



Team MISSION POSSIBLE

19LIV390 Live-in-Labs Village Visit Report on Kombupalayam Village Erode

Submitted by

K. Amrutha	CB.EN.U4CSE22065
Sravani Oruganti	CB.EN.U4CSE22457
Sivadharshini	CB.EN.U4CHE22043
Abhiyazhini	CB.EN.U4CSE22307
Shrimathan M	CB.EN.U4ECE22149
Aiyyappan RM	CB.EN.U4CSE22302
Raj Kiran Shah	CB.EN.U4CHE22054

Under the guidance of
Dr. Murali Rangarajan,

Department of Chemical Engineering and Materials Science
Amrita School of Engineering, Coimbatore

Table of Contents

Introduction.....	3
About the Village.....	4
Part I - Participatory Rural Appraisal.....	6
1. Resource Map	6
a. Methodology.....	6
b. Key Findings.....	7
2. AEIOU Framework.....	8
a. Methodology.....	9
b. Key Findings.....	9
c. Conclusion.....	11
3. Transect Walk.....	12
a. Methodology.....	12
b. Key Findings from Transect Walk-1.....	13
c. Key Findings from Transect Walk-2.....	14
4. Seasonal Calendar.....	17
5. Inflow-Outflow.....	19
6. Venn Diagram.....	20
a. Methodology.....	20
b. Key learnings	20
7 Income and Expenditure.....	22
8. Brainstorming.....	24
a. Methodology.....	24
b. Transcript.....	25
Part II - Human Centered Design.....	26
1. Interviews.....	26
2. Focus Group Discussion	28
a. Key Learnings from Discussion.....	30
4. Personas and Scenarios.....	31
a. Persona 1.....	32
b. Scenario 1.....	32
c. Persona 2.....	34
d. Scenario 2.....	34
Part III – Synthesis.....	36
Problem Tree	36
a. Causal Factors for Water Pollution.....	36

Introduction:

Our team, Mission Possible, embarked on a seven-day immersion in Kombupalayam village, Erode district, Tamil Nadu. Based at Amrita Vidyalayam in Erode, we dove into the local community's lifestyle, observing their daily routines, standard of living, and challenges. Through direct engagement and meaningful interactions, we identified key issues affecting their lives. Employing a human-centered design (HCD) approach, we focused on understanding problems and developing solutions tailored to the community's needs, values, and beliefs. By incorporating feedback and involving villagers in decision-making, we aimed to create sustainable, effective solutions.

To ensure active community participation, we utilized Participatory Rural Appraisal (PRA) tools, including:

PRA:

- Resource map
- Transect walks
- Seasonal Calendar
- Inflow-Outflow analysis
- Income-Expenditure
- Venn Diagram
- Brainstorming sessions

HCD:

- Interviews
- Focused group discussions
- Personas
- Scenarios

Synthesis:

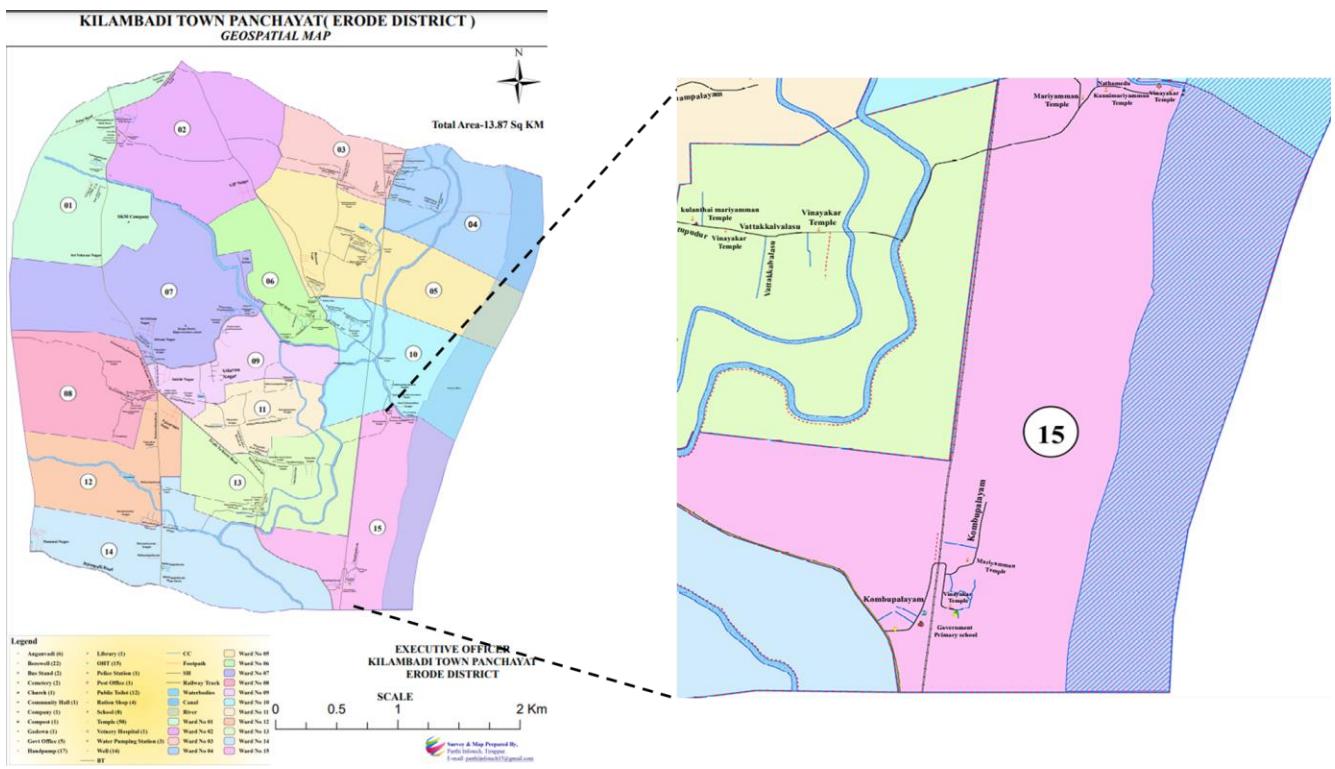
- Problem Trees

These tools enabled us to collaboratively identify and address community concerns.

Village Co – Ordinator: Ms.Sindhu, Kombupalayam, Erode, Tamilnadu

About the village:

Kombupalayam, located in Ward-15 of Kilampadi Town Panchayat in Erode District, Tamil Nadu, is a small yet vibrant village with a rich cultural and community profile. Situated at a latitude of 11.189150 and a longitude of 77.855711, the village spans an area of 3.42 square kilometers. With a total population of 364, comprising 166 males and 198 females, Kombupalayam is home to a close-knit community that primarily includes the Kongu Vellalar and Devendra Kula Vellalar communities. The village has 151 houses, reflecting a modest yet thriving residential setup.



Context:

Participatory Rural Appraisal (PRA) is a systematic, community-driven approach to identifying and addressing local challenges. It begins with building trust and rapport with the community, followed by tools like resource mapping to visualize key assets, transect walks to observe physical and social environments and the AEIOU framework help document activities, environments, and interactions, while the 6 Senses framework identifies subtle issues like pollution or health hazards. Problem tree analysis maps root causes and effects, persona and scenario building empathizes with individual experiences, and income-expenditure analysis highlights economic constraints. A seasonal calendar tracks annual patterns like crop cycles or food scarcity. This collaborative

process ensures comprehensive problem identification, empowers communities, and fosters sustainable, inclusive solutions tailored to their needs.

Part I - Participatory Rural Appraisal

Participatory Rural Appraisal Report: Resource Mapping in Kombupalayam Village

Resource Mapping: Process and Insights

In our Participatory Rural Appraisal (PRA) study of Kombupalayam village, resource mapping played a crucial role in understanding the distribution and accessibility of both natural and man-made resources. This map serves as a valuable tool for planning development initiatives and ensuring efficient resource utilization.

Methodology:

Our mapping process spanned multiple days, allowing us to capture a comprehensive and accurate representation of the village's resources.

