

CLIMATE RESILIENT AND CHILD FRIENDLY URBAN PLANNING

INTERVENTIONS WITH YOUNG PLANNERS

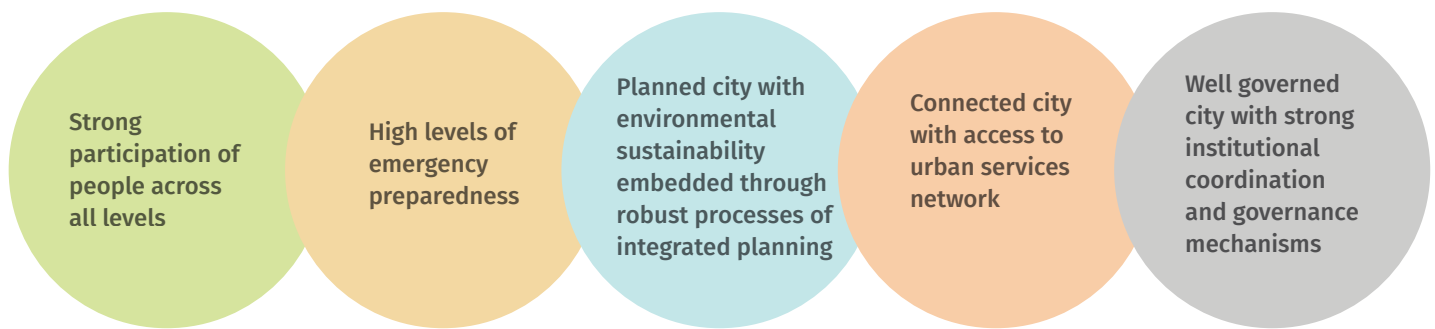
CITIES ARE HUBS OF INTENSIVE RESOURCE DEMAND, ENVIRONMENTAL DEGRADATION, AND GREENHOUSE GAS EMISSIONS. THEY ARE FACING MULTIPLE CLIMATE INDUCED IMPACTS THAT THREATEN THE URBAN POOR POPULATIONS, ESPECIALLY WOMEN AND CHILDREN AND ALSO ASSETS.

Cities are also becoming the locus of increasing losses due to climate change impacts because of high concentration of population and large scale economic investments. Most of the anthropogenic causes of climate change are linked with cities and cities are facing significant impacts from extreme weather events that come with this. Mainstreaming climate resilience into urban planning and development is essential because climate risks are increasingly becoming important factors which are defining poverty levels, well-being of poor and marginalized sections of the society, such as women and children, economic growth and good urban development. Thus, climate resilient urban planning needs to consider both current and future climate risks as well as other likely changes in the urban environment.



PLANNED CITY: RESILIENT CITY

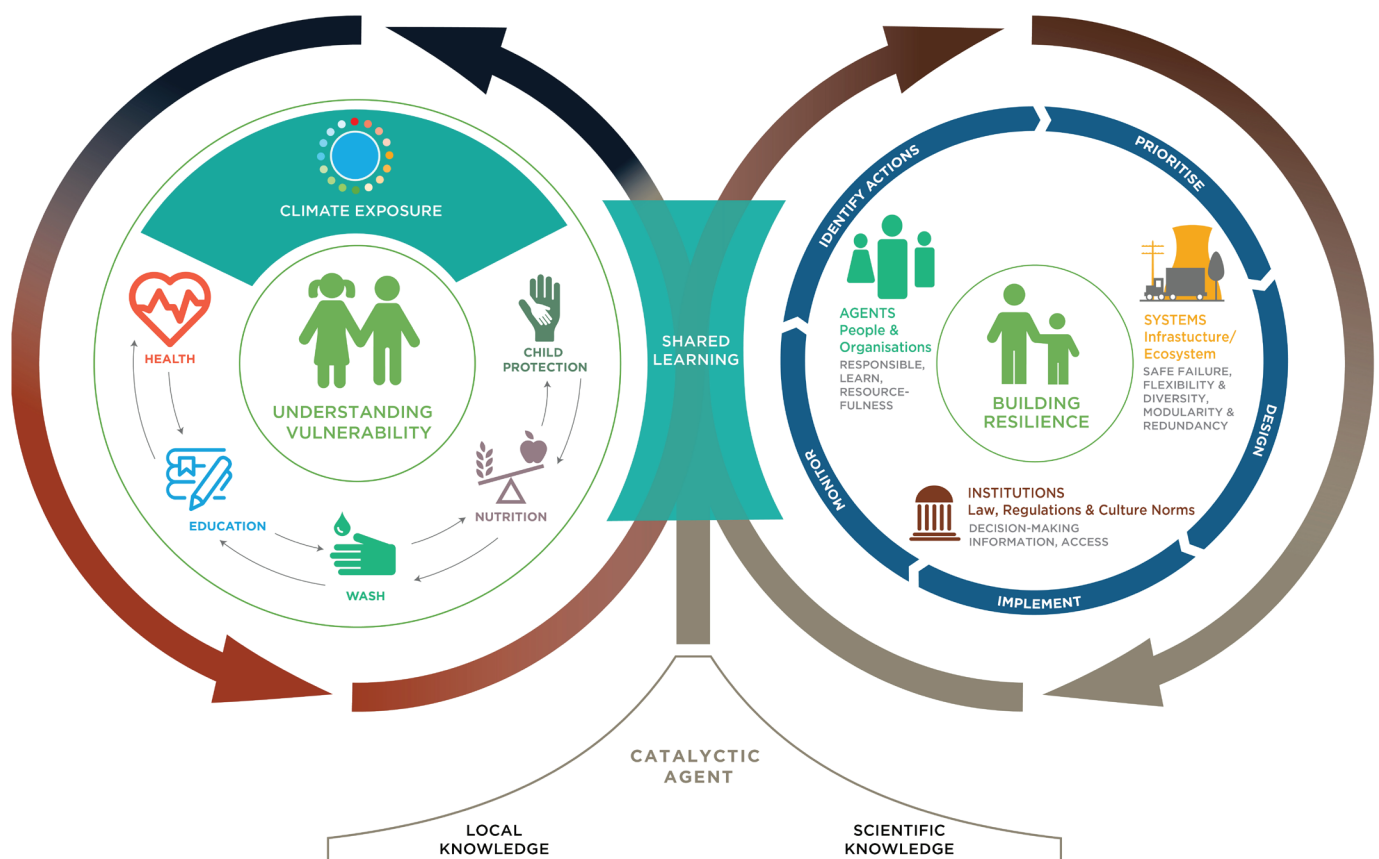
What makes a resilient city?



