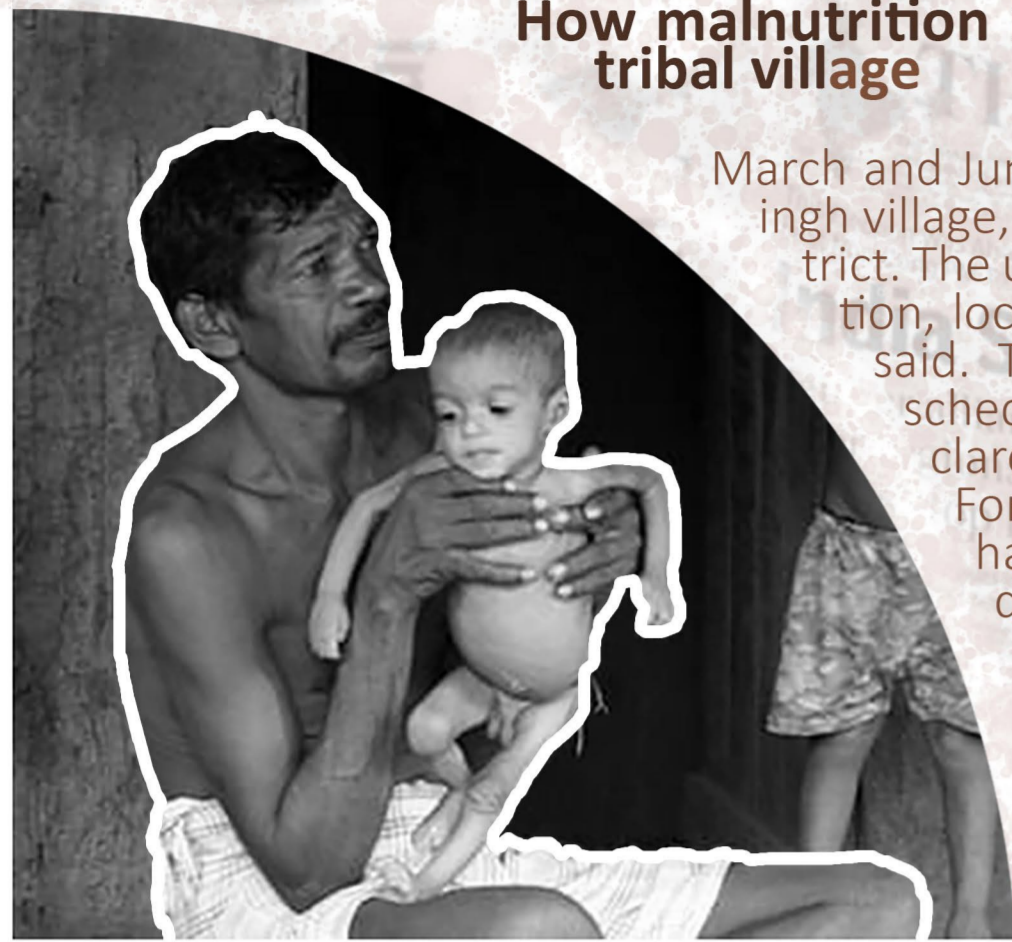




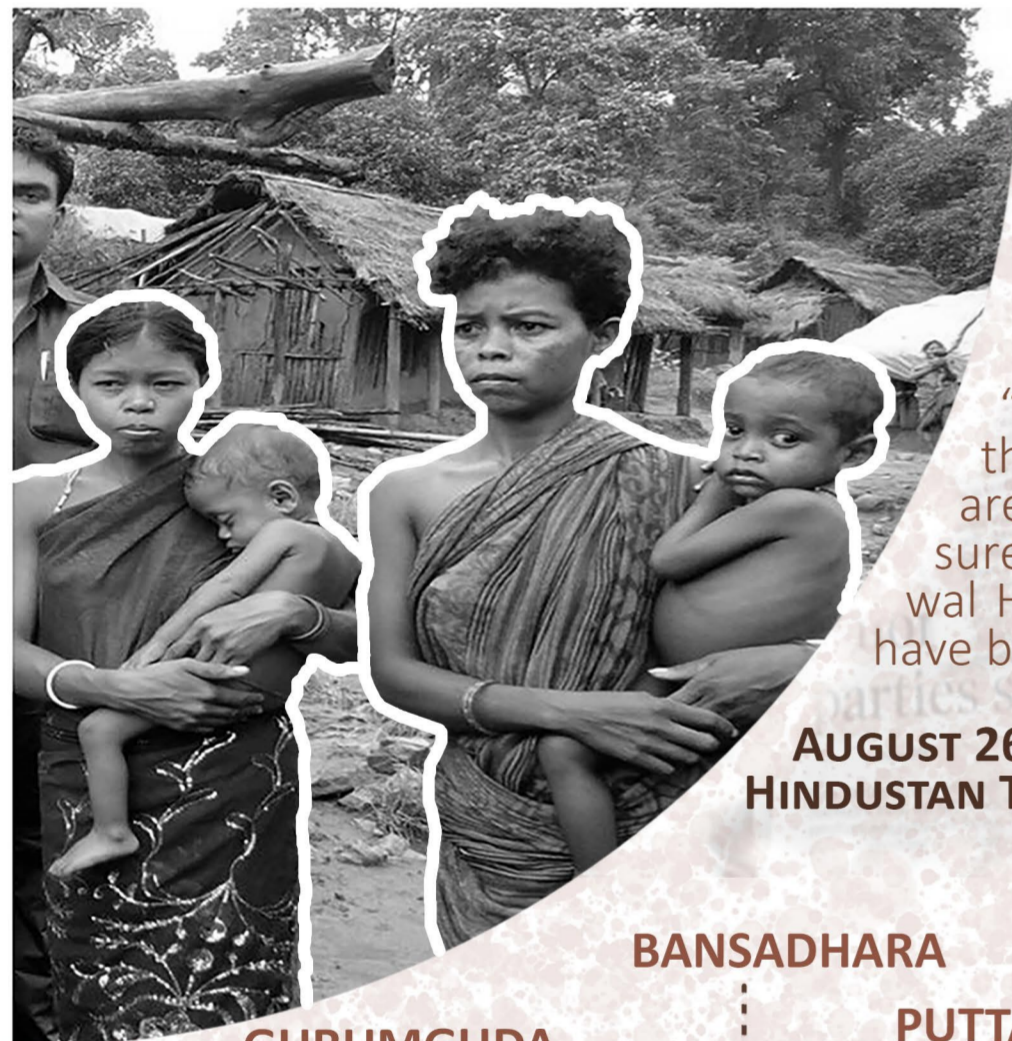
## How malnutrition is killing kids of a mineral-rich Odisha tribal village



March and June this year, at least 12 children died in Puttas-ingh village, located in the forests of Odisha's Rayagada district. The underlying reason for their deaths was malnutri-tion, local medical authorities and community workers said. The village population is solely of the Saura scheduled tribe, one of India's ancient tribes, de-clared 'particularly vulnerable' by the government. For the past two months, a chicken pox epidemic has been raging in the village, with at least 35 kids displaying the typical blister-like rashes.

JULY 9TH 2016  
THE TIMES OF INDIA

## Covid 19 triggered in remote tribe

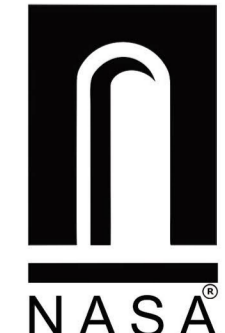
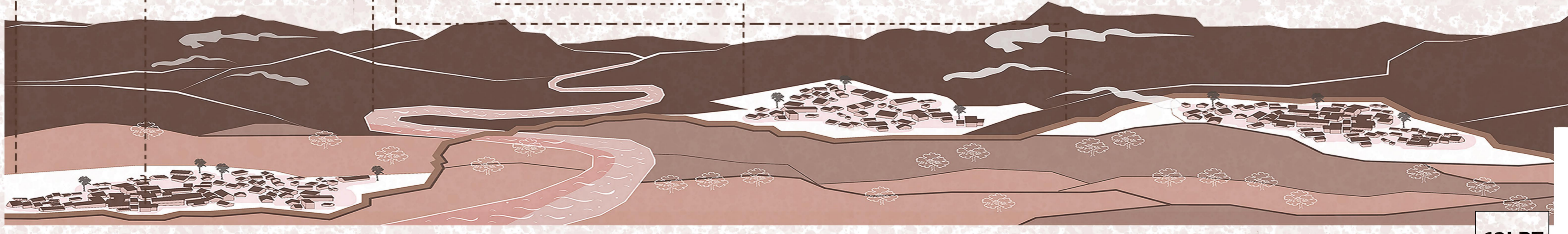
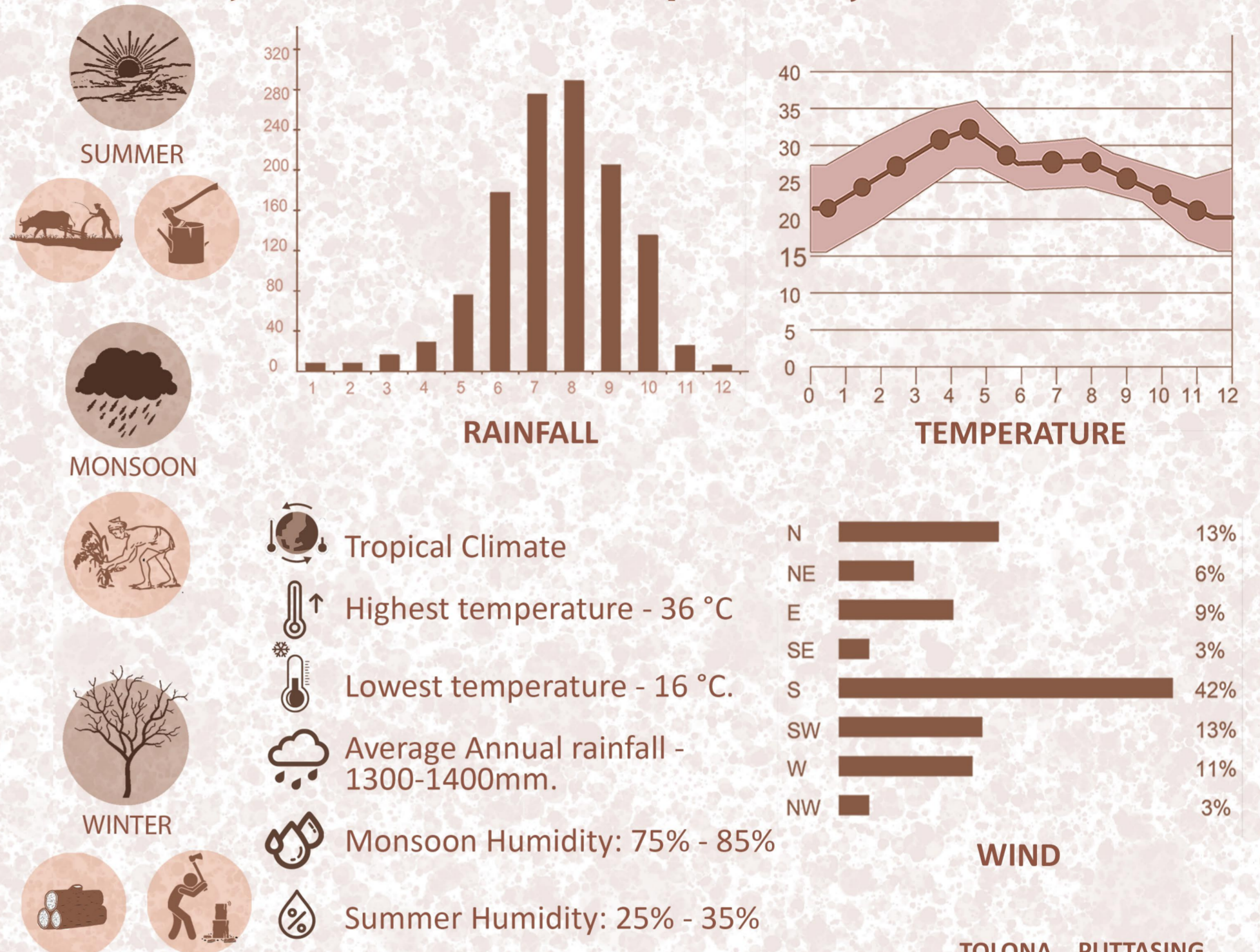