- **Day 1: Initial Sketch** On our first day, we took a trip through the village, observing key landmarks and making a rough sketch of the area. This initial draft provided an outline of major features such as water bodies, roads, and significant public structures.
- **Day 2: Detailed Exploration** The following day, we revisited the village, this time focusing on adding more details. By systematically roaming through different sections, we identified and marked additional features such as schools, temples, community spaces, and infrastructure like wells, taps, and drying areas.
- **Day 3: Defining Village Boundaries** To ensure the accuracy of our map, we traversed the village outskirts, carefully demarcating its borders. This step was essential in providing clarity on the extent of the village's resources and settlement areas.
- **Days 4 & 5: Validation and Refinement** Over the next two days, we conducted thorough validation exercises by cross-verifying our observations with local residents and re-exploring specific areas. Adjustments to the scale were made for better accuracy, and minute features like poultry farms, irrigation systems, and announcement speakers were included. Our coordinator played a key role in ensuring that the final version of the map was precise and reflective of real conditions.

Key Findings from the Resource Map

The resource map highlighted various essential elements that define the livelihood and infrastructure of Kombupalayam. The Kalingarayan Canal emerged as a vital water source, sustaining agricultural lands cultivating banana, eucalyptus, coconut, and teak. The map also shed light on significant infrastructure, including public toilets, wells, cattle farms, shops, railway lines, and a railway control room—showcasing the village's connectivity and economic activities.

Beyond infrastructure, the resource map helped us identify key issues affecting the village. One major concern is water management, as pollution from the egg factory pump, farming runoff, and domestic waste threatens the quality of water from the Cauvery River. Additionally, poor road connectivity and limited water storage facilities in certain areas were observed, indicating the need for infrastructure improvements. These findings can help local leaders prioritize interventions such as wastewater treatment, stricter waste disposal regulations, and sustainable agricultural practices.

Community facilities, including temples and announcement speakers, provide opportunities for awareness campaigns and local engagement in conservation efforts. Through a well-mapped understanding of resource distribution, the village can work toward sustainable growth, ensuring efficient resource management while preserving the environment.



AEIOU Framework

This framework helps us understand the village's socio-economic fabric by analyzing Activities, Environments, Interactions, Objects, and Users. By integrating insights from the resource map into AEIOU, we can examine how people interact with their surroundings, the effectiveness of existing infrastructure, and areas where improvements are necessary.

Through this structured approach, we aim to derive meaningful conclusions that will contribute to the village's sustainable development and enhanced quality of life for its residents.

Methodology and Key Findings of AEIOU Framework in Kombupalayam Village

Methodology

To systematically analyze the everyday life, challenges, and opportunities in Kombupalayam village, we employed the AEIOU framework, which focuses on Activities, Environments, Interactions, Objects, and Users. Our approach consisted of the following steps:

1. Field Observation:

- Conducted on-site visits to understand agricultural practices, labor work, and social interactions.
- Observed farming techniques, water resource usage, and traditional tool applications.

2. Interviews and Discussions:

- Engaged with farmers, laborers, and village authorities to gather firsthand insights.
- Discussed challenges related to farming, water management, and labor-intensive occupations.

3. Data Collection and Documentation:

- Recorded details of economic activities, environmental conditions, and infrastructure facilities.
- Documented the role of the Cauvery River in farming and daily village life.

4. Analysis Using AEIOU Framework:

- Categorized findings into five key dimensions (Activities, Environments, Interactions, Objects, and Users) for a structured evaluation.

Key Findings:

Activities:

- ❖ Agriculture, including banana, coconut, turmeric, and casuarina cultivation.
- ❖ Cattle grazing, broomstick making, and plucking weeds.
- ❖ Labor work on railway tracks, gram panchayat sweeping, and employment in the textile industry.
- ❖ Boating, school activities, and temple visits as part of daily life.

Environments:

- ❖ The village features diverse landscapes, including farmlands, water canals, wells, temples, and graveyards.

- ❖ The Cauvery River plays a crucial role in irrigation and transport but is increasingly affected by pollution.
- ❖ The environmental balance is threatened by soil fertility depletion and inadequate clean water resources.

Interactions:

- ❖ Farmers interact with natural resources such as soil and water, using traditional tools like ploughs and bamboo sticks.
- ❖ Gatekeepers ensure railway connections function efficiently, while waste collectors help maintain cleanliness.
- ❖ Cultural and social interactions revolve around temples, kitchen gardens, and communal activities.
- ❖ Key interactions include:
 - Farmer and tractor
 - Farmer and bamboo stick
 - Farmer and broomstick making
 - Gatekeeper and railway connections
 - Gram panchayat sweeper and broom
 - Cattle keeper and cattle fodder
 - Farmer and banana stem (chopping)
 - Waste collector and the people
 - Medicine (VHN) and people

Objects:

- ❖ Key objects in daily village life include:
 - Ploughs
 - Boats
 - Water pipes
 - Cattle fodder
 - Railway tracks
 - Coconut husk
 - Sticks
 - Houses
 - Banana stems
 - Soil
- ❖ These objects support agricultural, economic, and transportation functions.

Users:

- ❖ Farmers, laborers, and general village residents rely on these resources and interactions for their livelihoods.
- ❖ The community includes:
 - Village residents
 - Farmers
 - Laborers
 - Railway track gatekeepers
 - Gram panchayat sweepers
 - Textile industry workers

Pain Points:

1. Lack of clean water
2. Decreasing soil fertility
3. Health issues
4. High labor costs

Conclusion

The AEIOU framework enabled a structured understanding of Kombupalayam village's socio-economic dynamics. The findings highlight the community's dependence on agriculture, water resources, and labor-intensive jobs while revealing significant challenges that require improved resource management and sustainable development strategies.

ACTIVITIES	ENVIRONMENT	INTERACTIONS	OBJECTS	USERS
Agriculture - Banana, Turmeric, Coconut, Causarina, Eucalyptus	School	Farmer and Banana/ Turmeric/Coconut/Causarina/Eucalyptus Cultivation	Railway track	Village residents
Sale of agricultural produce	Temple	Farmer and tractor	Bamboo sticks	Farmers
Labour work	Banana farms	Farmer and bamboo stick	Plough	Labourers
Plucking weeds	Cattle	Farmer and broom stick making	Banana	
Working in textile industry	Railway track	Gate keeper and Trains	Soil	
Coconut woven mat	Kaveri river	Villagers and Gram panchayat sweeper	Boat	
Broom stick making	Graveyard	Cattle keeper and cattle fodder	Houses	
Cattle grazing	Kitchen garden	Villagers and Waste collector	Temple	
Boating	Eucalyptus farm	Villagers and Medical service provider	Cattle fodder	
Railway track gate keeping	Turmeric farm	Teacher and students	Coconut husk	
Gram panchayat sweeping	Coconut farm	Boatmen and fishes	Water pipes	
	Casuarina farm	Villagers and Tap/Well/Canal/River Water	Pesticide and Herbicide Sprayer	
	Water canals	Villagers and Temple Festivals	Water bodies	
	Wells			
	Water tank			
	Houses			
Pain Points:		Goals:		
1)No clean water		Banana/Coconut/Turmeric/Casuarina/Eucalyptus Cultivation		
2) Decreasing soil fertility		Livelihood		
3) Health issues				
4)High labour cost				
5)Migration				

Transect Walk:

Methodology:

A transect walk was conducted as part of a participatory rural appraisal (PRA) method to gather first-hand insights into the geographical, environmental, and socio-economic conditions of Kombupalayam village. This approach involved a systematic walk along a predefined route, covering diverse areas such as main roads, agricultural fields, water management systems, and residential zones. The objective was to document observations, engage with community members, and identify both strengths and challenges faced by the village.

Steps in the Transect Walk Methodology

- ❖ Route Selection:
 - A planned route was established, ensuring coverage of key infrastructure, natural resources, and livelihood zones.
 - The route included the main road, egg factory vicinity, motor room well, and common well.
- ❖ Community Participation:

- Local residents, including farmers, workers, and women, were involved in discussions to gain diverse perspectives.
- Key informants such as elders and municipal staff provided historical and contextual insights.
- ❖ Observation and Data Collection:
 - Environmental conditions, infrastructure quality, and resource distribution were observed and recorded.
 - Photographs, sketches, and field notes documented significant findings.
- ❖ Focus Group Discussions:
 - Small group discussions were conducted at different locations to validate observations.
 - Concerns regarding water quality, road infrastructure, and sanitation were highlighted by community members.
- ❖ Mapping and Documentation:
 - Findings were mapped out to visualize resource allocation and critical issues.
 - Patterns and trends were analyzed to formulate potential interventions.

