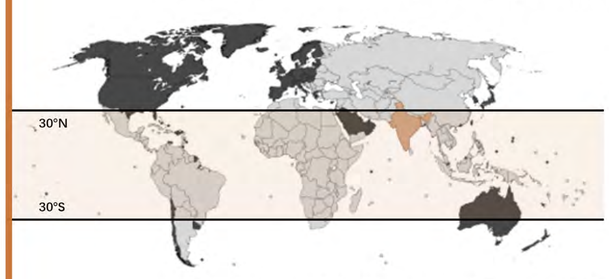
HEALING MANDALA
Indian Community Health Centre Design

I

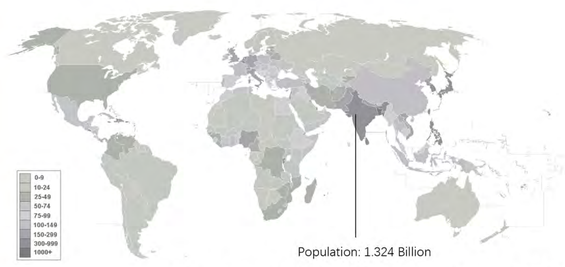
1 Why do we choose India?

1.1 India's Worldwide Profile



Distribution of World Developed Countries, 2016

Developed Countries | Developing Countries | India



Distribution of World Population Density, 2016

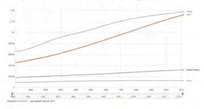
①In the left, we can find that most of the developing countries are at low latitudes.

②There are many similar climatic characteristics between countries at this region, that makes our design more universal.

③As a representative of developing country, India, with a long history and a dense population, features a wide gap between the rich and the poor as well as rapid urbanization.

In the left, India has a very high population density, which accounts for 17.8% of the world's population (The world's population is 7.442 billion in 2016).

The following figure shows the population growth curve of China, India, USA and Japan in the last 50 years.



1.2 Major Health Problems in India

MORTALITY DUE TO UNSAFE WASH SERVICES

World ranks: 33 **Asia ranks:** 1

Status:
- Lack of education of safe use of water.
- Messy sewerage management system.
- Easy to spread viruses and germs.

Built Environment:
- Suitable water supply and drainage system.
- Space for education of safe use of water.

NEED FOR NEGLECTED TROPICAL DISEASE TREATMENT/CARE

World ranks: 1 **Asia ranks:** 1

Status:
- Lack of sense of neglected tropical diseases.
- Poor sanitary conditions.

Built Environment:
- Clean and dirty diversion.
- Site plans.
- Well ventilation conditions.

GOVERNMENT SPENDING ON ESSENTIAL SERVICES, INCLUDING HEALTH

World countdown ranks: 12

Asia countdown ranks: 4

Status:
- Insufficient national Health financial expenditure.
- Great medical security gap between Cities and Villeges.
- Poor facilities in remote areas.
- Shortage of health care workers.

Built Environment:
- Passive and universal design.
- Simple and rapid method of container renovation.
- Convenient material Transportation.
- Space for health worker training.

1.3 Health Care System in India

PUBLIC Medical Institutions

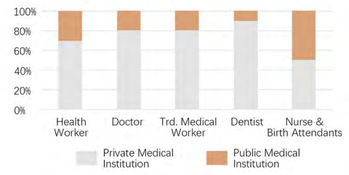
Public health centers are including SCs, PHCs and CHCs. They also provide some of the free medical services for the poor by providing general medical services. But the actual operations are not as expected. According to the 2001 statistics, the gaps in national SCs, PHCs and CHCs respectively reached 68%, 31% and 29%.

Public hospitals are funded by the government. Due to inadequeate health spending, most public hospitals have poor conditions and equipemnt lag. Because of the lower charges, ordinary citizens are mainly provided with medical services by public hospitals.