After remaining untouched for long, primitive tribal groups of Odisha in remote habitations have reported half a dozen Covid-19 cases re-cently, triggering concerns over the infection spreading to other such tribals in the state. Eleven Saura tribals in Sogada and Tolana vil-lages have tested positive for the virus over the last couple of days, officials said. Saura is a particularly vulnerable tribal group (PVTG). "The infection was reported a few days back and the infected person is doing well. His conditions are stable. We have taken all precautionary mea-sures," said Raygada district collector Manish Agar-wal. He also said that movements to Saura hamlets have been restricted.

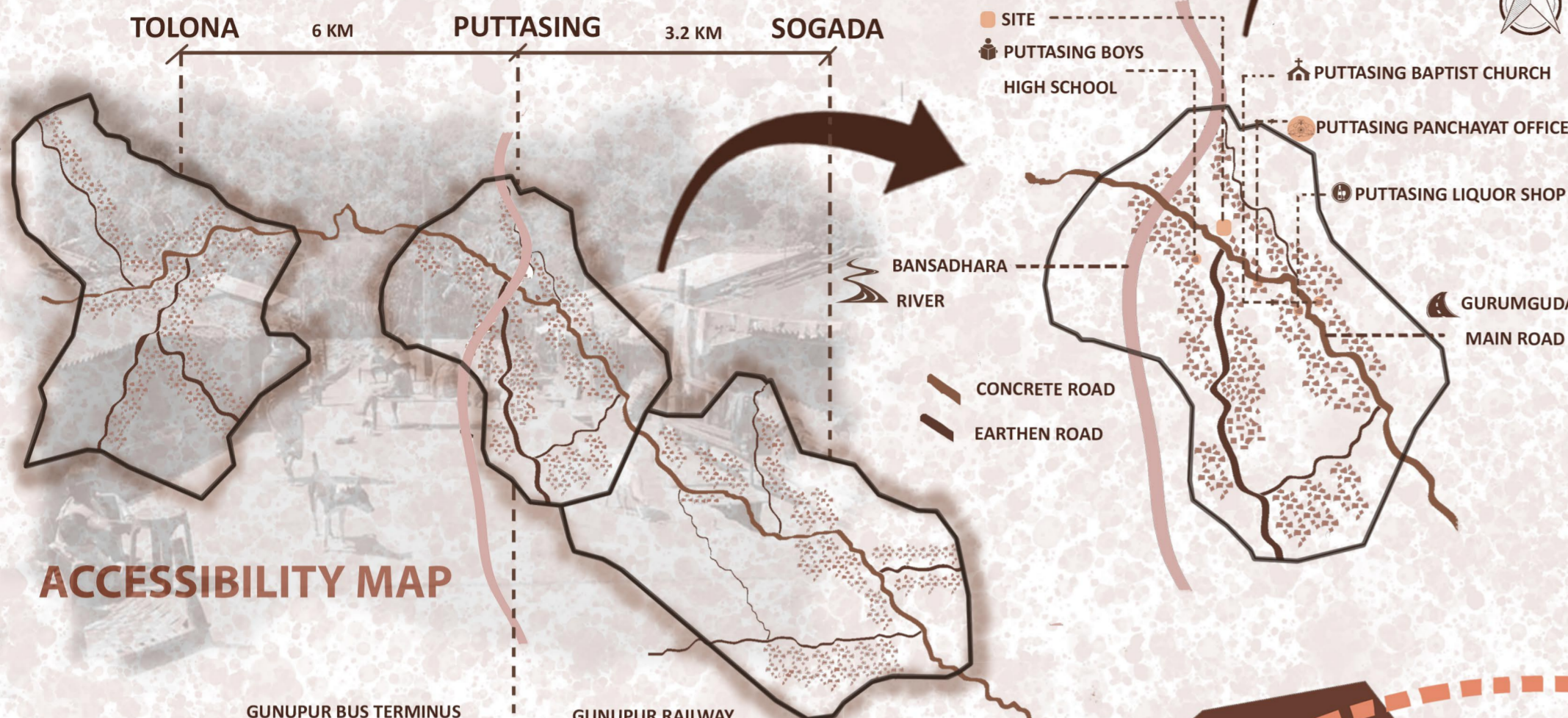
AUGUST 26TH 2020  
HINDUSTAN TIMES

## Tribes who aren't a part of the mainstream society, remain untouched yet self-sufficient independently from modern world.

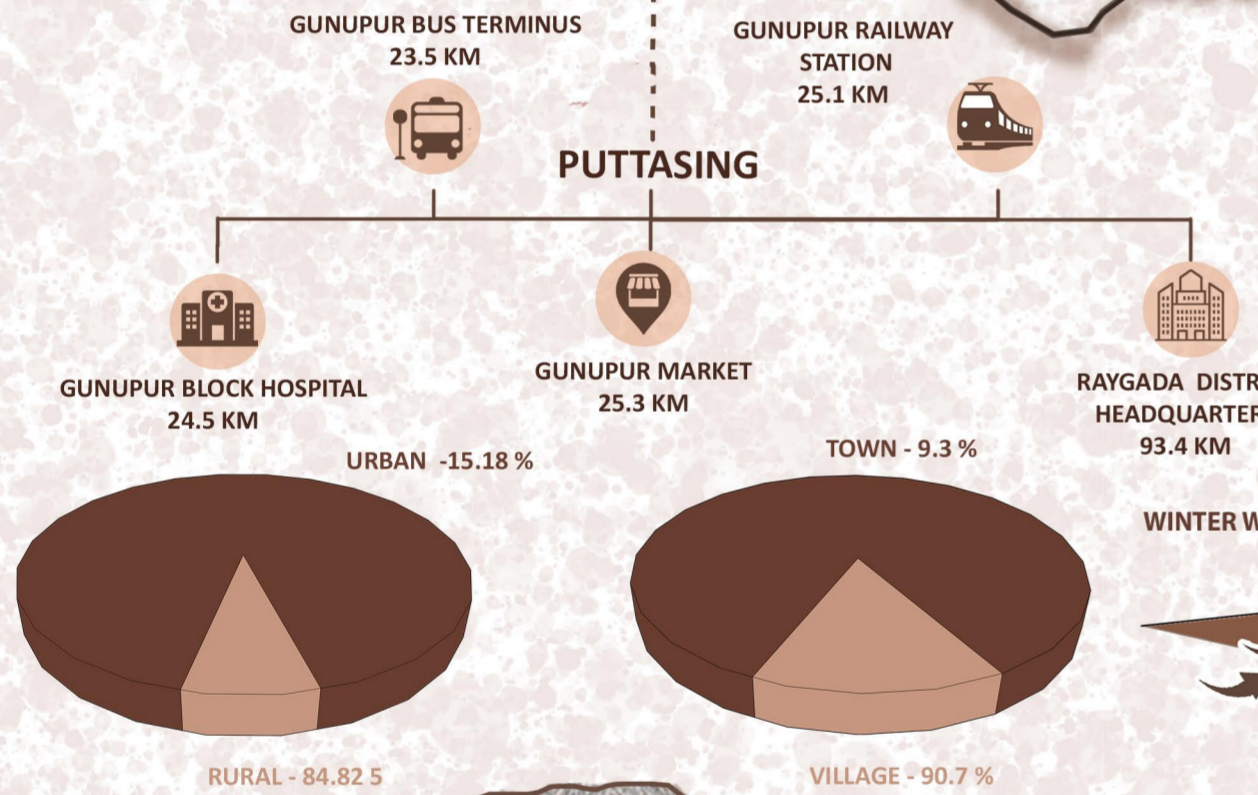
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# WHY THIS SITE?



## ACCESSIBILITY MAP



## Saora Tribe - particularly vulnerable group

The Indian state Odisha houses 22.1% of the country's tribal population with 62 different tribes. SAORA TRIBE, also known widely as Saura, Saurah, Sorah have a population of 5 lakhs i.e., 60% of them residing in Gajapati, Ganjam, Sundargarh, Sambalpur and Rayagada districts of Odisha. It is believed that this tribe existed since the times of Ramayana and Mahabharata. They have very rich culture and unique costume design famous for their saura tribal art. Saoras are one of the particularly vulnerable tribal group declared by the government of India. Being divided in two types, Lanjia and Kappu Saura slightly differ in their lifestyle, culture, settlement, food habits and occupation with Lanjia being settled at higher hills and Kappu on the lowlands mainly involved in agriculture, livestock, farming and handicrafts. They also have their own dialect known as SORA. The panchayats - Puttasing, Sogada and Tolana have 90.56% population of this vulnerable tribal group. Tribes in these panchayats are rich in heritage and culture but lag in various essential services like healthcare, education and economic growth.