Key Findings from the Transect Walk-1

- ❖ Road Infrastructure and Transportation:
 - The main road is a crucial transport link, supporting economic activities such as the egg industry.
 - Issues identified include dust pollution, narrow roads, and inadequate drainage, affecting daily commuting.
 - Free bus access for women significantly enhances mobility and promotes gender equality.
- ❖ Water Management and Sanitation:
 - The motor room well, used for water transportation, suffers from poor water quality, leading to health risks such as dizziness.
 - The common well, mainly accessed by the Kongu Vellalar community, is crucial for washing and irrigation but lacks proper maintenance.
 - Sanitation concerns, including potential disease spread (e.g., diarrhea and malaria), were observed.
- ❖ Opportunities for Improvement:
 - Road enhancements, including better drainage systems, are needed to improve transportation.
 - Technological advancements such as rainwater recycling and improved irrigation methods could enhance water sustainability.

- Regular maintenance and sanitation initiatives could mitigate health risks associated with water sources.

Transect Walk-1:



Activities/Themes	Temple	House	Shop(LHS)	Cattle farm(LHS)	Tap	Well	Banana cultivation	Casuarina plantation(LHS)	Coconut plantation	Cauvery River
Education										
Gender	no bias		no bias	no bias	no bias	no bias				
Agriculture	home garden						Banana cultivation	Casuarina cultivation	coconut cultivation	Source of water for irrigation
Climate	Hot	Cool	Cool	cool	Cool	cool	Cool	Cool	Cool	Cool
Waste Management	Waste collection by municipal workers	Waste collection by municipal workers	Waste collection by municipal workers	cattle waste used as manure			waste are periodically tilled and decomposed, after 3 cycles, waste generated is burnt	waste are periodically tilled and decomposed, after harvesting the waste is burnt	shedded leaves are used in Broom making; coconut husk, leaves are used as firewood	
Health	old people suffer from diabetes, pressure, seasonal diseases	preserved foods are threat to health	preserved foods are threat to health	cows get affected by diseases	during rainy season, monsoon water comes threat to water borne diseases	chemicals from effluent may seep through soil and have contaminated the well water	stagnant water is source for breeding of mosquitoes, causing dengue	stagnant water is source for breeding of mosquitoes, causing dengue etc	stagnant water is source for breeding of mosquitoes, causing dengue etc	factories effluent contaminates the river water and is a threat for health problems like cancer, water borne diseases
Energy	Electricity connection	Electricity connection	Electricity connection				engines, machineries used for harvesting	engines, machineries used for harvesting		
Livelihood			Shopkeeper	Milk, dairy products production (small scale)			Selling bananas and other products	raw materials for Fibre extraction, Paper factory	Selling coconut, leaves used to make Roofing and broom sticks	Fishing, Boating, agricultural land depends on it for irrigation
Water and Sanitation		drinking water is collected from tap, waste water drained in canal	drinking water is collected from tap, waste water drained in canal	drinking water is collected from tap, waste water drained in canal	source of drinking water for households nearby	some families use it for household purpose	water for irrigation is taken from canal, Herbicide, Pesticide, Fertilizer run-off	water for irrigation is taken from canal, Herbicide, Pesticide, Fertilizer run-off	water for irrigation is taken from canal, Herbicide, Pesticide, Fertilizer run-off	factories Effluent, household waste water discharge
Problems		Only one small shop is in village			Loose connections, impure drinking water	has more dissolved salts	sometimes waste is burned, use of agro chemicals, pests	no income during it's growth period	pests	Water pollution
Strength	Place for gathering, symbol for spirituality	settlements	availability of necessary commodities	Secondary income	source of drinking water for households nearby	water available for drinking, household purpose	provides livelihood to many agricultural labours, harvest is sold and thereby generates income	low maintenance , cash crop	Low maintenance , cash crop	Continuous supply of water
Opportunities		requirement for More shops	Panchakavyam preparation	source of drinking water for households nearby, purification systems can be installed	additional source of water	Medicinal product, medicinal values of the plant can be harvested (stem juice for treating kidney stones)	Alternative income	Value-added products	regulations in effluent discharge improves water quality	

Key Findings from the Transect Walk-2:

Water Resources:

- Various water sources, including wells, taps, and a canal, supply water for different needs.
- Water conservation and recycling opportunities exist.
- Some water sources are polluted, leading to health risks like dizziness, diarrhea, and malaria.

Road Infrastructure:

- Single-lane roads limit vehicle movement in both directions.
- Road construction improves connectivity and economic growth.

Education & Community:

- Only one primary school exists, requiring students to move out of town for higher education.
- Equal educational opportunities for boys and girls.
- Limited access to temple rituals due to communal divisions.

Sanitation & Waste Management:

- Public toilets are available but only for women.
- Poor waste disposal and sanitation cause health concerns.
- Potential for better waste management systems.

Energy Sources:

- Streetlights and motorized pumps provide essential services.
- Potential for solar-powered streetlights to improve energy efficiency.

Agriculture & Environment:

- Eucalyptus trees contribute to the pulp and paper industry but absorb large amounts of groundwater, causing shortages.
- Opportunities for sustainable farming practices.

Health & Safety:

- Air pollution from vehicle movement affects lung health.
- Dust from poultry farms leads to allergies.
- Poor sanitation contributes to disease outbreaks.

Livelihood & Economic Opportunities:

- Road infrastructure supports the transport of goods.
- Poultry farms provide employment but require better management.
- Potential for value-added agricultural products and eco-friendly farming.

Transect Walk-2:

Resource	Main Road	Motor room with well(LH 8)	Common well(LH 8)	Division of kalingasrayan canal	Primary School(RH 8)	Water course(Tap)(RH 8)	Temple(LH 8)	Public Toilet(RH 8)	Street light(RH 8)	Poultry farm(LH 8)	Eucalyptus		
Activities	Transportation	Transportation of water	Used by villagers for daily activities such as washing	Washing cloths, vessels and cattle activities	Educating kids	Fetching drinking water	Religious Rituals due to community divisions, otherwise people do not worship here	Maintenance and Cleaning	Maintenance and Repair	Feeding and Care of Poultry	Soil Preparation and Fertilization		
Gender Equality	Both men and women can access	Male staff only	Both men and women can access - but only the Kongu-Vellalar Community			Equal access to facilities	Only for women	Equal accessibility	Both the gender contribute equally	Equal Participation			
Education				Primary level education		Cultural Preservation	Hygiene Awareness						
Agriculture		For egg factory	Used for kitchen garden	Water supply for the nearby cultivated lands		For kitchen garden	Temple Gardens				Pulp and Paper Industry		
Climate	hot, lack of shade	Moderate temperature as the place is surrounded by trees	Moderate temperature	Cold due to constant water flow	Moderate with enough trees around	Moderate temperature	Was a bit warm as it was an open space	Moderate		Was cold as the air conditioner was installed and maintained at a constant			
Water management		Pump system and water proofing	Regular inspection and sanitization	Further divided into tributaries for better water supply	Safe drinking water	Regular inspection and sanitization		Efficient Water Use		Water Conservation	Efficient Irrigation Systems		
Health	Continuous vehicle movement causing air pollution leading to lung diseases	Polluted Water; Dizziness if the water is consumed	Health issues such as diarrhea, dengue and Malaria	Health issues such as diarrhea, dengue and Malaria						Sneezing and dust allergy			
Energy	Energy required while laying out a new tar road.	Efficient motor operation	Pumping system	Screen to project things to students	Pumping Stations		Light source	Light energy resource	Air conditioner and waste dispersal system	Diesel pumps to pump water for irrigation			
Livelihood Water and Sanitation	Road construction and transportation of goods in and out	Employment opportunity to monitor and control the system		Cattle maintenance and irrigation opportunities	Educational support	Free drinking Water	Employment Opportunities		Increased Safety for Workers	Income Generation	Job creation	Soil Quality and Erosion Control	
Problems	The road is a single lane and its not possible for vehicles to come in both the ways	Not suitable for drinking and daily usage activities as the water is poor quality	Cleaning of the well and sanitation is not proper	Health issues and sanitation problems	There was only one primary school for the village and for higher grades they need to move out of town	Leaks and Maintenance	Communal Division and restrictions on rituals	There are public toilets only for women	No sufficient number of street lights are installed	There are a lot of dust giving health issues and the feed costs alot	absorbs all the ground water leaving shortage of water		
Strengths	Improved connectivity to neighbourhood	Used by egg factory which increases livelihood	Water is stored and can be used during summers	Main source for dispersing waste water	Centralized location	Easy access for drinking water to people	Cultural Significance	Increased Accessibility	Improved Public Safety	Organic farming	Rapid Growth and multiple uses		
Opportunities	Economic growth and investment	Innovation and technology integration, possible rainwater management system	Water recycling and conservation	Water Recycling and Conservation	Increased Parent and Community Engagement	Technology Integration	Cultural Preservation Programs	Partnerships for Funding and Maintenance	Solar-Powered Street Lights	Sustainable Farming Practices	Value-Added Products and Global Demand for Essential Oils		