CHILD CENTERED URBAN RESILIENCE FRAMEWORK

The Child-Centered Urban Resilience Framework, adapted from the internationally acclaimed Climate Resilience Framework developed by ISET International, is an integrated approach for understanding vulnerabilities of urban poor children, one on part, due to climate change impacts around their five key development parameters – Health, Education, Child Protection, Nutrition and Water, Sanitation and Hygiene (WASH). On the other hand, it focuses on the

critical roles of Systems, Agents and Institutions across these five development parameters and the manner in which, with their own resilient characteristics, they can contribute in building urban climate change resilience for children. Structured approaches to urban planning at Systems, Agents and Institutions level can contribute in building climate resilient and child friendly cities.



Adapted from Climate Resilience Framework, ISET International

MAINSTREAMING RESILIENT DEVELOPMENT PLANNING IN SCHOOL OF PLANNING AND ARCHITECTURE'S COURSE CURRICULUM

In India, there is a dearth of both understanding and capacities on mechanisms of integrated urban planning considering development, climate change and disaster management. There is a huge planning gap in the current urban development planning regime where the needs and participation of children as stakeholders in the city planning process are ignored.

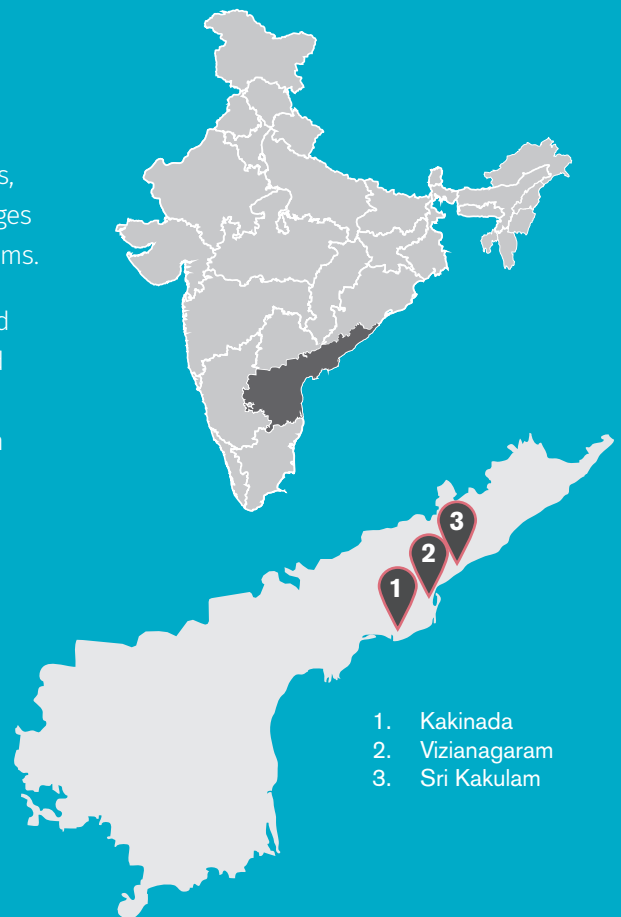
Urban planners can support a forward looking approach, influence the long-term decisions across systems and can act as visionaries for climate & disaster resilient and child friendly cities.