# POPULATION CHART - 2011 CENSUS DATA

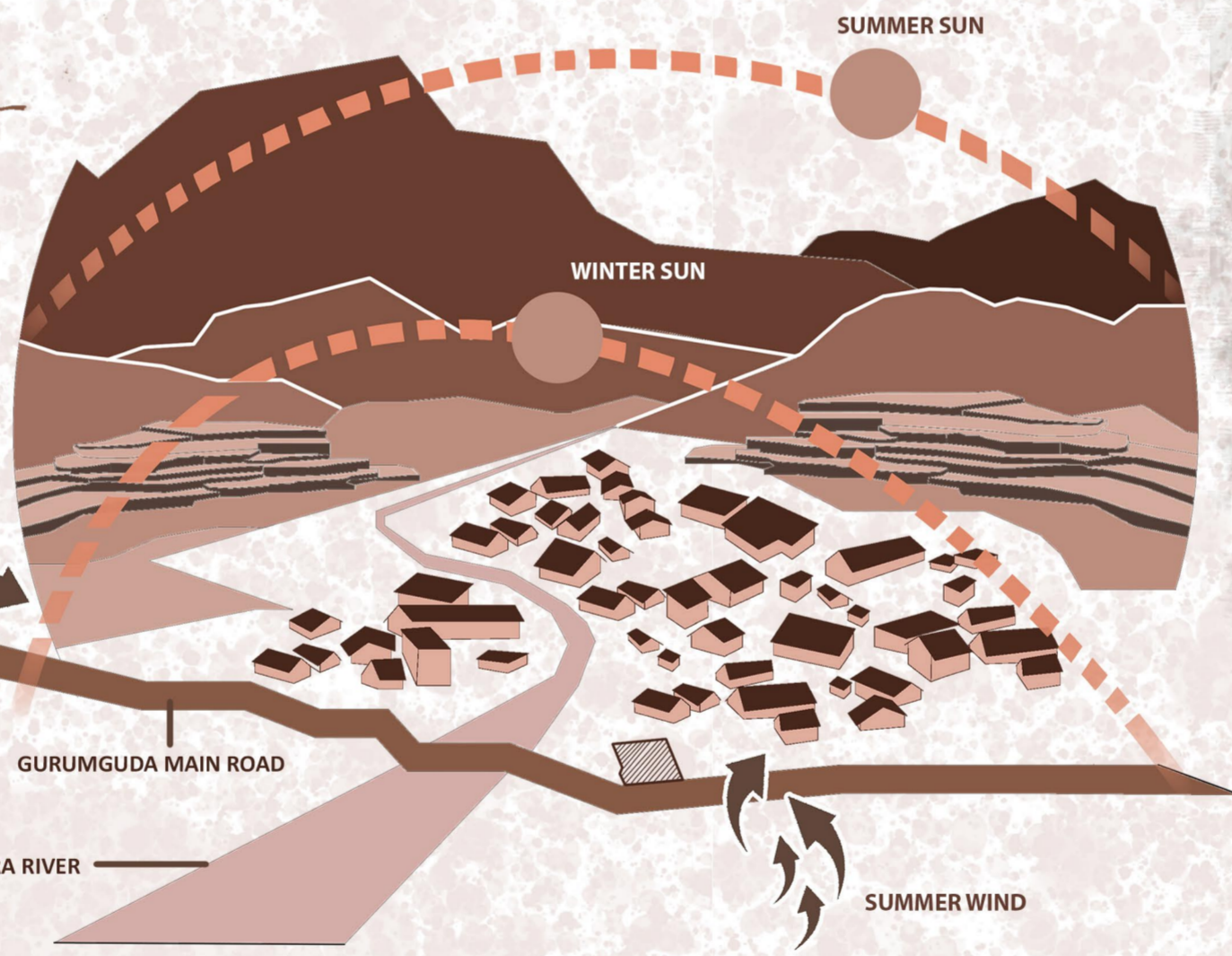
CATEGORY	PUTTASING	SOGADA	TOLONA
GENERAL	1193	151	36
SCHEDULED CASTE	0	0	4
SCHEDULED TRIBE	4955	3620	4710
TOTAL	6148	3771	4750

## OCCUPATION

- LIVESTOCK REARING - 11%
- AGRICULTURE - 64%
- WOOD CUTTING - 16%
- POTTERY and ARTEFACTS - 9%

## ASPIRATION

- BETTERMENT OF MEDICAL ASSISTANCE.
- GROWTH IN LIVING STANDARDS.
- FINANCIAL INDEPENDENCE AND EARNING EXPOSURE.
- EDUCATIONAL INFRASTRUCTURE AND QUALITY.



The location of the proposed PHC is chosen in the Northern side of Puttasing village along Gurumguda main road of 9m width. The Puttasing panchayat houses the highest population of vulnerable group of the SAORA TRIBE. Having badly off medical scenario, an urgent response of establishment of a PHC is felt. The 1200 sq.m site is so chosen to keep it in equal proximity to both the adjoining panchayats namely Sogada and Tolana.

CATEGORY	PUTTASING	SOGADA	TOLONA
LITERACY RATE	♂ 10.3 %	25.4 %	19.2 %
	♀ 6.9 %	16.6 %	10.1 %
WORKING POPULATION	♂ 51.1 %	43.9 %	43.4 %
	♀ 8.1 %	11.3 %	6.0 %
AGE DIVISION (0-6)	♂ 11.02 %	14.96 %	16.02 %
	♀ 14.07 %	17.92 %	17.10 %
SEX RATIO	1072 females per 1000 males	1018 females per 1000 males	1017 females per 1000 males





## HEALTH ISSUES IN SPOTLIGHT

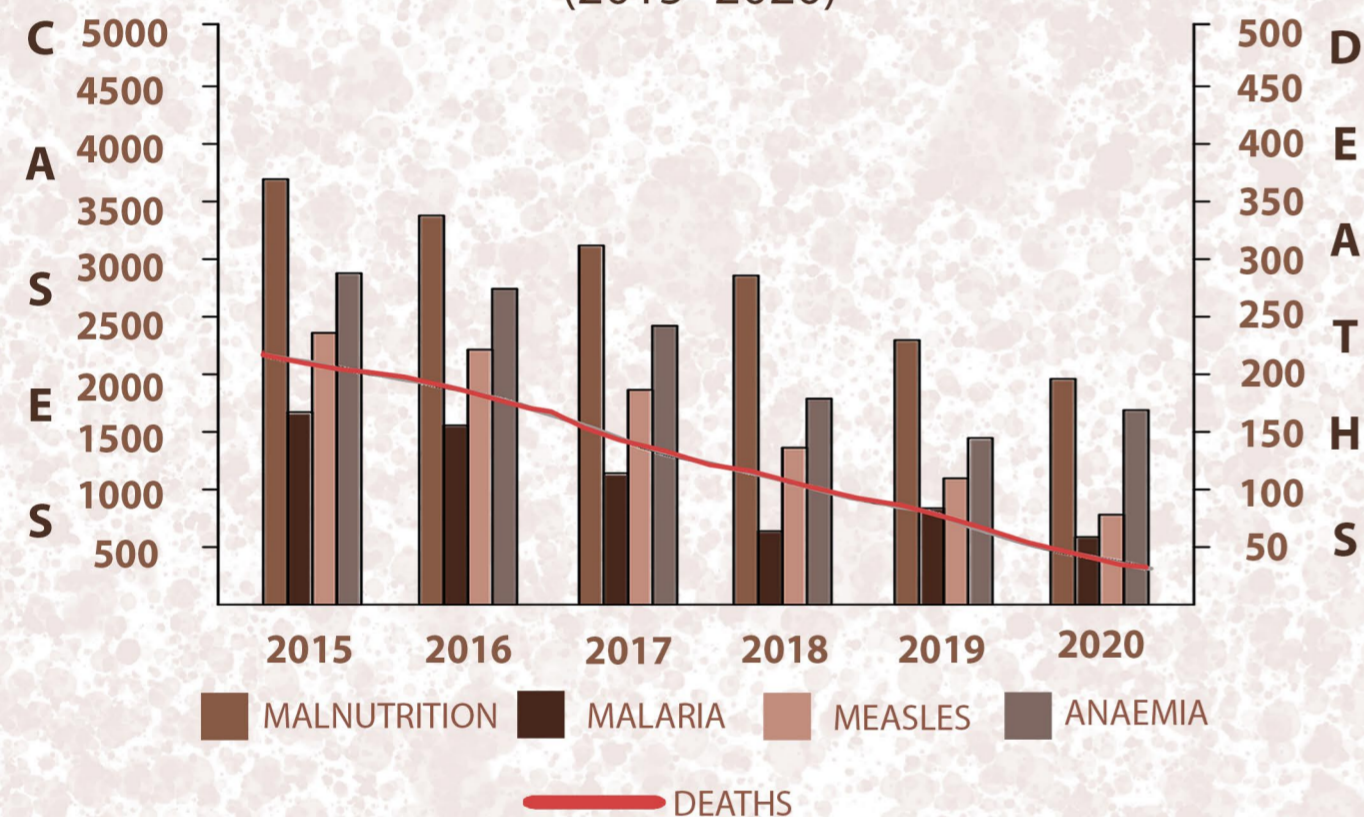
The maternal mortality ratio for Puttasing is 222 per 1,00,000 live births, which is higher than the national average of 167 per 1,00,000 live births.

Early marriage - 2015-16 reveals that 54.4% of girls are married within 18 years of age and give birth of low birth weight baby they themselves being high risk pregnancies. More than 50% of women are anemic.

Poor intake of nutritious diet among pregnant women - around 25-30% pregnant women are severe anemia and 65% are moderate group among pregnant women due to lack of proper diet & nutritious food, which leads more complication in last stage of pregnancy.

Spacing method - Only 34.5% of women are opting for spacing method which indicates that more couples are having more than 2 children.

TREND OF OUTBREAK CASES AND DEATHS DUE TO MAJOR DISEASES IN PUTTASING, SOGADA AND TOLONA (2015- 2020)



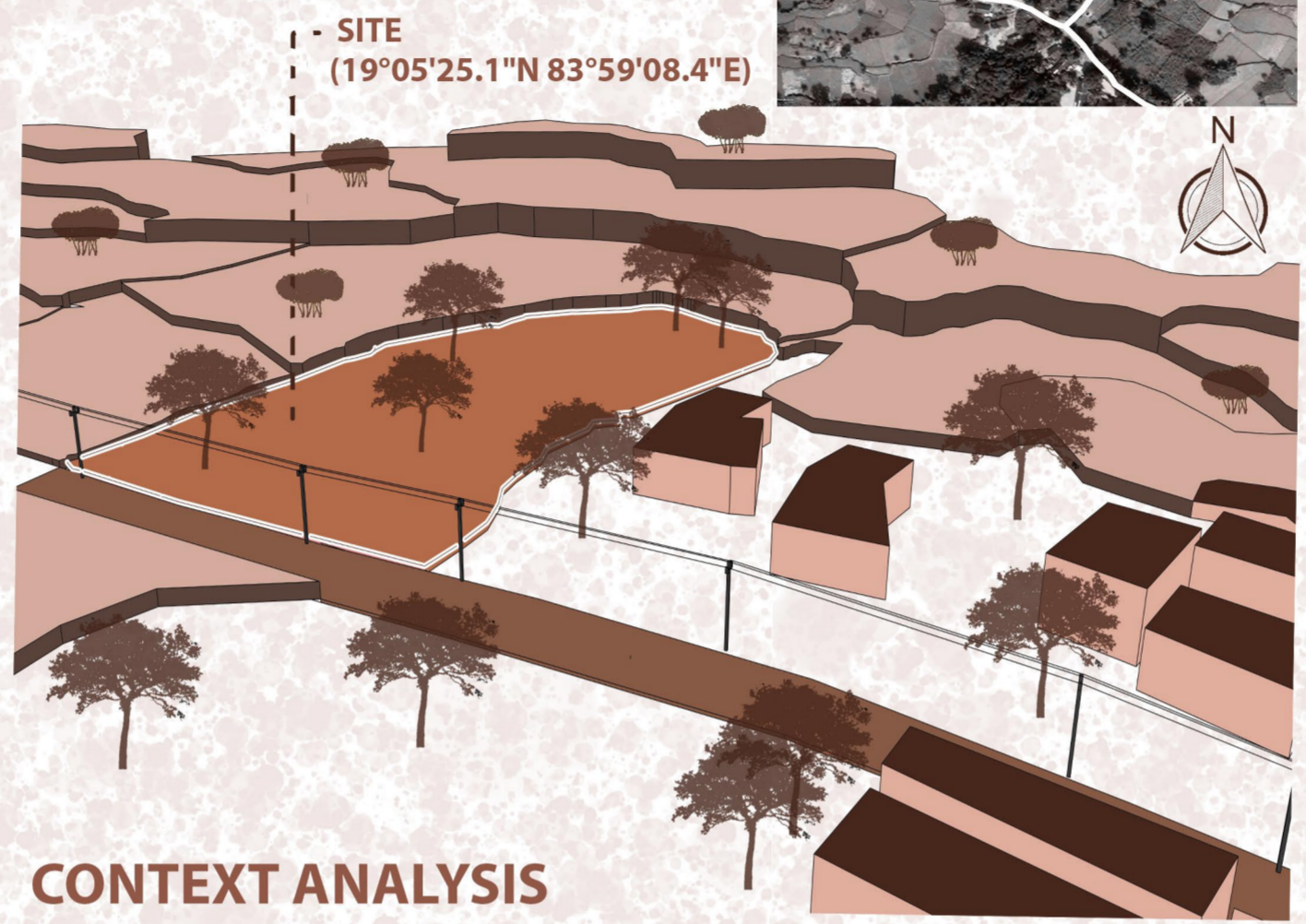
## MAJOR ISSUES TO TACKLE

- Inadequate health care facilities
- Heavy drinking habits and tobacco consumption
- Less access to safe drinking water
- Lack in awareness of health and hygiene