Seasonal Calendar:

SEASONAL CALENDAR KOMBUPALAYAM VILLAGE, KILAMPADI PANCHAYAT, ERODE- 638 154.														
English month	Apr	May	June	July	August	September	October	November	December	January	February	March	Apr	
Tamil month	CHITHIRAI	VAIGASI	AANI	AADI	AAVANI	PURATTASI	AIPASI	KARTHIGAI	MARGAZHI	THAI	MAASI		PANGUNI	
Season	AGNI NATCHATHIRAM				SOUTH - WEST MONSOON				WINTER SEASON					
Wind pattern	Strong winds @ bottom				strong winds @top								Very strong winds @bottom	
Water availability for irrigation	Kaveri water pumped using diesel motors				KALINGARAYAN CANAL (self irrigation)									
turmeric cultivation	harvest of seed turmeric		creating paar, sapling plantation, onion,maize (intercrop) seemakutchi (protection from sun)		fertilizers for intercrop	harvest of intercrop, land gets flooded, affected by nematodes, fungal disease	1st fertilizer for turmeric			semmakutchi is removed	harvest of turmeric			
banana cultivation (aipasi pattam)	budding starts		harvest of banana	pasumthazhuram is grown and is tilled using tractor		planting the sapling	pattam odhukudhai, fertilizer round 1, weeding	leaves get dried, rolled	fertilizer round 2			placing bamboo sticks for support		
pest attack in banana	Thrips (koonthal poochi)						banana aphids (ashuvini) banana weevil (vazhai puzhu) nematodes (urulai puzhu)		banana stem borer (vazhai thandu thuthai pan) banana leaves roller (vazhai llai suruttu)					
disease	chicken pox		malaria, dengue, viral fever, cough, cold, tonsilitis										chicken pox	
Work availability for agricultural labours	low	low	high	high	high	high	high	high	high	high	high	high	high	
festivals	new year celebration @ natateshwaram temple		aadi pirapu-coconut burning			diwali	kaarthigai deepam			Thai pongal, Pottusaamy thiruvizha- Kombupalayam	Kottai mariamman temple car festival @Kollanelli Sadayandi temple festival- Kombupalayam		Mariamman temple festival- Kombupalayam	

The team worked closely with experienced stakeholders to create the seasonal calendar. Through multiple discussions and iterations, details were refined. Their insights helped ensure accuracy and practical relevance. Each revision brought the team closer to documented details that were well-rounded and useful as a guide.

The seasonal calendar of Kombupalayam village, Kilampadi Panchayat, provides a comprehensive overview of agricultural cycles, water availability, disease patterns, labor demands, and cultural activities. The village experiences distinct Tamil seasons—Chithirai, Vaikasi, Aani, Aadi, Avani, Purattasi, Aippasi, Karthigai, Margazhi, Thai, Maasi, and Panguni—each influencing various aspects of rural life.

Agricultural Cycles and Water Availability:

Water availability for irrigation varies significantly, with peak levels during the monsoon months and scarcity in summer. The southwest monsoon (Avani to Purattasi) and winter season (Margazhi to Panguni) play a crucial role in sustaining agriculture, supported by Kaveri River water pumped using diesel motors and the Kalingarayan Canal system.

In Aipasi month (October–November), banana cultivation begins with planting of saplings and pattam odhukkudal, followed by the first round of fertilizer application and weeding to promote healthy growth. By Karthigai (November–December), the banana leaves start drying and rolling, requiring the second round of fertilizer application. Around Margazhi (December–January), pests begin to appear, approximately three months after plantation. Common pests include banana aphids, banana weevils (vazhai puzhu), and nematodes (urulai puzhu), which affect the roots and stems. As the crop reaches Thai (January–February) and Maasi (February–March), more pests, like banana stem borers (vazhai thandu thuzhaippam) and banana leaf rollers (vazhai ilai suruttu), attack the plants. Proper pest management through biological or chemical treatments ensures good growth. The banana harvest follows in subsequent months, depending on the variety and care taken.

In Aani month (June–July), turmeric cultivation begins with the plantation of saplings, often accompanied by intercrops like onion and maize to optimize land use. During Aadi (July–August), fertilizers are applied to promote healthy growth. To protect the turmeric plants from excessive sunlight, seemaikutchi is also planted along with turmeric. By Purattasi (September–October), the intercrops are harvested, but the field may face flooding and attacks from nematodes and fungal diseases, requiring proper disease management. In Aipasi (October–November), the first round of fertilizer application is done to strengthen root development. By Thai (January–February), the seemaikutchi is removed as the plants can now tolerate sunlight. Finally, in Maasi (February–March), the turmeric is ready for harvest. Seed turmeric is harvested during Chitirai.

Disease Patterns and Labor Demand:

Health challenges among the village residents fluctuate with seasonal variations. Chickenpox is prevalent in Chithirai and Maasi, while malaria, dengue, viral fever, cough, cold, and tonsillitis peak from Aadi to Aipasi due to stagnant water and temperature fluctuations.

Labor demand is highest during critical agricultural phases such as planting, transplantation, and harvesting. The seasonal calendar serves as a valuable tool for resource planning, disease prevention, and economic stability, ensuring sustainable livelihoods for the community.

Cultural Significance and Festivals:

Traditional festivals remain integral to the villagers' cultural identity, often aligning with agricultural cycles. Major celebrations include New Year at Natatreeswarar Temple in Chithirai, Aadi Pirappu and Mulaipari in Aadi, Deepavali in Aipasi, and Karthigai Deepam in Karthigai. Thai Pongal, Pottusaamy Thiruvizha in Kombupalayam, and the Kottai Mariamman temple car festival in Kollanelli mark key events in Thai. Mariamman temple festivals and the Sadayandi temple festival in Panguni further reinforce the villagers' commitment to cultural preservation.

Among these, the Mulaipari festival holds special significance as a testament to the community's values of sharing and preservation. Celebrated during Village Goddess festivals in Tamil Nadu, Mulaipari is a sacred women's ritual symbolizing growth, fertility, and prosperity. Women germinate seeds in pots, praying for rain, a good harvest, and peace. On the third day, seedlings are taken to the temple, adorned, and worshipped. The festival culminates on the ninth day with a grand procession, where the sprouted seeds are immersed in a water body.

Historically, Mulaipari may have originated as a method to ensure the quality of seeds for future cultivation. It is also believed to honor the goddess's 21 daughters, represented by the 21 types of germinated seeds.

By integrating agricultural practices, water management, labor dynamics, disease prevention, and cultural heritage, the seasonal calendar of Kombupalayam provides a strategic framework for sustainable rural development.

Inflow and Outflow:

The inflows and outflows of Erode Kombupalayam village were explored by interacting with the local community.

Key Findings:

The village depends on a steady inflow of resources to sustain daily life and agriculture. Farm laborers play a crucial role in cultivation, while essentials like vegetables, dairy products, drinking water, and health services support the well-being of residents. Education also brings young children into the village's schools, while fertilizers, herbicides, and canal water ensure productive farming. Waste management systems help maintain cleanliness, contributing to a healthier environment.

At the same time, the village sees a significant outflow of goods and people. Agricultural products such as banana, turmeric, sugarcane, and Casuarina are sent to external markets, along with handmade goods like thatched roof sheets and broomsticks. Many young people leave the village for higher education and job opportunities in cities, leading to a loss of human capital. Additionally, drainage systems carry waste and runoff away. Together, these inflows and outflows reflect the village's connection to the broader economy and shape its development over time.

INFLOW	OUTFLOW
Farm labourers	Farm products-banana ,turmeric ,sugarcane ,casuarina
Vegetable, dairy products	Thatched roof sheets ,broomsticks
Municipal drinking water	Secondary school students
Health services	Youngsters migrating to different cities
Primary school students	Kombu- the drain
Scavenging and waste management	
Ration food	
Fertilizers ,Herbicides ,Pesticides	
Kalingarayan canal water	
Farm equipments	
Regular medical checkup	
Raw materials for agriculture	

Venn Diagram:

Methodology:

We began by conducting interviews with key stakeholders who are mostly farmers. These discussions helped us gather detailed information about their roles, responsibilities, and interactions within the village. We also sought insights into how different groups collaborate, share resources, and influence one another.