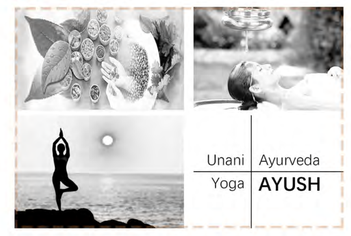
PRIVATE Medical Institutions

Private clinics are small and freely operating, but their medical and equipment conditions are uneven, and even the qualified licenses for medical practice of health workers are not surely available. They are widely distributed in villages and small towns, providing services to the widest populations.

Private hospitals are located in large cities with advanced equipment and well sanitary conditions, but the charges are higher than public hospitals. They represent the top level of Indian medicine and serve the high-income population.



The figure shows that the proportion of medical personnel in public medical institutions is much lower than privates.



In 1000 B.C., the Vedas, which recorded how ancient Indians performed the ritual of natural forces and eliminated disasters as well as treated diseases, is the earliest Indian medical classics.

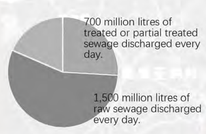
In 1000 A.C., Muslims conquered India and combining Indian medicine with Persian medicine to study how the ingredients of our bodies affecting our health.

In the 18th century, British brought western medical systems and research to India while they were invading it. Western medicine started coexisting with indigenous medicine popular in India.

In 2003, The AYUSH was established. It is a governmental body in India purposed with developing, education and researching in indigenous medicine systems. That India has been insisting on keeping traditional medicine up to date after nation independence.

2 Why do we choose Ganges Valley?

2.1 Ganges Valley's Present Situation



Water in the Ganges has been correlated to contracting dysentery, cholera, hepatitis, as well as severe diarrhoea which continues to be one of leading causes of death of children in India.

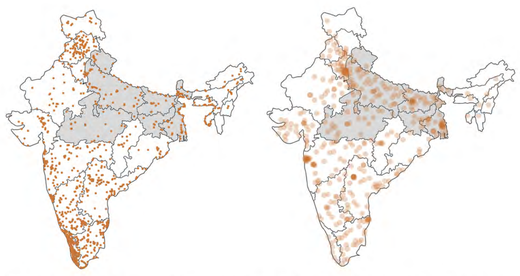
The middle-midstream urban agglomeration plant discharges a large amount of sewage, causing serious pollution to main stream and tributaries.

There are the abundant natural resources and tourist resources with clear water on the upstream.

The downstream is heavily polluted and densely populated as well as with poor medical conditions

India is the most cholera-infected country around the world in 2015.

2.2 Ganges and Medical Resources



Mapping of Hospitals in India | Population density in India

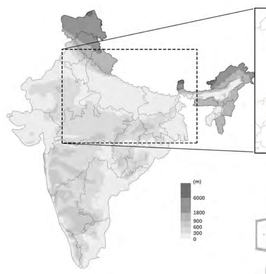
As shown above, the Ganges Valley is one of the most densely populated regions in India, especially some states such as Uttar Pradesh, Bihar and West Bengal. What's more, the Ganges Valley stretches across the eastern and northern India, where there are few hospitals distributed. It means that the per capita medical resources in the Ganges Valley are rather poor.

2.3 Ganges and Indian Culture

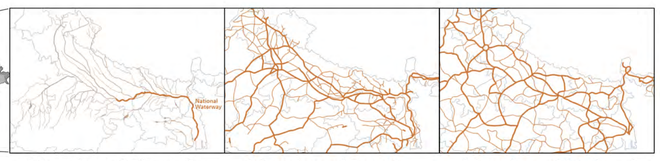
The Ganges is the mother river of India, and the Ganges Valley is the birthplace of Indian civilization, is the region which preserves a large number of shrines and ruins of Buddhist and Hindu.
Hindu believers have kept the custom of bathing the Ganges in holy water and drinking the river.

Contaminated water directly soaks the body, and even carries a variety of germs and virus into the digestive tract, that is easy to cause serious skin and gastrointestinal diseases.