SPA'S MASTER OF PLANNING (1ST SEMESTER) INTEGRATED PROGRAM (Housing, Urban Planning, Regional Planning, Transport Planning and Environmental Planning)

This programme emphasizes on training students with skills for analyzing physical, social, cultural, economic and ecological dimensions of urban settlements, comprehending their problems, preparing strategies to address the issues and emerging challenges in a planned manner and working out implementation mechanisms.

The studio exercises facilitate practical exposure for students and enable them to learn the various phases of plan preparation and project formulation. This also provides them an opportunity to interact with officials in various departments and familiarize with relevant data collection.

SPA's Studio Programme Cities 2017



1. Kakinada
2. Vizianagaram
3. Sri Kakulam

Assignment: Develop an Outline Development Plan (a Master Plan) for the cities

During a span of two weeks, the students collected data under different heads mentioned below:

- | | |
|--------------------------------------|---|
| 1. History and Evolution of the town | 8. Infrastructure |
| 2. Demography | 9. Tourism |
| 3. Socio Economics | 10. Heritage |
| 4. Trade, Commerce and Industry | 11. Climate Change, Environment and Disaster Resilience |
| 5. Land-use | 12. Institutions and Legislations |
| 6. Housing | |
| 7. Transportation | |

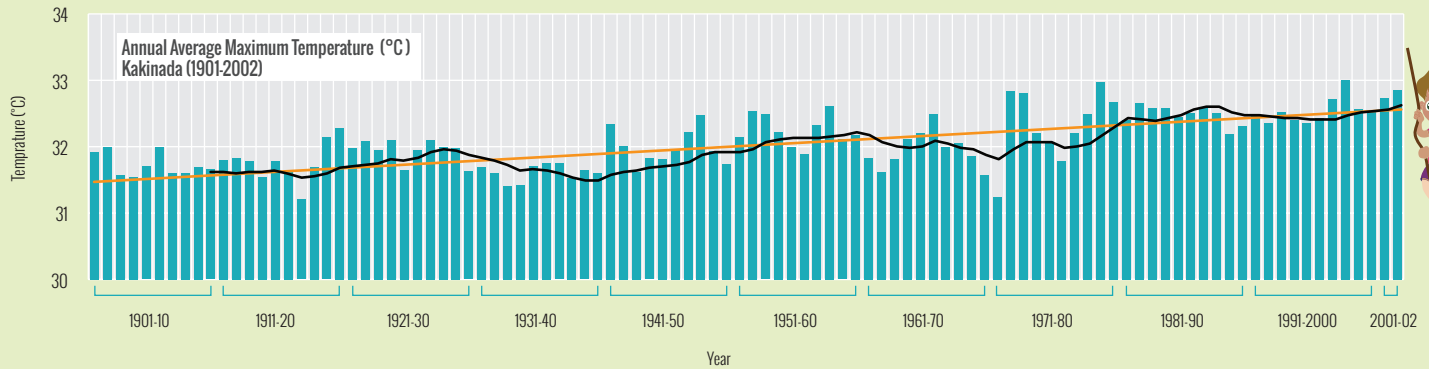
The following three surveys were also undertaken by the students:

- | | |
|---------------------|--------------------------|
| 1. Land-use Survey | 3. Transportation Survey |
| 2. Household Survey | |