After collecting the data, we carefully analyzed it to identify commonalities and overlapping areas of operation. We looked at how different sectors—such as agriculture, education, healthcare, and trade—intersect and support one another. This process helped us map out the relationships and dependencies among stakeholders, revealing the intricate network that sustains village life.

Using these insights, we created a Venn Diagram to visually represent these connections. The diagram illustrated how different entities contribute to the village's overall functioning, highlighting shared responsibilities and points of collaboration.

Key Learnings:

The Venn diagram provides a detailed representation of the various stakeholders, institutions, and resources that influence the Erode Kombupalayam village. The largest circle represents the village boundary, encompassing elements that directly impact the community. The size of each circle reflects the extent of its influence. Larger circles indicate factors that were frequently mentioned by the villagers, while smaller circles represent those with lesser influence.

At the center of the village's economic structure is farming, with significant cultivation of bananas, turmeric, eucalyptus, and coconut trees. These crops are a major source of livelihood, heavily relying on water sources such as the Kalingarayan Canal, Cauvery River, Kombu Canal, wells, and the village water tank, all of which play a crucial role in irrigation. The presence of cattle farms and a poultry farm further supports the agricultural economy, providing dairy and meat products.

The village is home to several influential industrialists, including Mr. Velumani, Mr. Saravanan, Mr. Senthil, and Mr. K.K. Ramesh, whose contributions significantly impact local employment and economic growth. Prof. Subramanian and Mr. Gopalakrishnan also played a crucial role in the village's development.

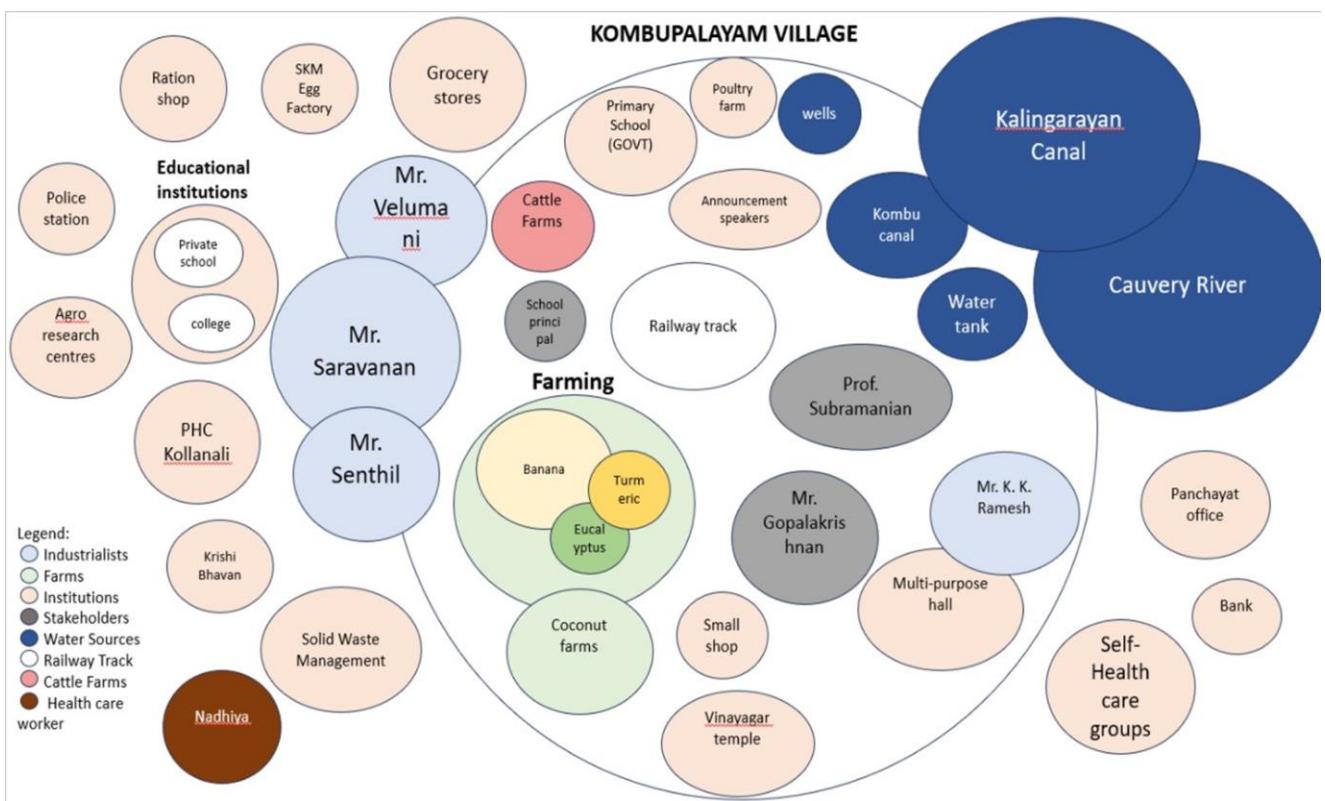
Essential institutions that serve the community include educational facilities, such as the government primary school, a private school, and a college. The school principal is a stakeholder in the education system, though their influence is relatively small, as seen in the diagram. The PHC Kollanali is one of the most recognized institutions, with a large circle indicating its strong presence outside the community, as many villagers rely on it for healthcare. The police station, on the other hand, has a smaller influence, suggesting that law enforcement is not a major part of daily discussions in the village. Nadhiya, a healthcare worker, also plays a role in providing medical support, though her individual influence is smaller compared to the PHC.

From a governance perspective, the Panchayat office has a significant role in decision-making, while self-help groups contribute to community welfare and financial independence. Other essential facilities include a ration shop, grocery stores, a small shop, and the SKM egg factory, which provide food and daily necessities. The Krishi Bhavan and agro research centers contribute to agricultural advancements, offering guidance and resources to farmers. Additionally, a solid waste management system ensures environmental cleanliness.

Social and religious influences are also present in the form of the Vinayagar temple and a multi-purpose hall, both of which serve as gathering places for community events. The announcement speakers installed in the village help disseminate important information to the residents.

The railway track runs through the village, providing transportation and connectivity, though its overall influence remains moderate.

The Venn diagram effectively illustrates the intricate relationships between these stakeholders and institutions, highlighting their varying degrees of influence on the village's development. Farming and water sources emerge as the most dominant elements, while healthcare, governance, and industrialists also play crucial roles. Smaller institutions and facilities contribute to daily life but have a more limited impact. By visualizing these connections, the diagram provides valuable insights into how Erode Kombupalayam village functions as a self-sustaining rural community.



Income and Expenditure:

To understand the financial dynamics of households in Kombupalayam village, we conducted interviews with families across different income groups. We gathered detailed insights into their sources of earnings, annual expenditures, and the challenges they face in maintaining financial stability.

Key Findings:

During the peak agricultural season from August to October, farming—especially banana cultivation—serves as the primary income source for most families. Each bundle (tar) of bananas, containing approximately 200 bananas, is sold at an average rate of ₹600, with each banana priced at ₹3. However, income drops significantly during the off-season, particularly in the rainy and winter months, when each tar sells for only ₹150-250, bringing down the price per banana to ₹1. This seasonal variation directly impacts household earnings, requiring many families to seek alternative sources of income.

Beyond farming, villagers engage in cattle rearing, poultry farming, agricultural labor, and small businesses to supplement their income. Household earnings range from ₹66,000 per year for elderly agricultural laborers to ₹6.6 lakhs for well-established farmers. Meanwhile, annual

expenses vary between ₹1.1 to ₹6.7 lakhs, covering essentials such as food, healthcare, farming investments, and education.

Water availability plays a crucial role in determining farming success, with irrigation relying on multiple sources, including the Kalingarayan Canal, Cauvery River, Kombu Canal, wells, and water tanks. In years of water scarcity, lower crop yields force families to depend more on secondary occupations.

Farming-related expenses are significant, with initial investment costs reaching around ₹1.6 lakhs per acre. Sapling and planting costs stand at ₹17 and ₹5 per plant, respectively, with an average of 900 saplings required per acre. Fertilizers like DAP, Potash, Urea, and Sulphate add to expenses, along with structural maintenance costs for bamboo sticks and tying materials. Harvesting costs vary depending on contractual arrangements, while transportation expenses can reach ₹25 per plant. On average, first-year farming expenditures amount to ₹1.5 lakhs per acre, but these costs decrease in subsequent years.