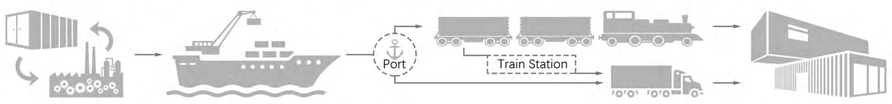
2.4 Topography and Traffic in The Ganges Basin



Relief Map of India



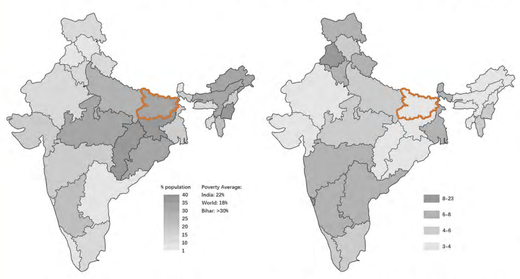
Mapping of Rivers & National Waterway | Mapping of Broad Gauge Lines | Mapping of National Highways & Roads



The Ganges Basin is a plain area possessing river networks and well-developed land traffic, with the largest volume of port cargo in India.
Change from shipping to by river or by overland transport, the processed containers can be transported to anywhere of the Ganges basin.

3 Why do we choose Bihar State?

3.1 Medical Resources in Bihar



Poverty Rates, 2012

Health Workers Per 10,000, 2001

Average Rural Population Covered by CHC:

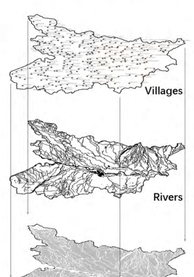
Norm	80,000-120,000
Status in India (2015)	154,512
Status in Bihar (2015)	1,319,163

Average Population Served Per Government Hospital Bed:

	Total Number of Bed	Result
India (2015)	1,376,013	879
Bihar (2015)	13,231	7,846

Bihar is a major state of poverty with the least number of health workers per capita. Some consider that Bihar is the poorest province in India.

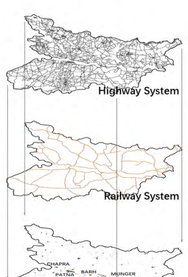
3.2 Space Form and Traffic in Bihar



Small villages are heavily dispersed throughout the region, and often only tens of thousands of people in each one.

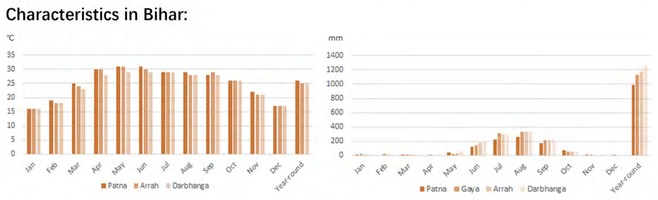
Network of waterways densely covered the whole Bihar, is that easy to form small settlements along rivers.

Bihar is a large population state with agriculture as its main industry, and about 90% of its land is cultivated.

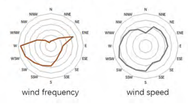


3.3 Climate in Bihar

Characteristics in Bihar:



Bihar is a typical monsoon climate zone, warm and humid during the same period of rain. Its main monsoon direction is west and south-west. We need to consider the effects of the humid region climate on the buildings we design, and how to use the high frequency winds properly.

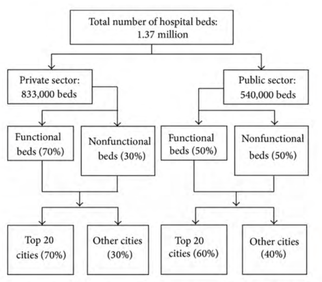


Floods in Bihar:

Bihar is India's most flood-prone State, with 76% of the population in the north Bihar living under the recurring threat of flood devastation. Floods in Bihar are a recurring disaster which on an annual basis destroys thousands of human lives apart from livestock and assets worth millions.

