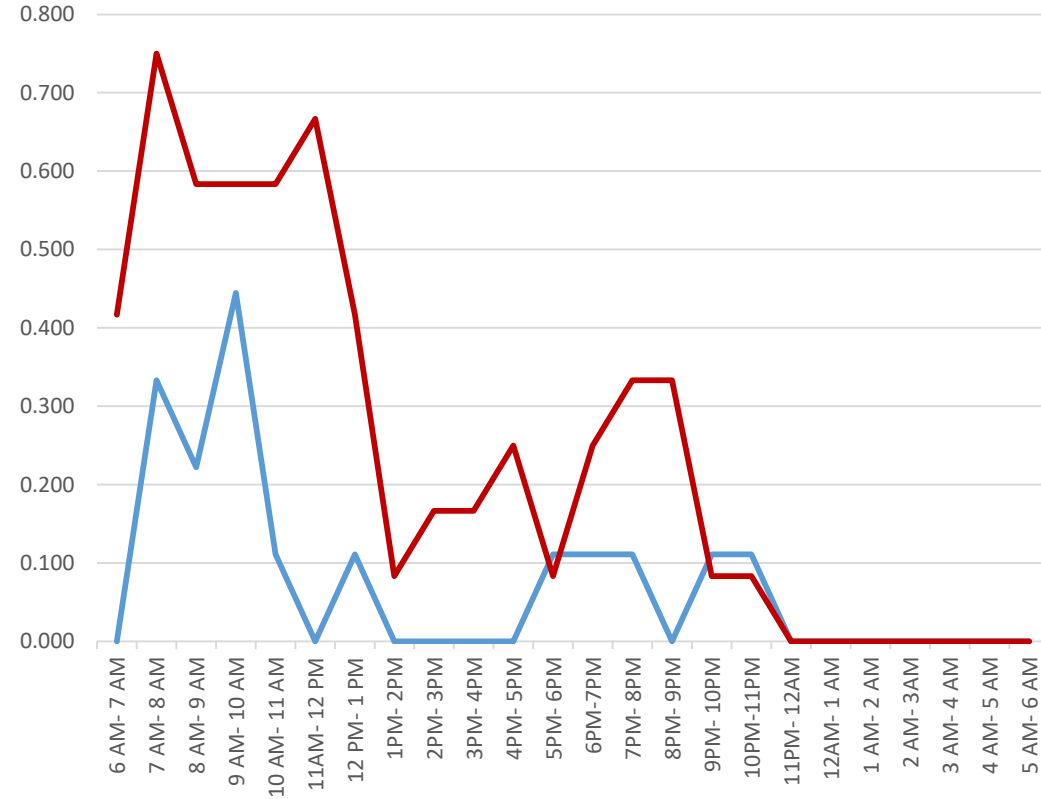
Variation of Activities of Peak Season



Lean



Peak

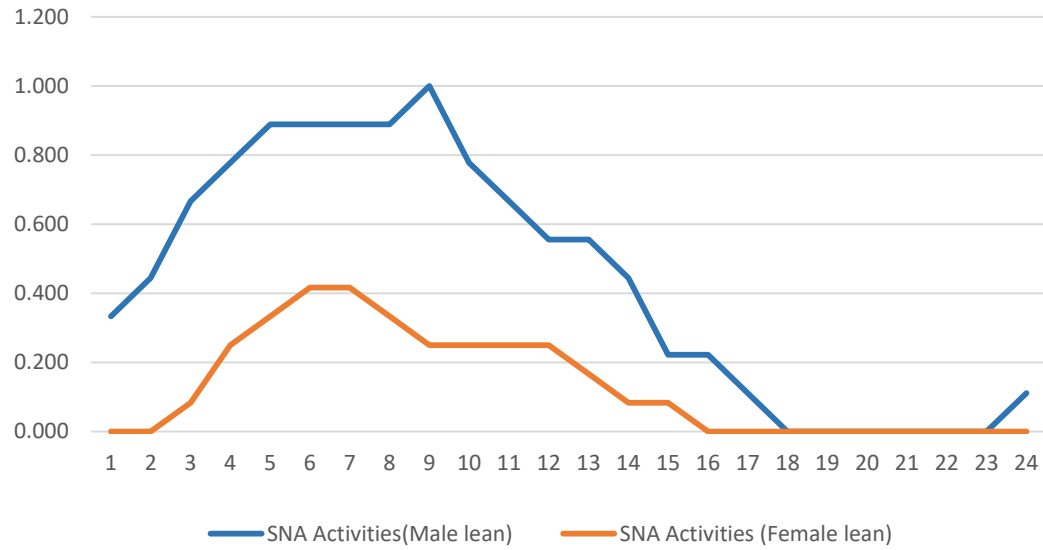


Non SNA Activity of Male

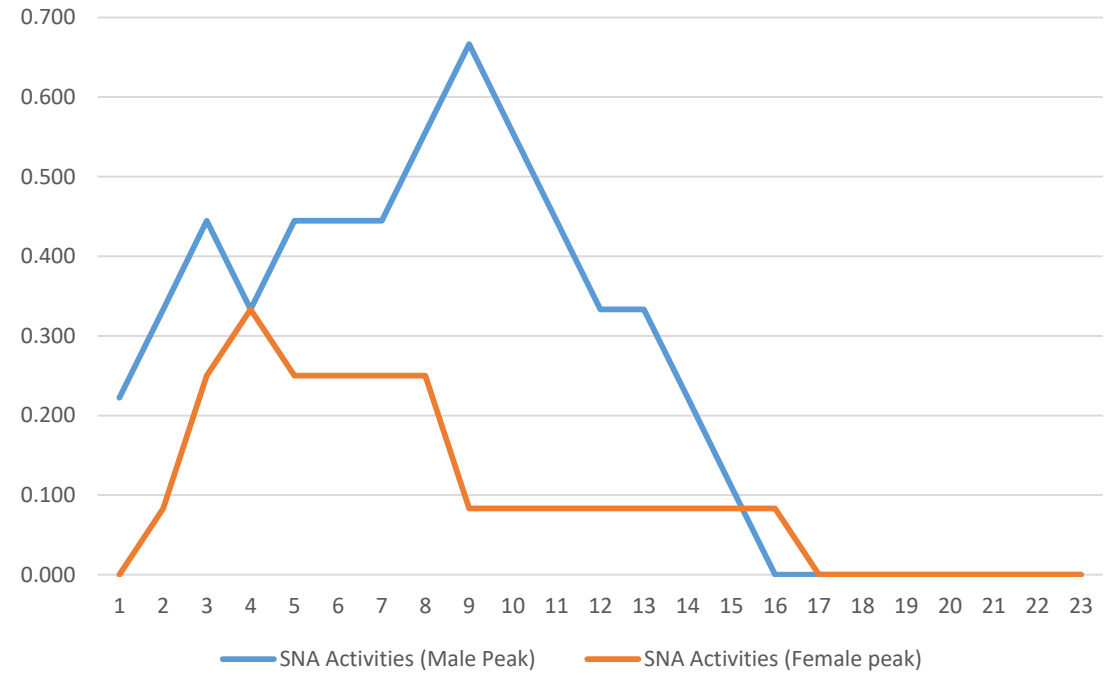


Non SNA Activity of Female

Lean



Peak



— SNA Activity of Male

— SNA Activity of Female

Ranking of households based on Economic Index derived on ownership and type of houses

Type of House	Stories of building	Ownership of house	weightage	Category	Ranking
Pucca	1	Owned	1	1 Higher Class	
Semi pucca	2	Owned	2		
Semi pucca	1	Owned	3		
Pucca	2	Rented	4	2 Middle Class	
Pucca	1	Owned	4		
Semi pucca	1	Rented	5		
Semi pucca	1	Donated	6	3 Lower Class	
Kutchha	1	Owned	7		



Poorest

Relationship of Water Sources & Economic Index (Drinking water)

Source of drinking water for Lean period * economic index
Cross tabulation

Type of source	Source	Higher Class	Middle Class	Lower Class
Primary	Can Water	7	3	3
	Tap water	0	0	1
Secondary	Public Well	0	0	1

Source of drinking water for Peak period * economic index
Cross tabulation

Type of source	Source	Higher Class	Middle Class	Lower Class
Primary	Can Water	5	3	0
	Tap water	0	0	2
	Public Well	2	0	1
	rain water	0	0	2
Secondary	ponds	0	2	2
	rain water	1	0	1

Relationship of Water Sources & Economic Index (Domestic water)

Primary sou

Count

		eco_index_1			Total
		1.00	2.00	3.00	
Primary source of domestic water for peak period	Tap water	0	0	1	1
	tank water	0	1	0	1
	public well	3	0	0	3
	rain water	2	1	1	4
	ponds	0	1	2	3
	private wells	2	0	0	2
Total		7	3	4	14