Despite the challenges, farming households manage to generate annual profits between ₹1.1 and ₹1.25 lakhs, depending on market conditions and land ownership. For families engaged in multiple occupations, additional income from cattle farming, labor, and small businesses helps them balance their financial needs. The insights from our household interviews highlight the diverse economic landscape of Kombupalayam village, where people continuously adapt their income strategies to sustain their livelihoods.

House	People	Income(per year in rupees)	Source/Job	Expenditure(per year in rupees)
H1	2	8 lakhs	Farming	6.53 lakhs
H2	2	4.68 lakhs	Farming,Cattle	2.1 lakhs
H3	2	10.095 lakhs	Farming(karumandamplayam), Cattle and birds	7.88 lakhs
H4	2	6.6 lakhs	Agriculture farming	5.1 lakhs
H5	2	2.7 lakhs	Agriculture farming	1.1 lakhs
H6(DKV)	2(old people)	0.66 lakhs	Broom stick , Agricultural labour	0.32 lakhs
H7	3	2 lakhs	Agriculture labour, designing/decorations	1.7 lakhs
H8	3(2 earning)	2 lakhs	Agricultural labour, A/C service	1.6 lakhs
H9	3	1.6 lakhs	Plumber	1.46 lakhs(more medical expenses)
H10	2	2.13 lakhs	Retired income tax dept, cattle,farming	1.24 lakhs

The income and expenditure of House(H1-4 acres of banana plantation):

Expenditure: Per acre of banana plantation 1.4-1.6 lakhs => around 6 lakhs for 4 acres

Groceries => around 3k per month = 36k per year

Other expenses => 5k per year, Medical expenses => 10k per year

Total Expenditure: 6.5 lakhs

Income: 2 lakhs per acre on an average => 8 lakhs for 4 acres

Total Income: 8 lakhs

The same format follows for the other houses also.

Brainstorming:

Methodology: Structured Brainstorming Process

Our approach to brainstorming was structured yet inclusive, focusing on gathering direct insights from the villagers. To ensure meaningful participation, we collaborated with the village coordinator to determine a suitable time for a community meeting. This session was scheduled on the fourth day of our visit, allowing us sufficient time to observe and familiarize ourselves with the village's environment and socio-economic conditions.

The primary goal of the brainstorming session was to collaboratively address key questions and validate our research findings. To ensure clarity, we outlined the purpose of the session in advance and confirmed the accuracy of resource map sketches with the villagers. During the discussion, we presented our observations and initial problem identifications, fostering transparency and encouraging open dialogue.

Creating a conducive environment for discussion was a key aspect of our methodology. We invited a representative group of villagers and provided refreshments to promote active participation. The response from the villagers was enthusiastic, with many actively engaging in the conversation. This session facilitated a collaborative approach to problem-solving, allowing villagers to share their perspectives on the challenges and opportunities within the village.

Through interactive discussions, we sought validation of our findings, ensuring alignment with the lived experiences of the villagers. This participatory process enabled us to gather detailed responses to critical questions:

Transcript:

1) Number of families and Population of the village?

Ans: Families: 45

Population: 80

2) Primary occupation of the village.?

Ans: The primary occupation of the village is agriculture. It has a variety of crops dominated by banana.

3) Change in agricultural practices, patterns, methods etc. over the course of time:

Ans: This village was once a paddy cultivating community and the village thrived on it for a long period supported by abundant water supply from river, canal and rain fall. But due to the lack of profitability and rising labour costs. They slowly shifted towards cash crops like banana, eucalyptus and casuarina.

4) Key sources of water

Ans: Kalingayarayan canal, Cauvery, borewell and public taps.

5) Did you notice any signs of contamination in water?

Ans: Water's colour and taste has changed and visible particles were seen floating.

6) Water quality and its potential degradation?

Ans: Water quality has degraded significantly to the point of avoiding physical contact. Precautionary measures should be taken before and after using water.

7) Common diseases in the village, prevalence of water related diseases.

Ans: Skin diseases, rashes, dysentery, dizziness, cancer

8) How does using the potentially polluted river affects the user.

Ans: It causes skin irritation, burning sensation in eyes and drinking the water causes stomach pain and dysentery.

9) Safeguards taken before and after using the contaminated water.

Ans: Avoiding physical contact and using safety covering to protect. Taking shower after coming into physical contact. Using water filtering and boiling water before drinking. Using tap water for cooking and drinking purposes.

10) How does the degraded river affect the ground-water and borewell water quality.

Ans: Slowly due to seeping through underground, groundwater and borewell water quality has started degrading.

Part II -Human Centered Design:

Interviews:

Our Human-Centered Design (HCD) interviews in Kombupalayam village were conducted over three days and aimed to gather insights from households, farmers, laborers, and land owners. The interviews covered various aspects of household demographics, including income, expenses, educational levels, livestock ownership, and sources of income.



Household interviews were conducted based on the following question template:

1. Name:
2. Age:
3. Number of people in the family:
4. Male:
5. Female:
6. Main source of income:

Waste Management and Water Quality:

1. How is waste managed in the farmlands? Is it burned, disposed of, or treated in any manner?
2. Is any agricultural waste being dumped into water sources?
3. How is household waste managed in the village? Are there any formal waste disposal systems in place?
4. What is the quality of drinking water available in the village?
5. What is the primary source of drinking water? When was it installed? Was there any monthly payment required for its installation? Who installed it?
6. Has there been any noticeable change in the color of the water? If so, when was it first observed?
7. Do households purify drinking water before consumption? If so, what methods are used for purification?
8. Do residents drink groundwater after any in-home treatment?
9. What are the sources of drinking water for households located in the interior parts of the village?
10. Is the water stored in overhead tanks treated before use, or is it stored as it is?
11. What is the primary source of water for bathing, household activities, and other domestic uses? How is wastewater discharged?
12. Who is responsible for maintaining and cleaning the Kaveri water used for drinking?
13. Other than tap connections, are there any additional pipelines extending from the water tanks to other parts of the village?
14. Have groundwater usage patterns contributed to a decline in groundwater levels?
15. Are there any government schemes in place related to water management and treatment?

Agriculture:

1. Do you own land? If so, how many acres?
2. What type of works do you do? How long have you been doing? What are the labour charges
3. How often do you work(per week)? How does it vary from season to season?

4. Do you work only in this village or outside?(electrician, plumbing etc)
5. What is your estimated monthly income?
6. If you are using fertilizers/herbicides how do you dissolve it?
7. After covid did you leave your land uncultivated? If so why? (either labour shortage, migration, or disinterest in job)
8. Do you burn waste? If so, how frequently?
9. If agriculture is not livelihood where do you work? (income)

Education:

1. Where did your children study (school)?
2. Where did your children attend college?
3. What is your highest level of education?

Health:

1. Do you have any health-related issues (e.g., diabetes, heart disease, asthma)?
2. How do you obtain medical care for your health-related issues?
3. How is waste management affecting your health?

Miscellaneous:

1. What festivals are celebrated inside temples?
2. Is household waste being segregated into degradable and non-biodegradable categories?

Focused Group Discussion :

The focused group discussions were conducted in the village. A structured discussion guide was developed to facilitate the exploration of key topics including water pollution, health issues, and possible solutions.

Here are the few questions that were asked in the focused group.

1. How is waste managed in the farmlands? Is it burned, disposed of, or treated in any manner?

Ans: Either burn the waste or decompose the waste in the same farmlands.

2. How is household waste managed in the village? Are there any formal waste disposal systems in place?

Ans: The municipal people collect the waste every 2 days.

3. What is the quality of drinking water available in the village?

Ans: some houses have filter, some dont. But overall quality is poor.

4. Do households purify drinking water? If so, what methods are used for purification?

Ans: yes, usage of RO filters

5. What is the profit that you gained from a banana plantation?

Ans: Profit ranges from 40,000 to 50,000 in seasons where there are no natural disasters.

6. Why did youngsters migrate to other cities?

Ans: In search of better life and better opportunities

7. Is your income only from agriculture? Is it sufficient?

Ans: It is not only from agriculture some have cattle also and the income is hardly sufficient for few

Agricultural Practices and Economic Aspects:

1. What type of agricultural methods are predominantly followed in the village?

Ans: The village primarily follows traditional farming methods, with a mix of organic and modern agricultural practices

2. How has the agricultural landscape changed over the past ten years?

Ans: Over the past decade, the agricultural landscape has seen a shift from staple crops like rice and wheat to commercial crops such as banana, coconut, and vegetables.

3. What were the reasons behind shifting from rice plantation to banana plantation?

Ans: Banana farming offers better financial returns compared to rice.