4 Why do we start with town & countryside?

4.1 Imbalance between Urban and Rural Medical Resources

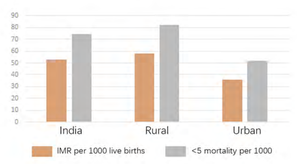


The Imbalance of The Number of Beds

Urban-Rural Medical Gap in India:

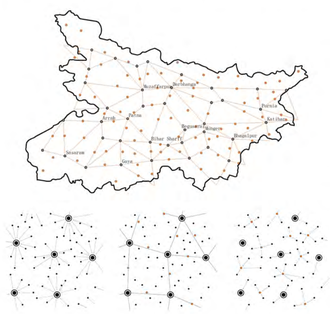
NCMH report that about 80% of health infrastructure, medical workers and other health resources are concentrated in urban areas where only 31% of the population live.

Existing data's have shown that about 50% of the sanctioned posts of specialists at CHCs were vacant which accounts to a shortfall of 6110 specialists at the CHCs.



More than 70% of the households of rural India do not have toilet facilities. India urgently needs to strengthen its rural health care infrastructure and manpower manifold.

4.2 Model of CHCs Location Selection



Before

In the absence of CHCs, rural populations need to go to cities for medical treatment.

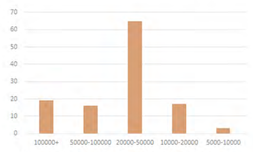
Then

Connect the central points of the adjacent two cities and mark the settlements closest to the midpoint of the segments.

After

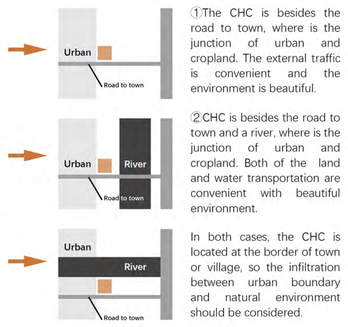
Marked settlements, as the site of the CHCs, is closer to service to other villages or towns.

4.3 Settlement Types and Site Selection



Number of Cities/Towns in Different Population Size-class in Bihar

As the chart above, most of built-up areas have a population of less than 100,000 and do not need a separate CHC, so CHCs have to serve multiple towns or villages for Rational utilization of medical resources.

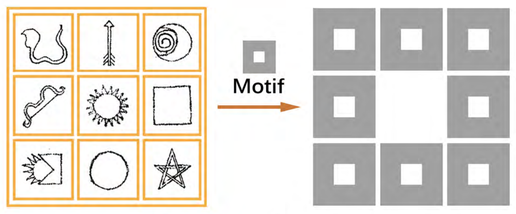


①The CHC is besides the road to town, where is the junction of urban and cropland. The external traffic is convenient and the environment is beautiful.

②CHC is besides the road to town and a river, where is the junction of urban and cropland. Both of the land and water transportation are convenient with beautiful environment.

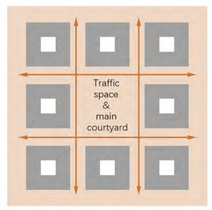
In both cases, the CHC is located at the border of town or village, so the infiltration between urban boundary and natural environment should be considered.

5 How do we establish basic layout patterns?

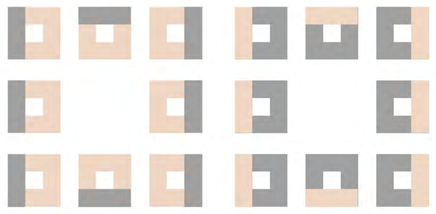


The nine-square mandala is a cross-culturally vaild archetypical symbol for a centred universe in India. It represents a simple worldview of Buddhist philosophy, and in modern times it also represents a new metrod of thinking.

We extract the motif from the nine-square mandala, and transform it into a central courtyard as well as eight blocks with their own courtyards, which forming a framework for the basic of area planning and design.