## EXISTENCE IN CRISIS

The Saora tribal community of Puttasing living in steep inaccessible hills still of Southern Odisha are deprived of basic health facilities. They are directly dependent on nature for their day to day life and still believe in Shamanic rituals for curing diseases. Being economically weak and having low literacy, they are unaware of modern health facilities. Inadequate knowledge about diseases and their remedies has brought their living is in danger. The lack of health and sanitation facilities needs to be addressed in order to preserve and resuscitate the indigenous group.



### CONTEXT ANALYSIS

- CONCRETE ROAD ( 9 M WIDE)
- OVERHEAD ELECTRIC LINE
- VEGETATION
- SETTLEMENTS
- TERRACE FARMLANDS

### LOCALLY AVAILABLE CONSTRUCTION RESOURCES

CLAY	TIMBER	Clay – from nearby unused lowlands farms
BAMBOO	MUD	Timber – from the dense hilly forests near to the site
COCONUT SHELL	STONE	Cow Dung – from livestock waste of nearby settlements
COW DUNG	STRAW	Bamboo - from the dense hilly forests near to the site
		Coconut shells – from scattered vegetation areas near to the site
		Stones – from foothills
		Straw – from farmland waste
		Mud – from nearby unused lands

## Tribal communities in Odisha left to fend for themselves during pandemic and cyclone

"The unseasonal rains and cyclone have dismantled the forest-based livelihood and MFP trade of the Adivasi and other forest dwelling communities of Odisha. Ever year, there has been MFP crop loss because of cyclones. Yet, there has been no adequate steps taken by the authorities," said Archana Soreng, research officer, Vasundhara, an Odisha-based non-profit organisation.



THE NEW INDIAN EXPRESS 22ND MAY 2020

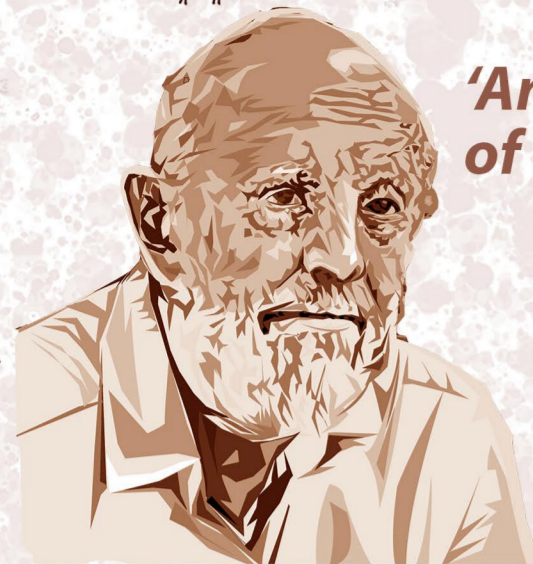
The state government on Thursday directed collectors of Ganjam, Gajapati and Rayagada to evacuate people to safe places as incessant rain triggered by cyclonic storm Titli created flood-like situation in Rushikulya and Vamsadhara rivers. Over 30 lakh people in 3250 villages under 22 blocks in Ganjam district affected due to flood situation in Rushikulya and its tributaries; several people at Kashinagar in Gajapati and Gunupur area in Rayagada district affected due to flood in Vamsadhara river, official sources said.

TIMES OF INDIA 12 OCT 2018



S W O T A N A L Y S I S		<b>STRENGTH</b> Abundant construction natural resources Rich cultural existence Government scheme supports for ST Unity and belongingness towards the tribe
		<b>WEAKNESS</b> Low literacy Low economic status Less social infrastructure Poor medical facility
		<b>OPPURTUNITY</b> Enhance in agricultural industry Tourism attraction Enhancement of artifacts and SMEs Enhance of cattle trade
		<b>THREAT</b> Prone to cyclones Cancerous deaths due to intake of tobacco and hard drinks Deaths due to genetic disorders Prone to epidemic





**'An architect should connect the Soul of the user'**

Identified major foliage on site to preserve and use the existing vegetation respecting local people's faith and belief of worshipping trees and settle around it.

**STAGE 1**

A site of 2474 sqm on the side of 9m wide gurumgura main road in puttasing village.

**STAGE 2**

Identified the major foliage on site with very thick vegetation.

**STAGE 3**

Massing developed to preserve the thick vegetation on site and settling around it

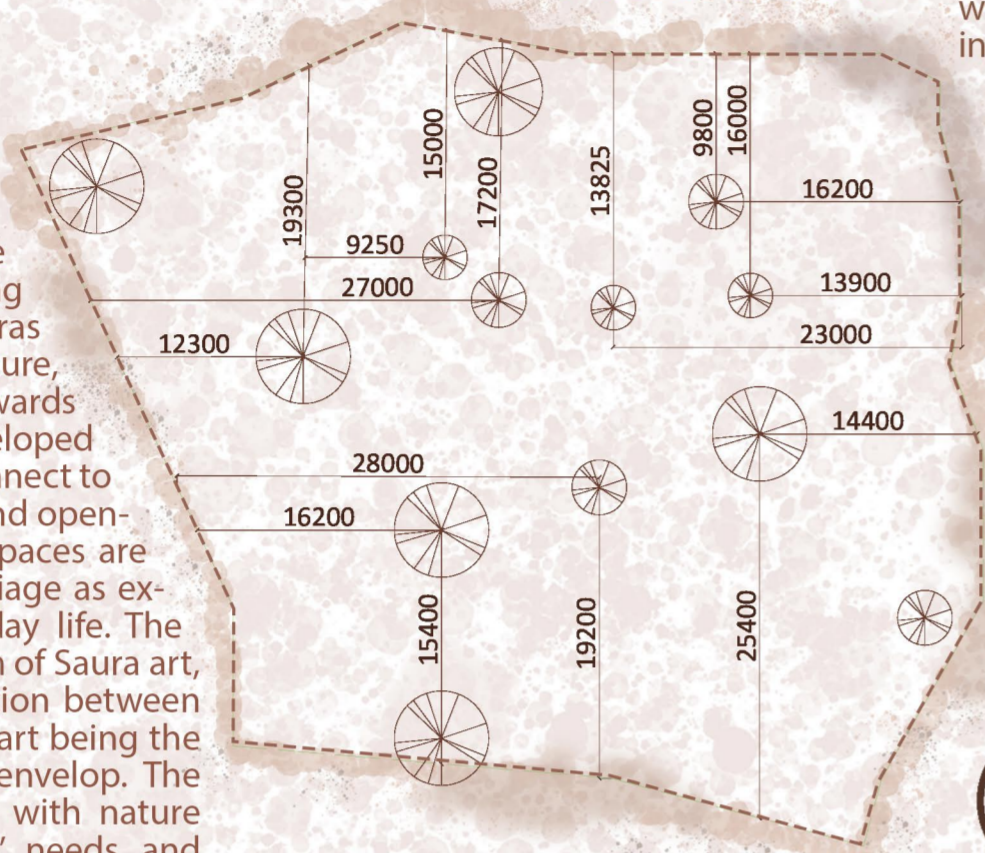
**STAGE 4**

Form developed considering the position of all the foliage and with spaces developed

**CONCEPTUAL FORM DEVELOPMENT**

**CONCEPT**

The concept originated from the Saura tribe's manuscript of living around trees and with nature. Sauras always remain close to the nature, their love and belongingness towards nature is their pride. The site developed in such a way to make people connect to the space incorporating nature and openness of living in the place. The spaces are developed in and around the foliage as exactly, they live in their day-to-day life. The premises is developed in the form of Saura art, which is the way of communication between them in ancient form with Saura art being the main component in the building envelop. The design is very much contextual with nature while understanding the locals' needs and wants with sustainable approach and vernacularness.