4. What is the comparative profit gained from banana plantation versus rice cultivation?

Ans: Farmers report that banana cultivation yields significantly higher profits compared to rice farming.

Socio-Economic Challenges :

1. Why are many youngsters migrating to other cities? What are the primary reasons for migration?

Ans: Limited job options in the village

2. Is agriculture the only source of income for the community? If not, what other occupations contribute to livelihood?

Ans: No, agriculture is not the only source of income for the community. Others include daily wage labor, and cattle rearing.

3. Is the income from agriculture sufficient to meet household needs and expenses?

Ans: In most cases, the income from agriculture alone is not sufficient to cover all household expenses.

Key Learnings from the Discussion:

Waste Management and Water Quality:

- Farmland waste is mostly disposed of traditionally, with some farmers opting to burn it, potentially contributing to air pollution.
- Household waste disposal lacks a systematic approach, leading to concerns about sanitation.
- Drinking water quality remains a significant issue, with reports of contamination.
- Some households purify water through boiling or using basic filtration methods, but not all families have access to proper purification techniques.

Agricultural Practices and Economic Aspects:

- The village has experienced a shift in agricultural practices over the last decade.
- Farmers transitioned from rice to banana plantations due to better profitability and lower water requirements.
- Banana plantations offer higher returns, making them a more viable economic choice in comparison to rice farming.

Socio-Economic Challenges:

- Many youngsters migrate to cities due to limited employment opportunities in agriculture and aspirations for better income.
- Agriculture remains the primary source of income, but diversification into other occupations, such as small businesses and labor work, is emerging.
- The income from agriculture alone is insufficient for many families, prompting them to explore alternative livelihood opportunities.

Conclusion:

The focused group discussion provided valuable insights into the challenges and adaptations within the village. The findings highlight the need for improved waste management strategies, better water

purification facilities, and sustainable agricultural practices. Additionally, addressing the migration trend requires creating more local employment opportunities. Future interventions should focus on infrastructure development, agricultural support, and economic diversification to enhance the overall well-being of the community.

Persona and Scenario:

Rajasekar, a 50-year-old farmer in Kombupalayam, Tamil Nadu, is facing significant challenges due to the issue of water pollution in his community. As described in his persona, Rajasekar struggles with various health problems, including the lingering effects of cancer treatment, which he believes are caused by the polluted water he and his family rely on. Despite these hardships, Rajasekar remains quietly determined and hopeful, wishing for a healthier and more secure future for his family.

In the scenario, we see Rajasekar navigating the daily realities of living with water pollution. While his health has been slowly improving after cancer treatment, he still experiences skin issues and lacks the full strength he once had. Rajasekar and his wife take precautions, such as boiling the water before use, to avoid further health problems. As he plans for the upcoming farming season, Rajasekar is hopeful for better yields, but knows he must contend with the mild challenges posed by the water quality. Throughout the day, Rajasekar observes the impacts of water pollution on his community, from the slight odor in the water drawn from the borewell to the slower plant growth in certain areas of his fields. Despite these difficulties, Rajasekar remains optimistic that through unity and determination, the community can work together to address the water pollution and secure a brighter future for Kombupalayam.

Persona 1:



Scenario 1:

Morning Dedication

Ramasamy starts his day before sunrise, preparing for a long day in the fields. His farm is alive with paddy and banana crops, but maintaining them has become increasingly challenging. As he inspects the crops, he notices a patch of bananas affected by pests. He mentally calculates the cost of the herbicides he'll need, it also worries him as it causes occasional dizziness.

Ramasamy's wife brings him breakfast, and they discuss the rising cost of labor. With fewer young people staying in the village, hiring skilled workers has become expensive. This forces Ramasamy to take on more tasks himself, even those that take a toll on his health.

Day in the Fields

By mid-morning, Ramasamy is manually spraying herbicides across the fields. Despite wearing a basic mask and gloves, he feels the familiar itch on his hands and lightheadedness. He knows these are effects of prolonged exposure but continues his work, determined to protect his crops.

His neighbor stops by to discuss a new power sprayer that could reduce health risks and save time. While Ramasamy is interested, the high upfront cost makes him hesitant. He wonders if the local agricultural cooperative could help him access such tools at a subsidized rate.

During lunch, Ramasamy reviews his financial situation. With his current income from agriculture, he manages to provide for his family but struggles with the increasing costs of pesticides, labor, and farm maintenance. His dream of transitioning to more sustainable farming practices feels distant but not impossible.

In the afternoon, he visits a nearby cattle shed. Though cattle farming is a secondary interest, Ramasamy sees potential in integrating it with his agricultural activities. Organic manure from the cattle could reduce his dependence on chemical fertilizers, improving both soil health and long-term costs.

As the sun sets, Ramasamy joins a small group of farmers under the banyan tree. They discuss the labor shortage, rising costs, and environmental concerns. Ramasamy shares his thoughts on adopting sustainable practices, such as crop rotation and organic farming. While some agree, others feel hesitant about changing traditional methods.

Encouraged by the conversation, Ramasamy decides to explore a training session on modern farming techniques offered by the local agricultural office. He believes these small steps could lead to significant improvements in his farm's efficiency and sustainability.

Before bed, Ramasamy reviews his plans for the next planting season. He calculates the costs and benefits of reducing pesticide use and investing in organic alternatives. Though the challenges are many, his resourceful and hardworking nature drives him to keep exploring new ways to adapt.

His ultimate goal remains clear: to provide his family with a quality life while preserving the land for future generations.

Persona 2:

Hello! I am
Rajasekar ♥
The Water's Victim
"The water we drink is our life and our struggle"

Demographics

Age : 50 Gender: M Religion: Hindu Marital Status: Married
Occupation: Farmer Secondary: None Location: Kombupalayam
Level of Education: 8th Home Ownership: Own
Hobbies: Family time & interacting with neighbors

Psychographics

Personality: Quietly determined, reflective, and hopeful.
Values: Prioritizes family's health and security.
Lifestyle: Struggles with farming due to poor health, frequent clinic visits, and relies on community support.

Pain points

- Suffering from skin diseases and post-cancer effects due to polluted water.
- Limited access to clean water and medical care.
- Declining income from lower yields and reduced work capacity.
- Fear for family's long-term health.

Technographics

Skills: Basic farming knowledge, deep awareness of local water issues.
Interests: Advocating for clean water and affordable healthcare.

Skill Expertise

- First-hand experience with water pollution effects.
- Community advocate for awareness and action.
- Resilient provider despite health and financial struggles.

Scenario 2:

Morning Routine

Rajasekar wakes up early, as usual, to tend to his small farm. His health has been improving slowly after his cancer treatment, though he still experiences skin issues. While he is not as strong as he once was, he remains optimistic about making the best of his situation. His wife draws water from the borewell, which, though drinkable, has a slight odor. They use the water after boiling, a habit the family has adopted to avoid health issues.

Over breakfast, Rajasekar and his wife discuss the upcoming farming season. Last year's yields were moderate, and they are hopeful for better results this time. He plans to try crop rotation to improve soil health, despite mild challenges from water quality.

A Day in the Fields

Rajasekar spends the morning in the fields, pacing himself carefully to avoid overexertion. His neighbors pass by, sharing updates about the village's Jal Jeevan Mission supply. Some mention how chlorinated water has reduced common illnesses, but Rajasekar knows that more consistent maintenance of the supply is needed.

The irrigation water he uses is adequate for now, though he notices that certain areas of the field show slower plant growth. He makes a mental note to seek advice from the local agricultural officer about improving soil health further.

Night Reflection

As the day ends, Rajasekar sits with his wife, watching their children play in the courtyard. He feels content knowing his family is safe and healthy for now. While challenges remain—such as ensuring the water remains safe and boosting farm productivity—he is optimistic that their collective efforts will make a difference.

Rajasekar believes the mild struggles faced by the community can be managed with unity and determination. He feels a growing sense of responsibility to help drive these changes, knowing that small steps today can lead to a brighter future for Kombupalayam.

Part III - Synthesis

Problem Tree:

Based on an extensive PRA that included tools such as Resource Map, AEIOU, Transect Walks, Seasonal Calendar and Inflow/Outflow, followed by HCD-based interviews, focused group discussions and informal/semi-formal interactions with the village stakeholders, specific pain points for the villagers were identified. A detailed cause-effect analysis was carried out for each of the pain points. These analyses are captured in the problem tree presented in Figure . The problem tree provides a comprehensive overview of the interconnected issues plaguing the village community. At the root of the problem is the widespread water pollution, which stems from several key factors. Improper drinking water treatment, excessive usage of agro-chemicals, discharge of factory effluents, and lack of proper agro-waste management have all contributed to the deterioration of water quality in the region. These fundamental issues have then led to intermediate problems, such as poor soil fertility and the prevalence of Hethima allergy among the population.