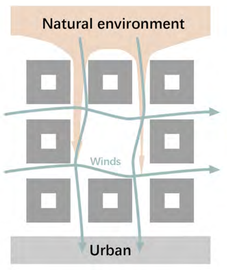
The space among the blocks as the main traffic space. The other 8 modules of function are organized through this traffic space.



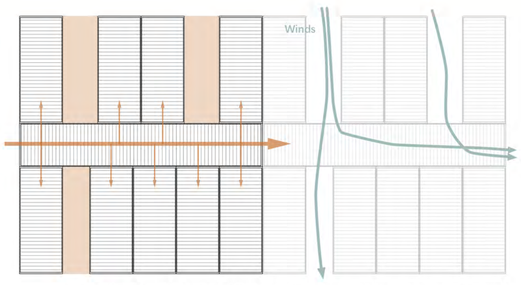
Eight blocks are different functions: ① the lobby, ②department of outpatient, ③department of emergency, ④department of medical and technical, ⑤inpatient, ⑥administration, ⑦logistics, ⑧service personnel residential area.

We have reserved 25% of the space for Follow-up construction, because in India, the shortage of facilities is a frequent problem.

There is a constant rush of peak medical facilities in Indian public medical institutions, especially in inpatient department, so we reserve the additional parts at the periphery of the Community Health Center.



The natural environment penetrates into the city through the space between blocks.



The basic construction unit consists of a 45-inch container and a number of 20-inch containers. The patio between small containers brings daylight to the next room, forming a beautiful sequence of light and shade in corridor.

6 How do we do pattern design?

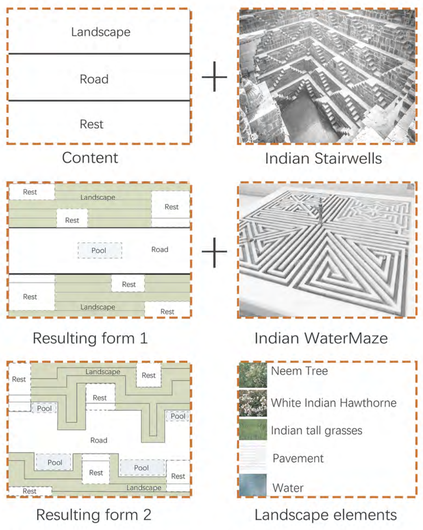
The gray spaces surrounding the courtyard, including the open corridors or halls, are common forms of space in Indian traditional public buildings.

Under the backdrop of India's warm climate, outdoor steps are important public venues. What's more , outdoor steps can form a pleasant courtyard with water or greenland.

Courtyard is important spatial organization of the Indian architecture, which can form the system of outdoor public spaces and organize clear functional relationships.

Pergola is a very common shading device in Indian residential houses, which can provide moving light and shadow effect while shielding the direct solar radiation.