**KEY PLAN (SCALE - 1:500)**



**Primordial Saura Art depicting the 'Tree of Life' and the day to day activities revolving around them.**

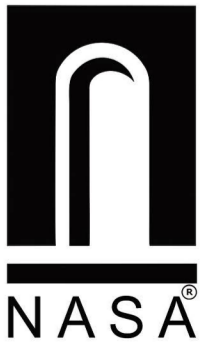
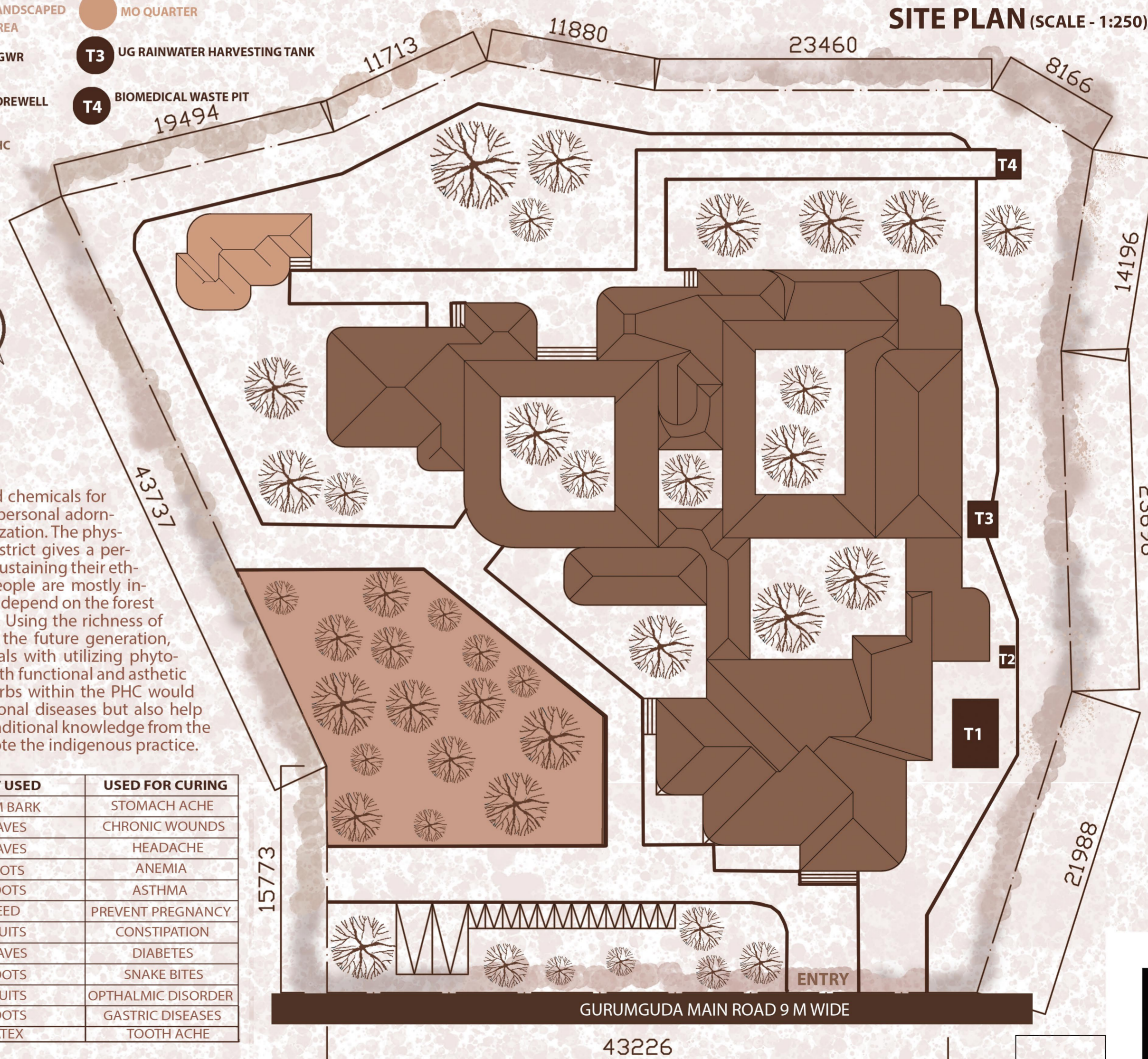
**LANDSCAPING CONCEPT**

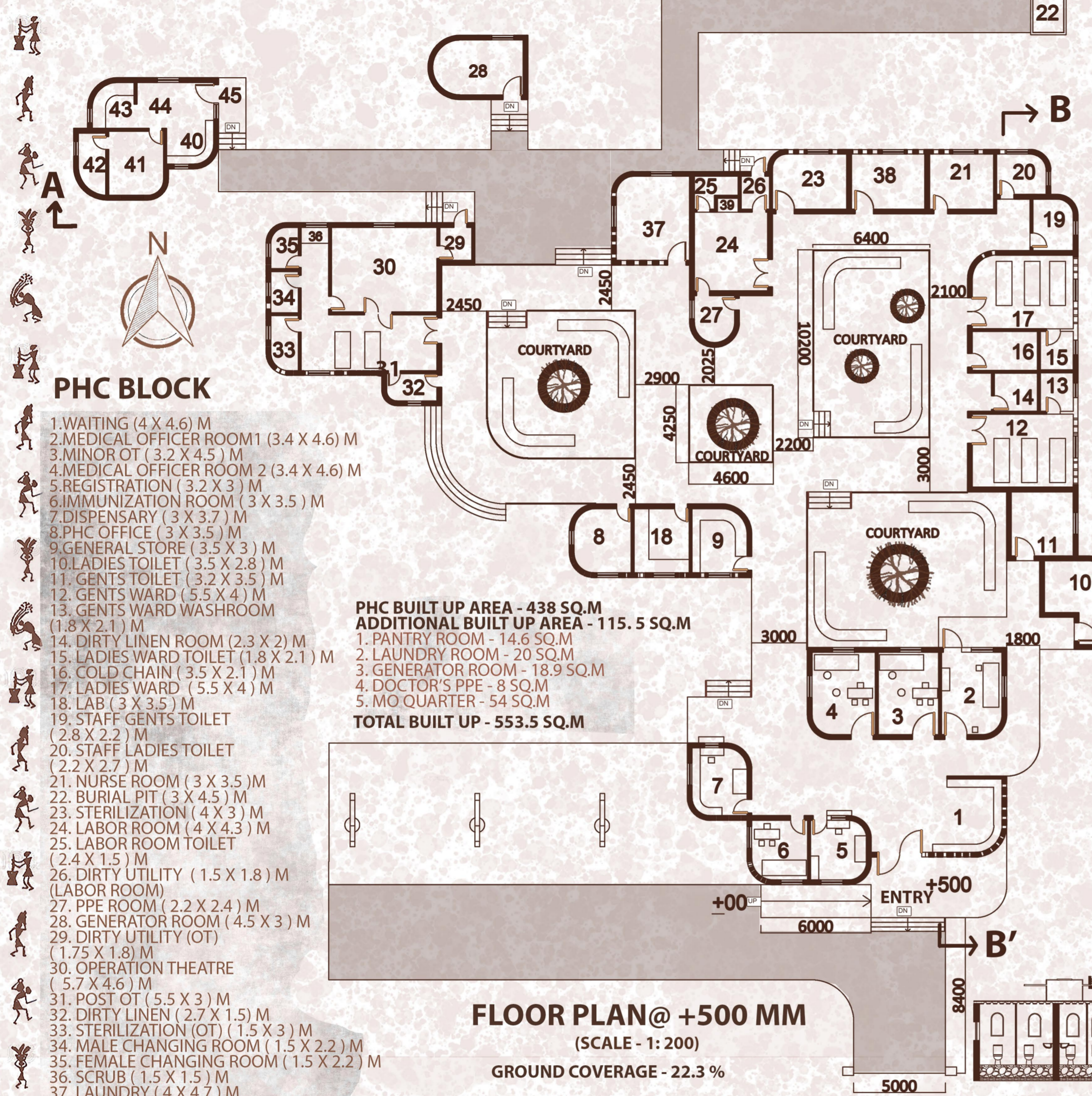
Use of plant based drugs and chemicals for curing various ailments and personal adornment is as old as Human civilization. The physiography of the Rayagada district gives a perfect platform for the tribal in sustaining their ethno-cultural identity. Tribal people are mostly inhabited in the forest area and depend on the forest resources for their livelihood. Using the richness of nature and preserving it for the future generation, the landscaping concept deals with utilizing phyto-therapeutic claims by tribal in both functional and aesthetic aspects. Planting medical herbs within the PHC would not only help in curing seasonal diseases but also help the local youth to learn the traditional knowledge from the old herbal healers and promote the indigenous practice.

LOCAL NAME	PART USED	USED FOR CURING
BELA	STEM BARK	STOMACH ACHE
ANKUL KOLI	LEAVES	CHRONIC WOUNDS
BHUIN NIMBA	LEAVES	HEADACHE
DASKA RANDA	ROOTS	ANEMIA
ATIKAPUDI SAGA	ROOTS	ASTHMA
PALASA	SEED	PREVENT PREGNANCY
SUNARI	FRUITS	CONSTIPATION
GUDMARI	LEAVES	DIABETES
LAJAKULI	ROOTS	SNAKE BITES
BAHADA	FRUITS	OPHTHALMIC DISORDER
DHATAKI	ROOTS	GASTRIC DISEASES
PITA KARUN	LATEX	TOOTH ACHE