Causal Factors for Water Pollution:

	High	Low
Direct	Poor drinking water treatment Untreated factory effluent	
Indirect	Use of agrochemicals	Agro waste management

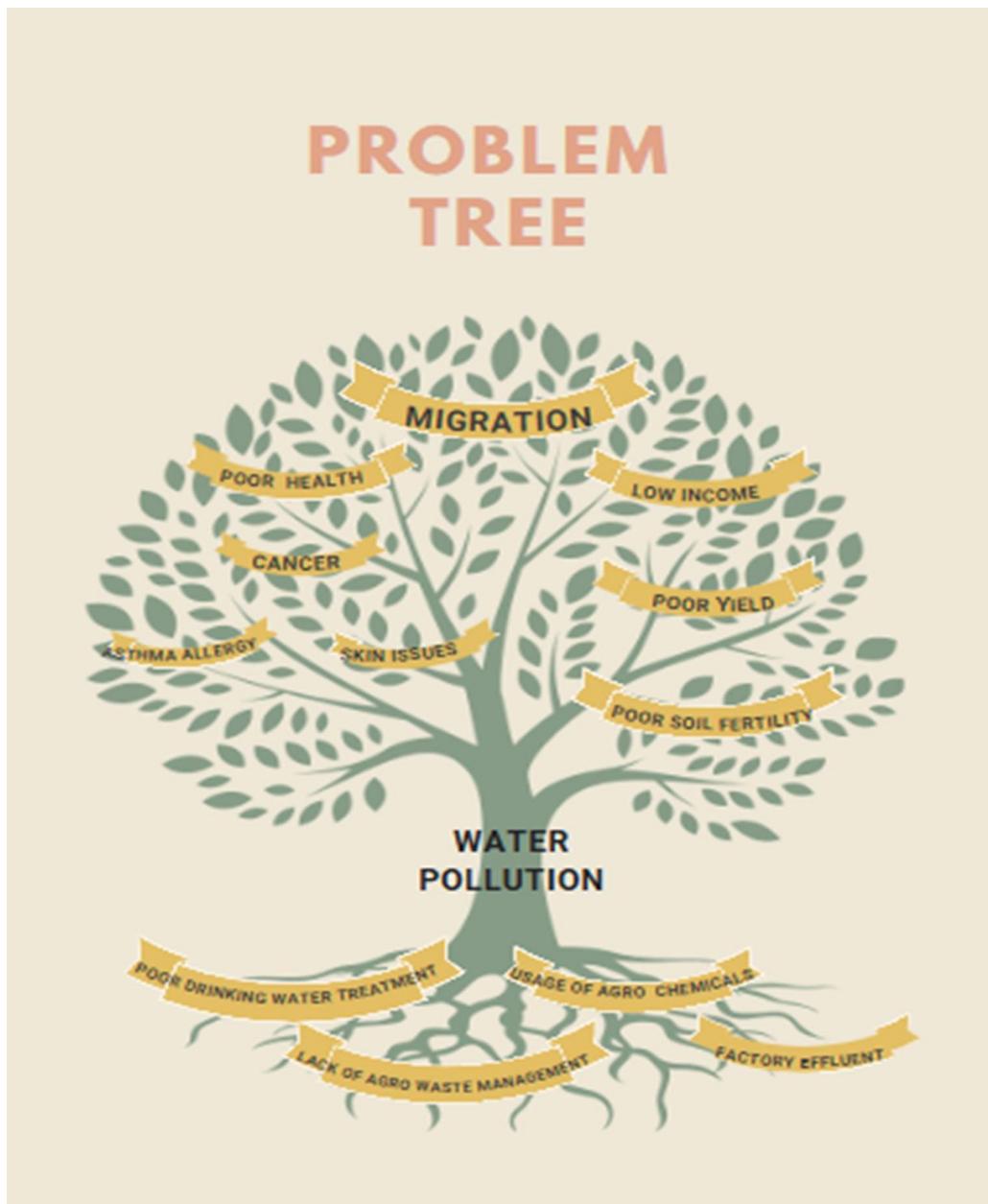
Water pollution occurs due to various human activities that introduce contaminants into water bodies. The classification in the image helps us understand the sources based on their directness and severity.

1. Direct Causes:

- **High Impact:**
 - **Poor drinking water treatment:** Inadequate purification processes lead to contaminants such as bacteria, heavy metals, and industrial chemicals persisting in drinking water.
 - **Untreated factory effluent:** Industrial waste discharged into rivers and lakes contains hazardous chemicals, heavy metals, and pollutants, leading to severe water quality degradation.
- **Low Impact:**
 - No specific mention in the image, but generally, small-scale untreated domestic waste or minor industrial discharge with some treatment can be considered.

2. Indirect Causes:

- **High Impact:**
 - **Use of agrochemicals:** Fertilizers, pesticides, and herbicides used in agriculture run off into water bodies, causing eutrophication and contaminating drinking water.
- **Low Impact:**
 - **Agro waste management:** Proper management of agricultural waste, such as composting and controlled disposal, reduces pollution risks, making it a lesser concern.



The effects of these underlying problems are far-reaching and severe. The poor water quality and soil conditions have directly impacted agricultural productivity, resulting in low crop yields for local farmers. This, in turn, has driven many to migrate in search of better economic opportunities, further exacerbating the community's challenges. Additionally, the polluted environment has taken a toll on public health, with the image highlighting the incidence of cancer and other ailments. Addressing these complex, interlinked issues will require a multifaceted approach targeting the root causes of water pollution and their cascading impacts on the local ecosystem and livelihoods.



Fig-1 Focused group discussion



Fig-2 : Focused group discussion 2 with the villagers



Fig-3 : Goddess Mariyamma



Fig-4: Banana stem used for cooking

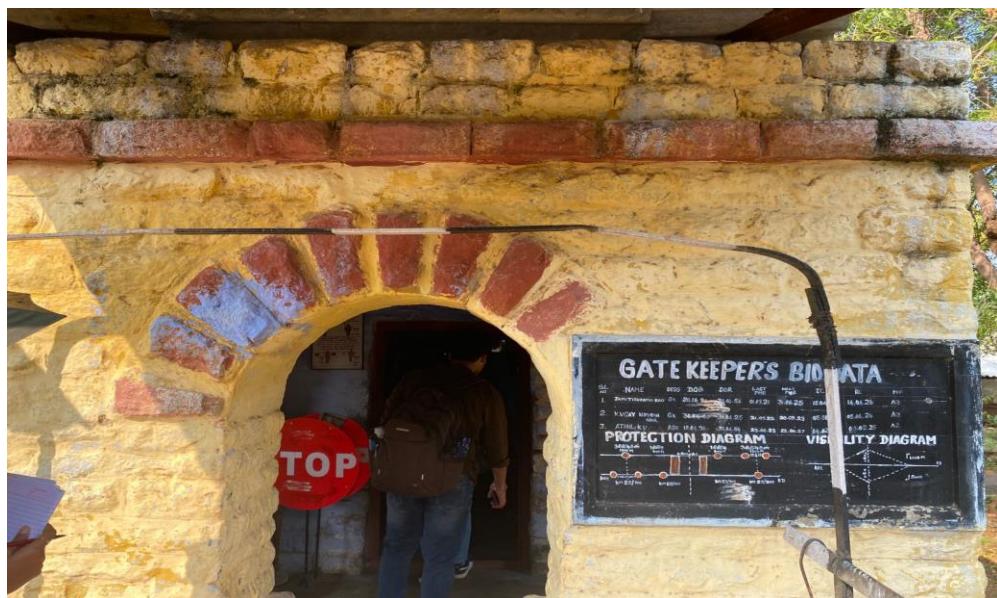


Fig-5: Railway monitoring system of Kombupalayam



Fig-6: Plantations of Kombupalayam



Fig-7: Banana Plantations



Fig - 8: Well used for water storage purposes



Fig-9: Interaction at the Village Coordinators house



Fig-10: Interview with the municipality workers



Fig-11: Focused Group discussion at the vinayagar temple



Fig-11: Women knitting baskets



Fig-12: Fertilizers used by the farmers in the farmland



Fig-13: Kaveri River (Major source of water for Kombupalayam Village)