Secondary source of domestic water for peak period * eco_index_1 Crosstabulation

Count

		eco_index_1			Total
		1.00	2.00	3.00	
Secondary source of domestic water for peak period	Tap water	2	0	0	2
	tank water	2	2	2	6
	rain water	1	0	0	1
	ponds	1	1	2	4
Total		6	3	4	13

Relationship of Affordability & Water source

	Drinking Water in Lean			Drinking water in Peak		
	Higher Class	Middle Class	Lower class	Higher Class	Middle Class	Lower class
Paid Water	7	3	3	5	3	0
Unpaid Water	0	0	1	2	0	4

Paid water – can and supplied water

Unpaid water – Public wells, pond, rainwater

Relationship of Religion & Water source

Primary source of domestic water for lean period * Religion Crosstabulation

Count

		Religion			Total
		Hindu	muslim	christian	
Primary source of domestic water for lean period	tank water	5	0	2	7
	public well	1	1	2	4
	ponds	2	0	0	2
	private wells	0	0	1	1
Total		8	1	5	14

Findings – Qualitative Analysis (KPI and IDI)

- Impact of disasters and the vulnerability of community

S NO	INTERVIEWEE	WATER AVAILABILITY	LIVELIHOODS	OCCUPATION	ADAPTATION & MANAGEMENT RISKS
1	KALIAMMAL AGE: 47 NADU COLONY	Vulnerable to access the natural water sources and panchayat water	<ul style="list-style-type: none"> • People never used to do sea fishing • Spending their money to access good quality of water 	<ul style="list-style-type: none"> • Women and Men do prawn catching • Men work in salt production 	<ul style="list-style-type: none"> • They practiced to collect rain water for domestic purpose • Adapted to the flood condition
2	BUVANESHWARI & JAYAKUMAR NADU COLONY	Vulnerable to access good quality of water from common resources	<ul style="list-style-type: none"> • In dry season, sometimes he will take leave for 10 days to fetch water from 6 AM- 9:30 AM • Travel 2 km to fetch water and it will take 15 minutes 	<ul style="list-style-type: none"> • He is not doing his traditional work. Because of domestic waste discharge into the Back water. 	<ul style="list-style-type: none"> • Collect rain water during rainy season • Adapted to the seasonal pattern changes

S NO	INTERVIEWEE	WATER AVAILABILITY	LIVELIHOODS	OCCUPATION	ADAPTATION & MANAGEMENT RISKS
3	DHAKSANA MOORTHY	Vulnerable to access good quality of water after 2015 flood event	<ul style="list-style-type: none"> • Dry season: Car Driver • Peak season: Salt production and this also get worsen because of less income 	<ul style="list-style-type: none"> • Skin problems and pain in legs after work 	<ul style="list-style-type: none"> • No proper distribution network for drinking water • In public meetings, peoples voice are voiceless
4	ETHTHU RAJAM	<ul style="list-style-type: none"> • Difficulty in fetching good quality of water (public water sources) • Access to private wells quality getting worse day by day. There may be a cause like multiple well for one aquifer. 		<ul style="list-style-type: none"> • Earlier villagers practiced paddy vegetables cultivation 	<ul style="list-style-type: none"> • Adaptation to the flooding which takes place often • Schemes were not implemented in a correct way(Desalination plant) • Distribution is not functioning well

S NO	INTERVIEWEE	WATER AVAILABILITY	LIVELIHOODS	ADAPTATION & MANAGEMENT RISKS
5	AMZED AHMED, NADU COLONY	Initially depend on tap water due to uncertainty they used to take well water. Increased use and sea water intrusion reduced the availability of water. Now they are preferring for can water.	Some times their less income push them to use saline water for cooking purpose	
6	THIRUNAKAR, NADU COLONY	Initially the rainfall pattern is certain one and now the intensity gets increased and inundation of houses occurring. High income satisfies their water needs.	lack of proper maintenance and dumping of garbage on lake the water on pond was worst	lack of proper maintenance and dumping of garbage on lake the water on pond was worst

Conclusions

- The area is naturally vulnerable due to its location near to the bar mouth. Rise and fall of salinity affects both surface and sub surface water
- Natural hazards, man made changes and the natural water scarcity in the area have made people more vulnerable.
- These changes affects both Men and Women in a different perspectives
- Proper management and awareness would bring more sustainable solutions



Thank You...!