- LANDSCAPED AREA
- MO QUARTER
- T1 UGWR
- T2 BOREWELL
- PHC
- T3 UG RAINWATER HARVESTING TANK
- T4 BIOMEDICAL WASTE PIT

**SITE PLAN (SCALE - 1:250)**



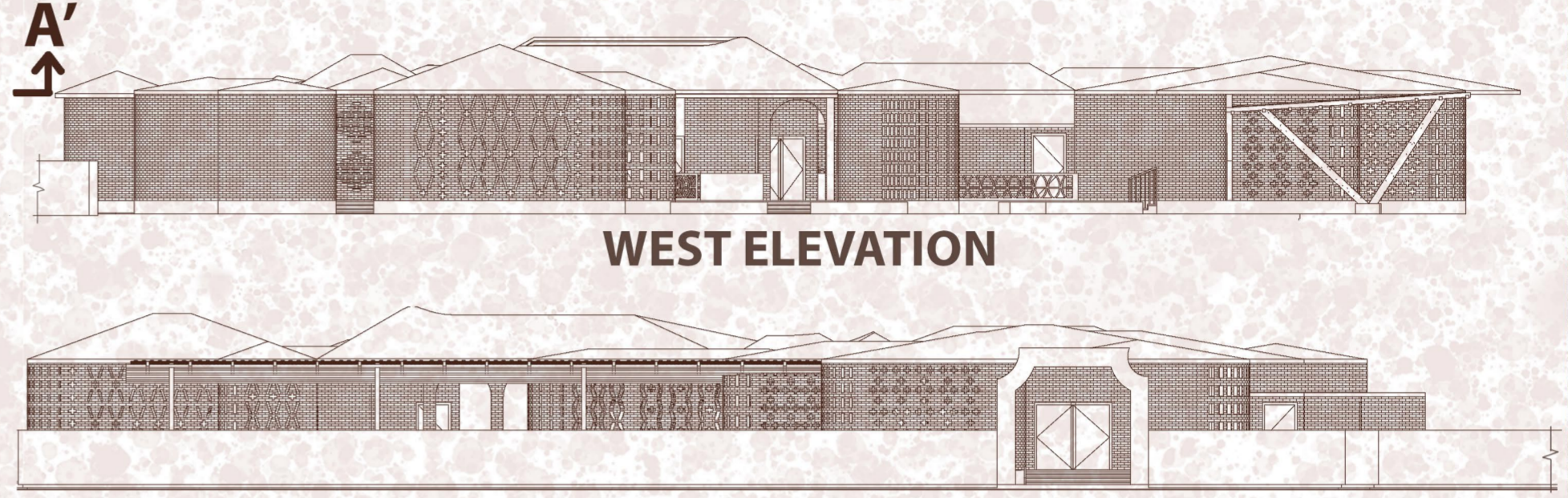


**PHC BUILT UP AREA - 438 SQ.M**  
**ADDITIONAL BUILT UP AREA - 115.5 SQ.M**  
**TOTAL BUILT UP - 553.5 SQ.M**

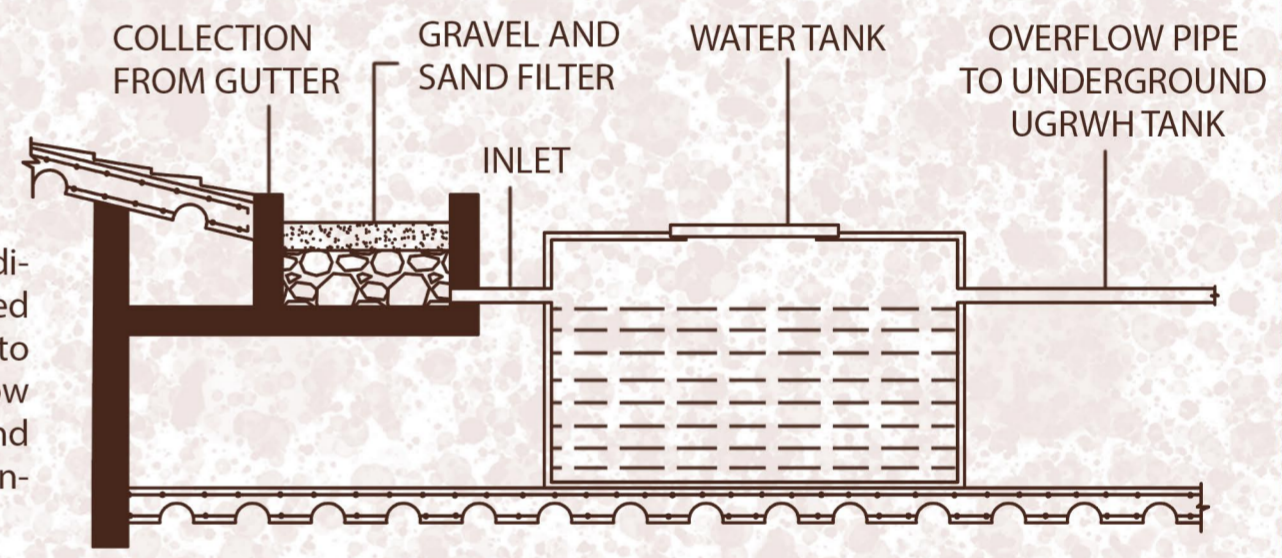
**FLOOR PLAN@ +500 MM**  
 (SCALE - 1: 200)  
 GROUND COVERAGE - 22.3 %

- MO QUARTER**
- 40. LIVING HALL (2.5 X 2) M
  - 41. BEDROOM (3 X 3.5) M
  - 42. TOILET (1.8 X 3) M
  - 43. KITCHEN (2.2 X 2.5) M
  - 44. DINING ROOM ((4 X 2.5) M
  - 45. BALCONY (1.5 X 3) M

All the habitable places were planned and oriented to get exposure of maximum diffused light through Brick jalis and trap prevailing south wind with cross ventilation through windows and brick jalis. Design with very local context response with open circulation around existing foliage making the internal courtyard gives rise to pleasure microclimate.

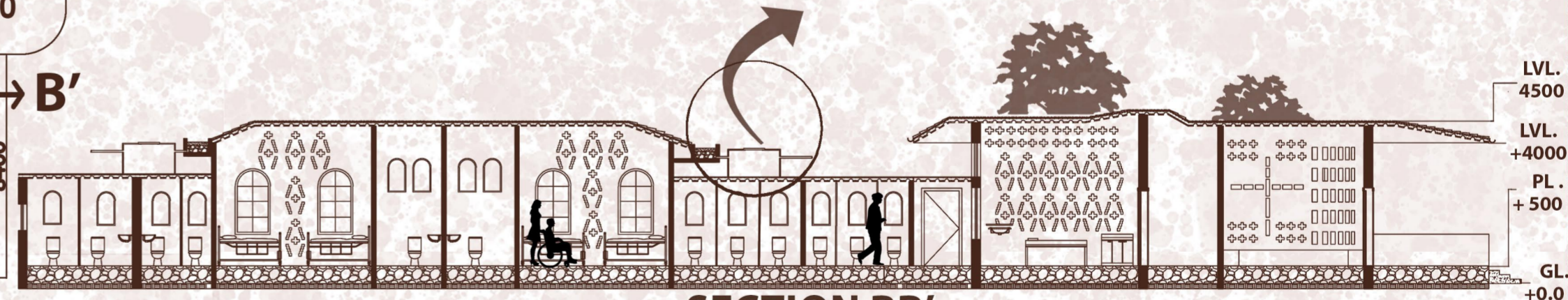


**FRONT ELEVATION ( SOUTH )**



**DETAILED SECTION OF OVERHEAD RAINWATER HARVESTING UNIT**

Rainwater harvesting unit with filtration is directly attached on the roof with a tank placed above toilet roof making level difference to harvest rainwater and to have gravity flow during long powercuts in cyclone times and the overflow of water is directed to the underground rainwater harvesting tank.

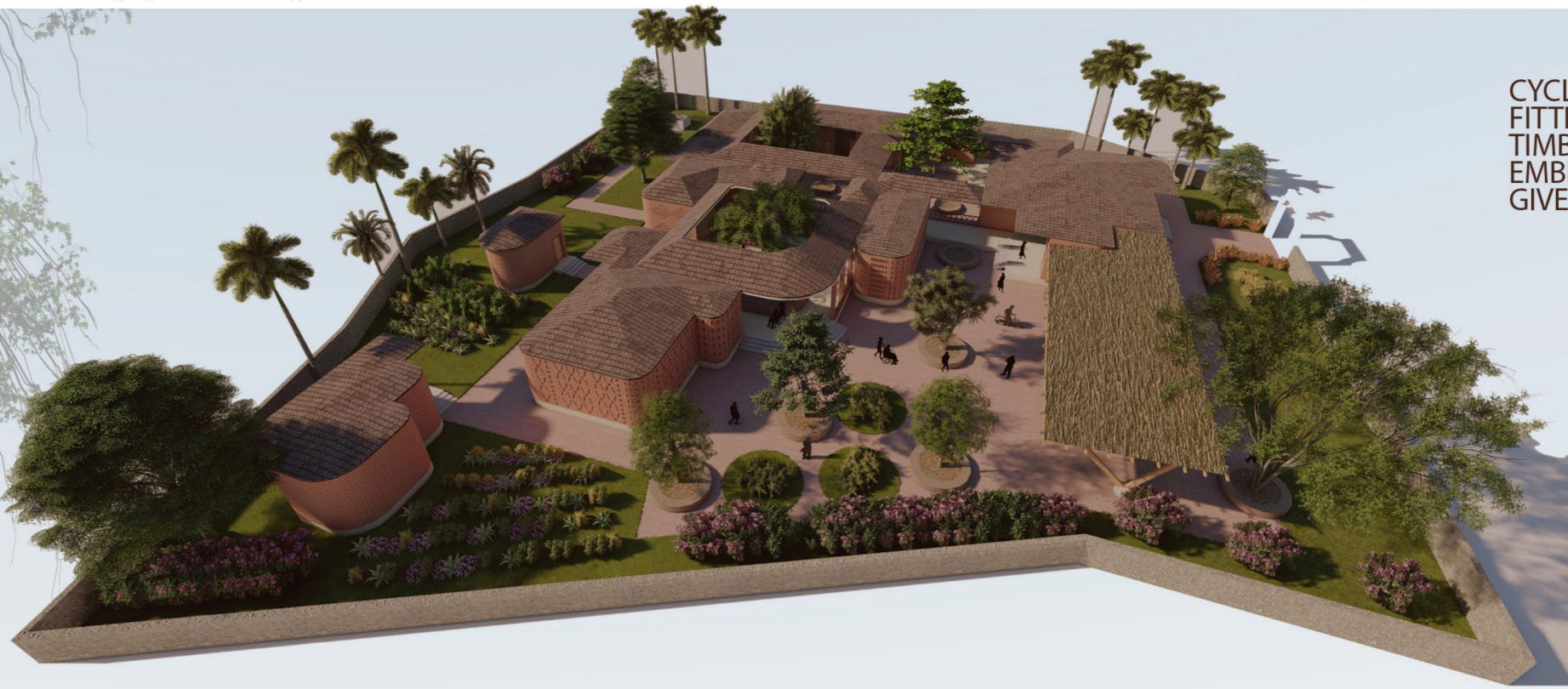


**SECTION BB'**  
 (SCALE - 1: 150)

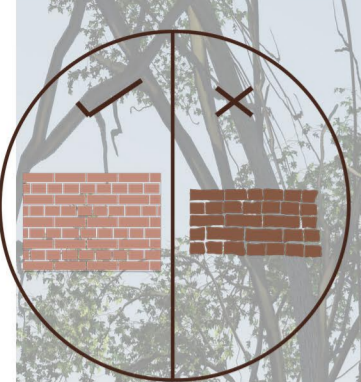


**SECTION AA'**  
 (SCALE - 1: 150)

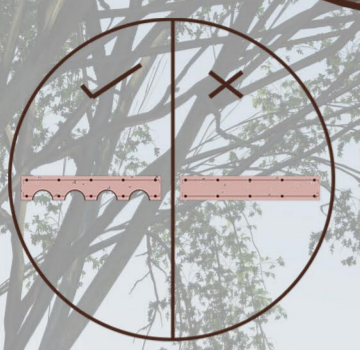




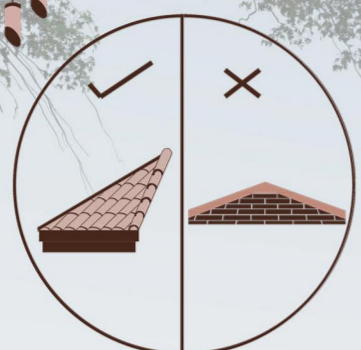
## MATERIAL SPECIFICATION



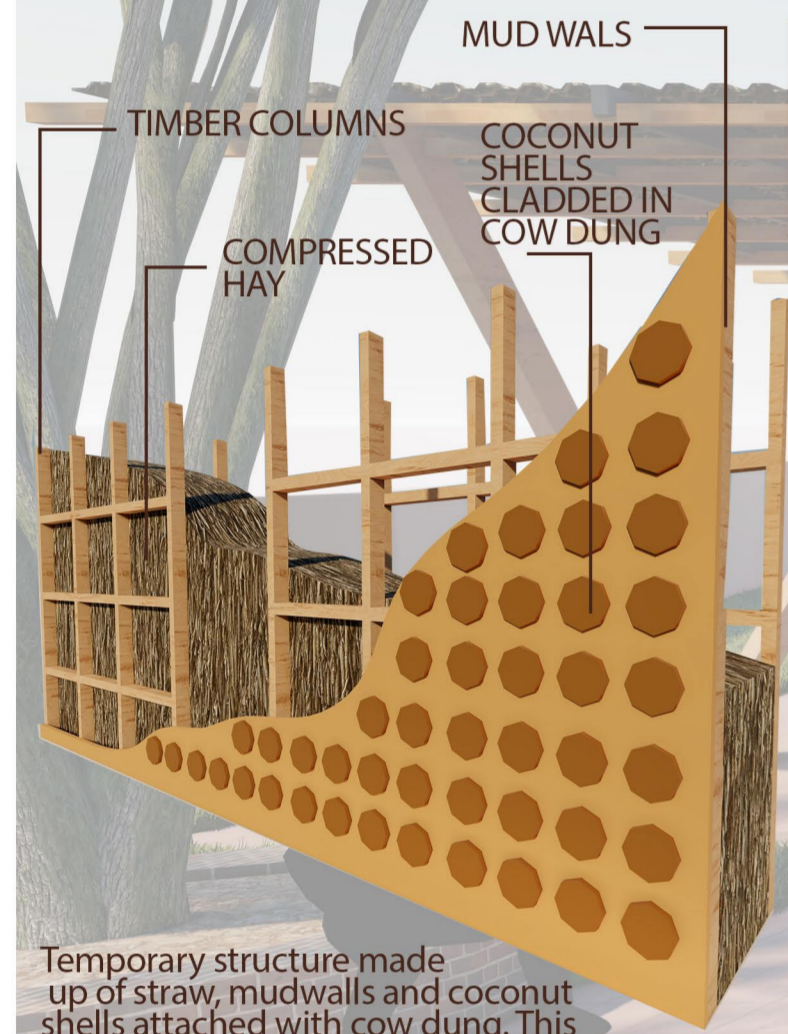
Proper mortar thickness and laying of brick should be done



Coconut shell filler slab which saves 40% of steel and 30% of concrete usage.