Architecture space analysis & design

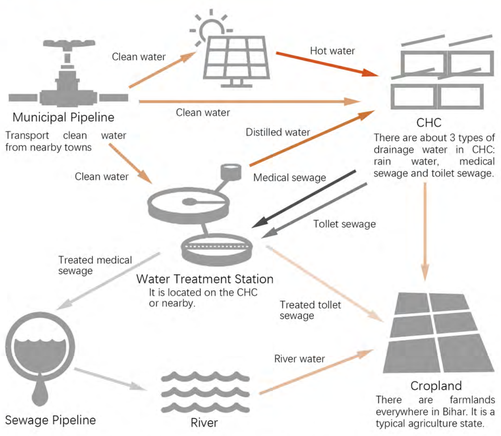


Landscape analysis & design

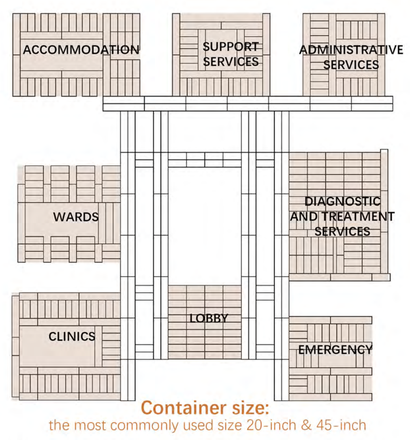
HEALING MANDALA

Indian Community Health Centre Design

II



Water treatment & recycle



Container size:
the most commonly used size 20-inch & 45-inch

Partition design & modular

7 How do we do practical design? (exp. : Giriyak, Bihar)

First Floor Plan 1:300

Location analysis

The Giriyak is located at the midpoint of the lines connected Nawada with Bihar Sharif, two important cities of Bihar state. It is the crossroads of the main roads.

There are a number of towns and villages near Giriyak, with a population ranging from thousands of to tens of thousands, but all of them are without the conditions for a separate community health centre.

Master Plan 1:1500

Use it as the structure of garden ceiling

We also intend to take adavantage of the remainning side wall of the container which were removed to contruct a bigger space.

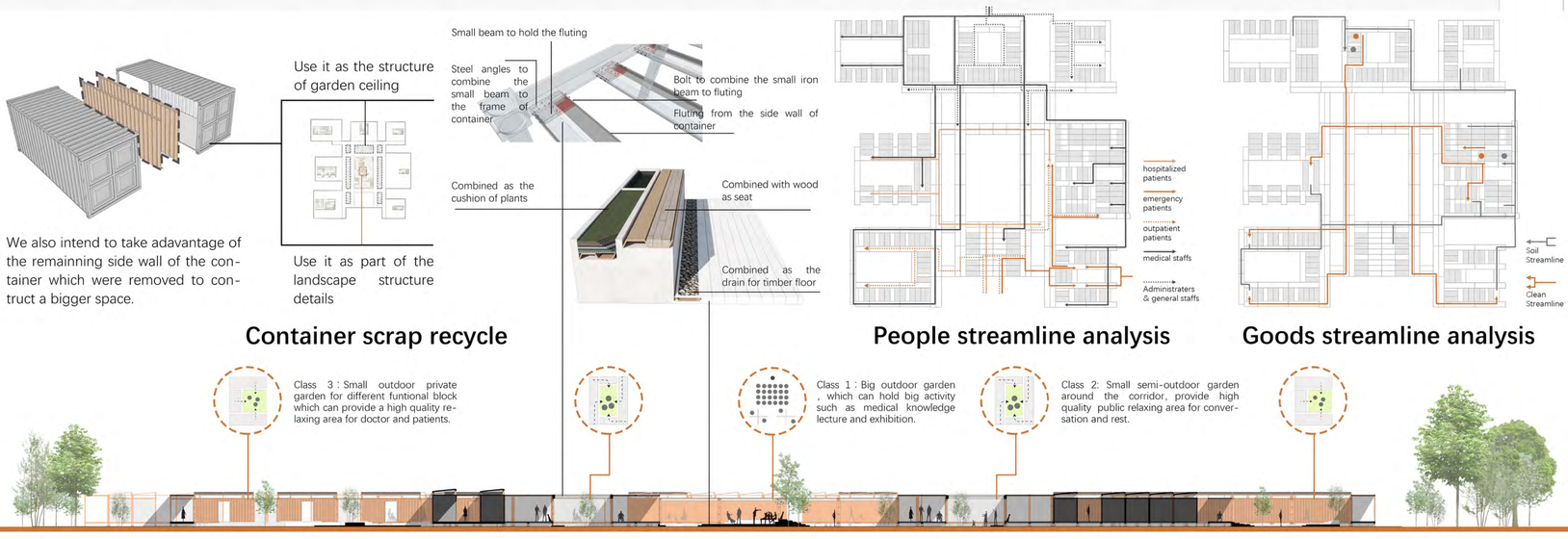
Use it as part of the landscape structure details

Container scrap recycle

People streamline analysis

Goods streamline analysis

Structural analysis (exp. : 6-bed ward)



A-A section 1:300