Mangalore tiles are cheap and locally manufactured. Bambo lights with solar panels are used



Temporary structure made up of straw, mudwalls and coconut shells attached with cow dung. This helps in insulation. These walls shall be used in the relief centres or to build temporary isolation spaces to with local epidemic and pandemic situations

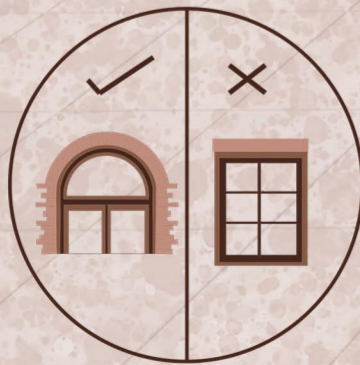
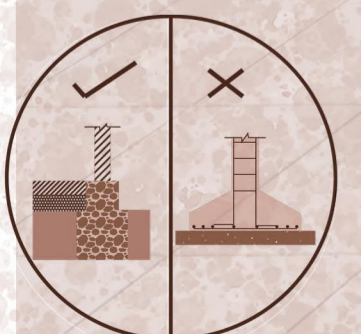
Jaalis as perforation on walls for ventilation and less usage of material. Rat trap bond are used for insulation.

For light and ventilation, induced stack effect due to high opening.

Since one part of the roof always remains cool and for rainwater collection. Thick bamboo used in gutter.

Arch windows as they do not require lintel and beam.

Total cost will be less and abundant local material.



### BRICK

Well burnt crack free bricks with sharp edges of standard size. Water absorbing capacity not more than one-fifth of its weight after soaking it in water for one hour. Crushing strength of 10.5 N/mm<sup>2</sup>. Proportion of cement shall be one part of cement by six parts of sand by volume. Standard quality cement and clean coarse sand shall be used. Broken bricks shall be used except for closers. Work shall be kept well watered for at least 15 days.

### MUDWALLS

Subsoil with sandy and clayey soil shall be used. Mud shall be collected from nearby unused land. Bricks qualified after Cigar test, biscuit test and hand washing test shall be used. Weaker material shall be reused by mixing with stabilizers like cement, lime, straw, cow dung, molasses, tannic acid, bitumen etc.

### BAMBOO

Shall be at least be 3 years mature. Straight bamboo culms used. Up to 10 mm taper or change shall be considered for 3m long bamboos. Treated with boric acid and borax in the proportion 2:5 to protect it from insect attack.

### STONES

They shall be hard, durable and free from weathering and defects like cracks and flaws. Round surfaced stones shall not be used. They shall be procured from the nearby foothills. Combination of coursed rubble masonry and random uncoursed rubble masonry is used to increase the strength of the masonry. Joints shall be packed with mortar and chip faced joints shall not be more than 20 mm thick.



CYCLE BALL BEARINGS FITTED TO TIMBER LOUVERS EMBEDDED IN WALLS GIVES 360° ROTATION

TIMBER LOUVERS

The louvers are made up of timber which are attached to ball bearings of cycles. These are easily available in the nearby local areas. Ball bearing shall help in easy rotation of the louver according to wind pattern.

### MANGLORE TILES

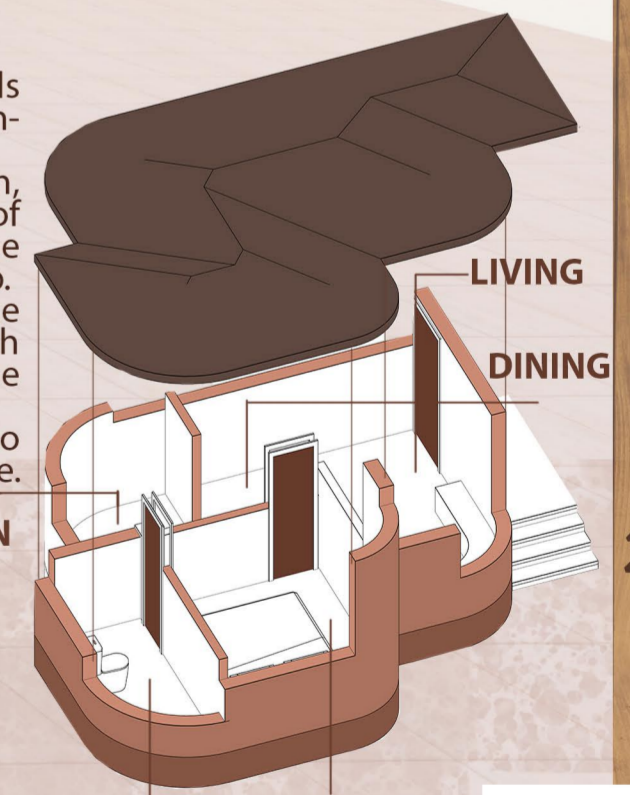
Made of suitable clay of even texture that is well burnt. Free from irregularities. Free from impurities like particles of stone, lime & other foreign materials. The gap between the corners of the tiles shall not be more than 6mm.

### HAY WALLS

Moisture free, sun dried compressed hay to be used. Dried and dusted thoroughly before use. A strong timber framework with proper joinery for structural stability. Clay soil coating to be done and sundried before application. Cow dung coating of 10 mm given which will act as an insect repellent. Coconut shells cladded for insulation.

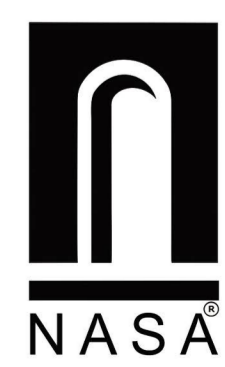
### FILLER SLAB

Filler slab of 100mm is given. Coconut shells and Mangalore tiles as filler materials as they are inert in nature and do not react with concrete or steel in RCC slab. Filler material should be of a size and cross-section, which can be accommodated within the spacing of the reinforcement and also thickness wise could be accommodated within the cross section of the slab. The dimension of filler material will help decide the spacing of reinforcement and accordingly the depth of the slab and other structural details will be worked out. Filler material should be properly soaked in water so that it does not absorb any water from the concrete.



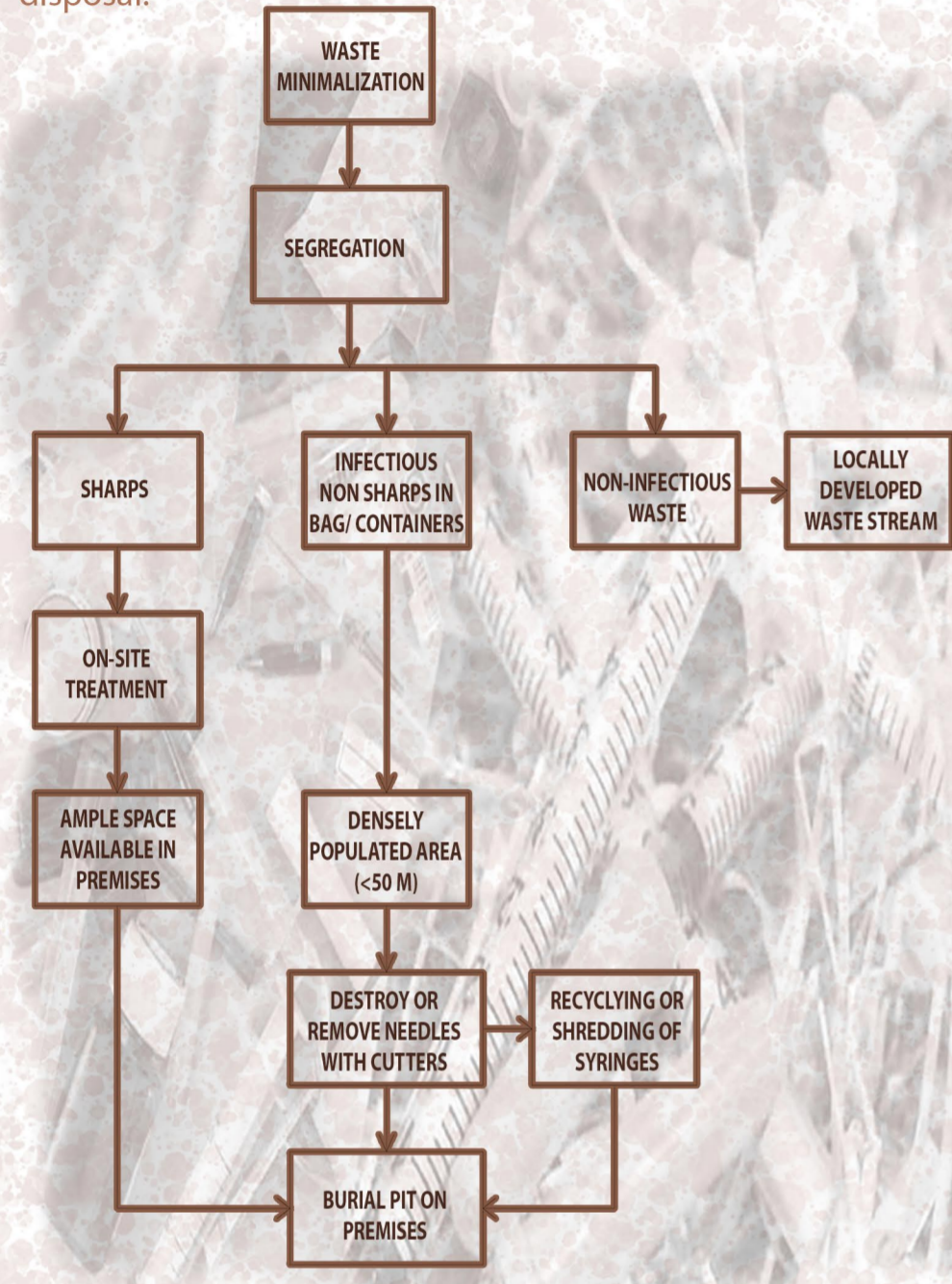
### MEDICAL OFFICER QUARTER

A dwelling unit for the doctors have been proposed for situations when doctors need to stay in the PHC during emergency need such as pandemic outbreak and long operating hours.

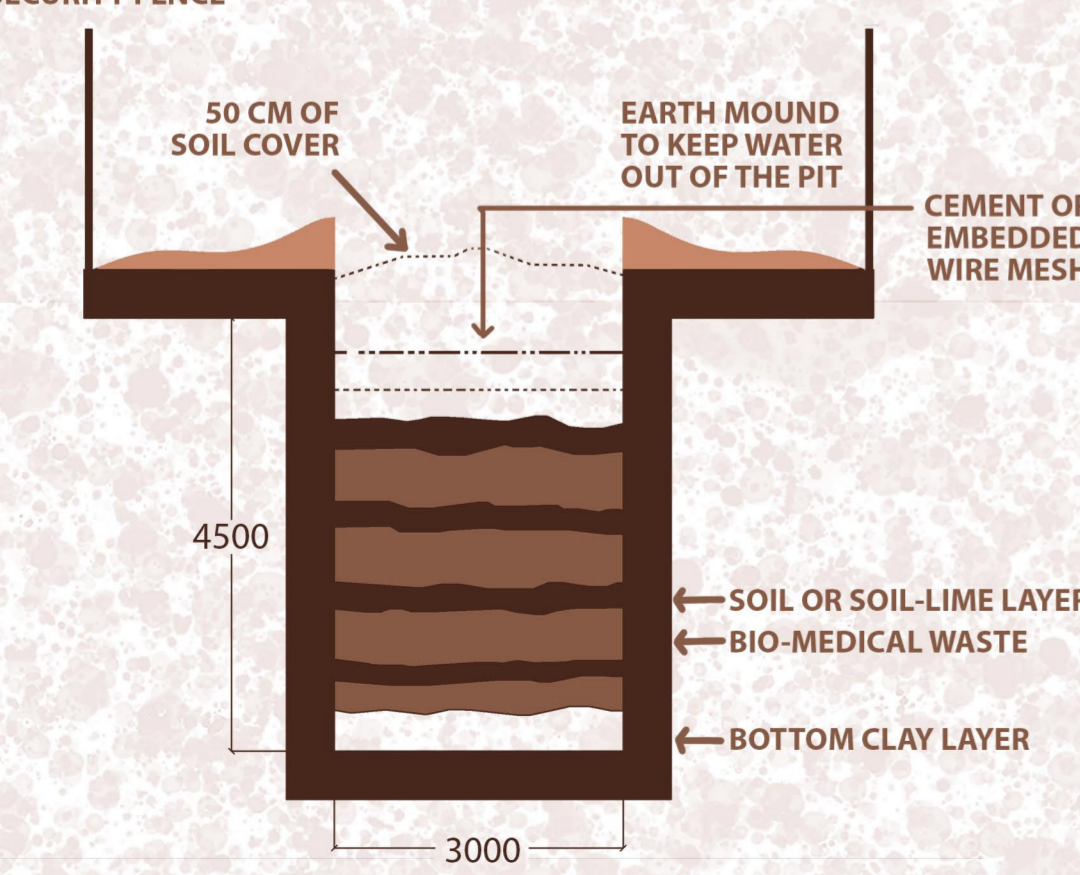


# BIO-MEDICAL WASTE MANAGEMENT PLAN

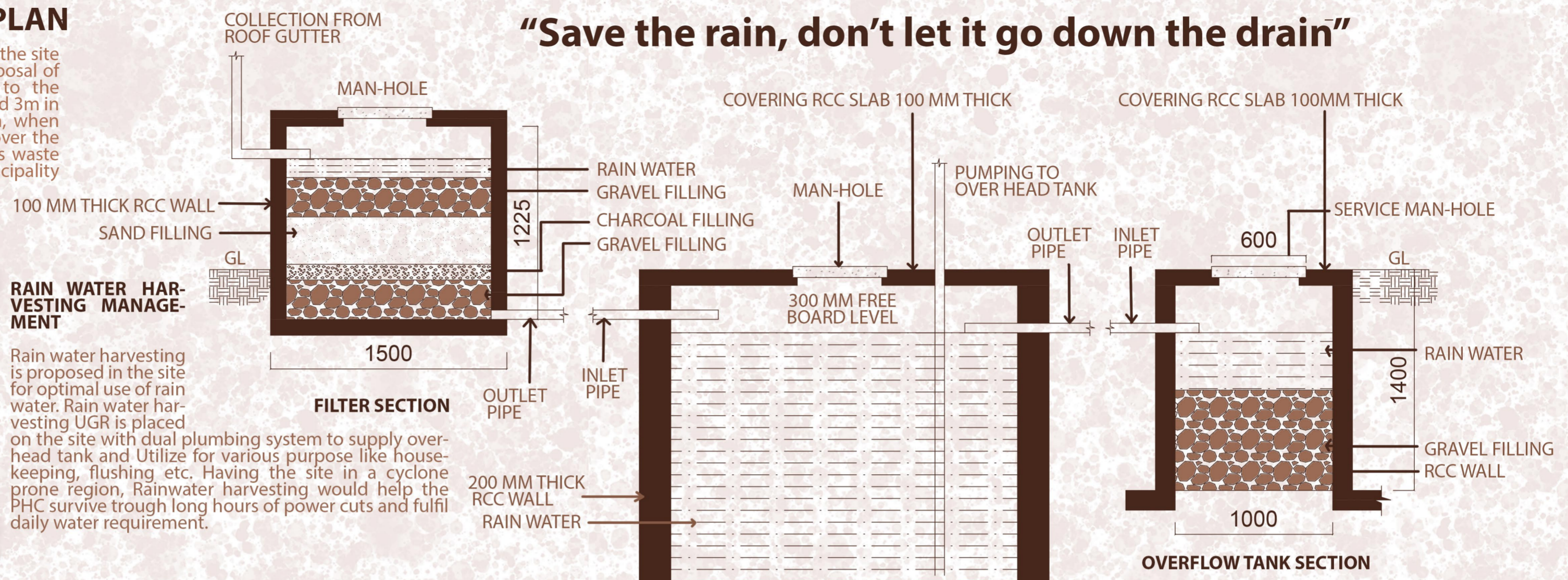
A biomedical waste burial pit is proposed towards the rear corner of the site far from the UGR to avoid contamination and to ensure proper disposal of hazardous medical waste under enclosed supervision. Access to the common public is not given to that zone. The pit is 4.5m in depth and 3m in width covered with 50 cm lime on the surface. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil is added to cover the wastes. This method is so chosen to have proper on-site infectious waste treatment due to its remote location and distance from block municipality disposal.



## BIO-MEDICAL WASTE DEEP BURIAL PIT



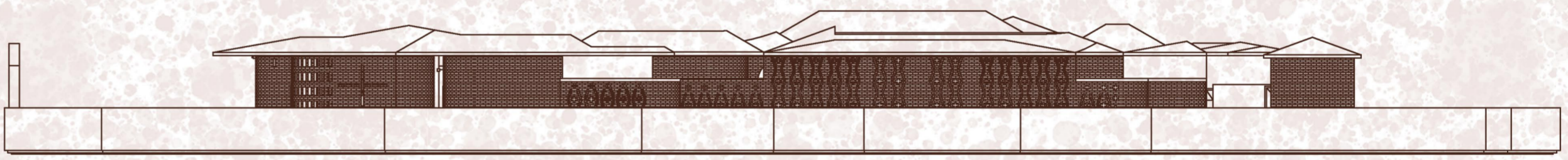
## "Save the rain, don't let it go down the drain"



### RAIN WATER HARVESTING MANAGEMENT

Rain water harvesting is proposed in the site for optimal use of rain water. Rain water harvesting UGR is placed on the site with dual plumbing system to supply overhead tank and Utilize for various purpose like house-keeping, flushing etc. Having the site in a cyclone prone region, Rainwater harvesting would help the PHC survive through long hours of power cuts and fulfil daily water requirement.

East walls have been made with jalis to let morning sun inside which is believed to have very good healing power on the human body and good vitamin supply. The sun plays a major role in Saura's life as they believe it is the power of fire which ignites the entire world. With their beliefs on spirituality the jalis has been made on patterns of alphabets from saura tribe to make people connect with the space.



EAST ELEVATION (SCALE - 1:200)

## COST ESTIMATION IN PLINTH AREA RATE BASIS

PARTICULAR	QUANTITY	UNIT	RATE	AMOUNT	TOTAL (RS.)
WOODEN LOGS					45,310
1. COLUMN	45	NO	204.00	9180	
2. BEAM	45	NO	210.00	9450	
3. ROOF	08	NO	210.00	1680	
4. HAY	10,000	NO	2.50 PER BUNDLE	25000	
5. BRICK PER PIECE 3.5 RUPEES .					

TOTAL BUILT-UP AREA- 5957 SQ.F  
 PER SQ.F COST- 848/-  
 TOTAL COST= 50,51,536/-



Past experiences gives us the best ideas to perform better today.

# IMPACT ANALYSIS AND IMPROVISATIONS

## ECONOMICAL IMPACT

Having a phc will give them proper knowledge about production of herbal medicinal plants which they regularly do and create a exposure to have market reachability of the products they grow which can earn them a financial stability which in result will earn them a good livelihood.



## CULTURAL IMPACT

Saura tribe has faith and belief on their manuscript and very spiritually connected toward god and nature. so as to respect their belief the design has evolved from their manuscript worshipping nature and more than 98% people here have faith on cristianity so Jalis have been made to make them connect to the place and divine spirituality in hards times while they visit PHC.



**Major maternity health issues solved with healthy child birth.**

**A SUSTAINABLE APPROACH**  
Using vernacular material and a climate responsive structure that harness nature in efficient way preserving the nature on site and compensating the carbon footprint generated due to construction. Locally available natural resources are used to have less dependence on cement replaced by filler materials. Storm water management and native landscaping has also been incorporated.

**Solution to lack of medical assistance and infrastructure.**

**DISASTER MANAGEMENT**  
Curved walls are given for structural stability. Opening in the building envelope is given considering the wind pattern that has been observed during cyclones in the region to cut the impact of strong winds. Semi-open spaces are provided that shall be used as relief centers. The sand content of the mud used shall not exceed 40%.



**Awareness camps hosted for betterment of health and sanitation**

**ENVIRONMENTAL IMPACT**  
Eco-friendly and locally available materials like mud walls, straw, bamboo, timber, stones are used. Overall use of RCC and steel is reduced with help of filler materials in slabs which significantly reduces carbon footprint of the built structure. Adequate measures have been taken to harvest rainwater and ground water table recharge and filtration strategies. Burial pit has been chosen over incineration to reduce air pollution.

**No more shortage of doctor due to lack of dwelling units**

**MATERIALS**  
Locally available materials used for ease in construction and lower overall cost of the project. Local materials are chosen in accordance with the climate of the region. Mangalore tiles and bricks are locally produced. For filler slabs, coconut shells are used as filler materials. Straw and bamboo are used in the proposed temporary structure that shall be used for relief centers during cyclones. Overall transport cost is also reduced considering its remote location.

**Proper health assistance and correct diagnosis reducing death rates.**

## ECOLOGICAL IMPACT

Human excreta collected are composted and used in manure in the proposed landscaping of medical plants. Disposal of hazardous medical waste.

## WATER AND WASTE MANAGEMENT

Rainwater harvesting is proposed in the project to ensure 24 x 7 supply of water in the PHC and to survive lengthy power cuts during cyclones. Burial pits for biomedical waste is also given within the site to for proper contamination free disposal. This also creates awareness among people about health and sanitation.

## HANDLING PANDEMIC CONDITIONS

A semi-open courtyard space is proposed that can be used as an isolation ward as well as a relief centre as per need by installing temporary walls made of straw with timber framework. Awareness camps can also be hosted in the courtyard.