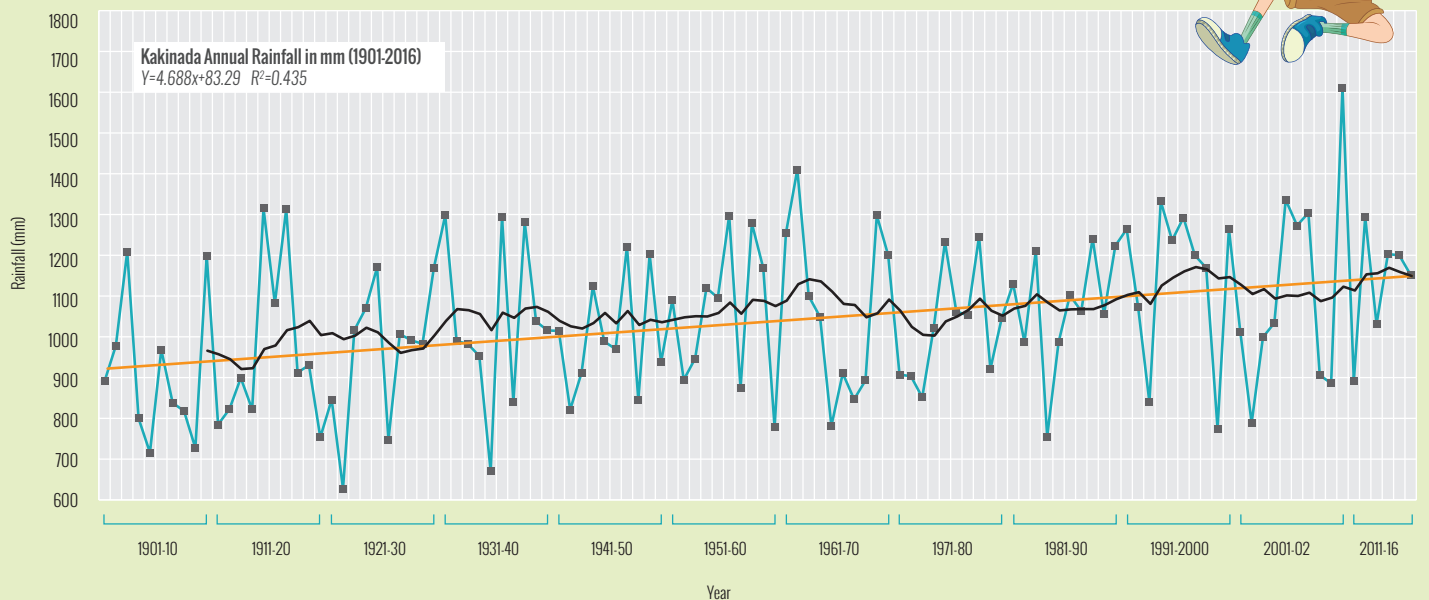


- Kakinada is a coastal city and is the head quarter of East Godavari district of Andhra Pradesh.
- Climate of Kakinada is tropical savanna with hot and humid conditions throughout the year.
- The city experiences most of the rainfall during SW monsoon, whereas considerable rain also falls during NE monsoon.
- Cyclones formed over Bay of Bengal frequently strike the city.



Present Climate Trends

- Annual mean max. and min. temperature shows significant rising trend (.95 °C /100 yr and 0.80 °C /100 yr) respectively.
- Annual rainfall shows a significant increasing trend over Kakinada i.e. 65 mm in last 100 years, whereas monsoon rainfall shows decreasing trend during the periods 1981-2016.
- Extreme events are increasing post 1990.
- Sea level rise is 0.70mm/year in last 50 year

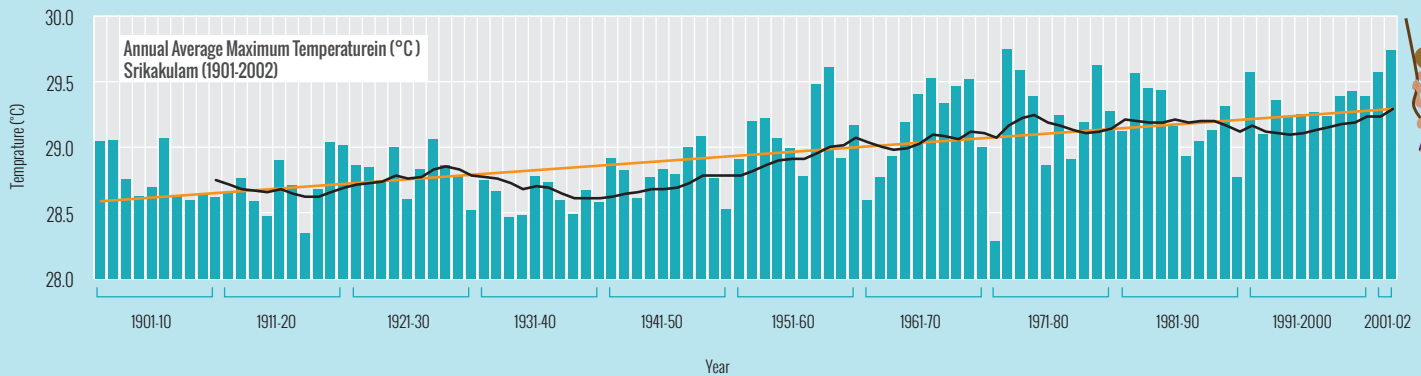


Future Climate Change Projections

- Mean maximum and minimum temperatures are likely to increase by 1.75 to 2.1 °C & 1.6 to 2.0 °C by the end of the fifth decade of this century.
- An increase of 7-10 % in summer monsoon rainfall is indicated by the year 2050. Similarly annual rainfall is likely to increase by 8-12 %. NE monsoon also likely to increase by 5 % by 2050.
- Extreme rainfall events might increase by 10-20 % by 2050.
- Hot days and warm night might increase in future.
- Sea level rise expected 0.21 to 0.48 meter by 2100.

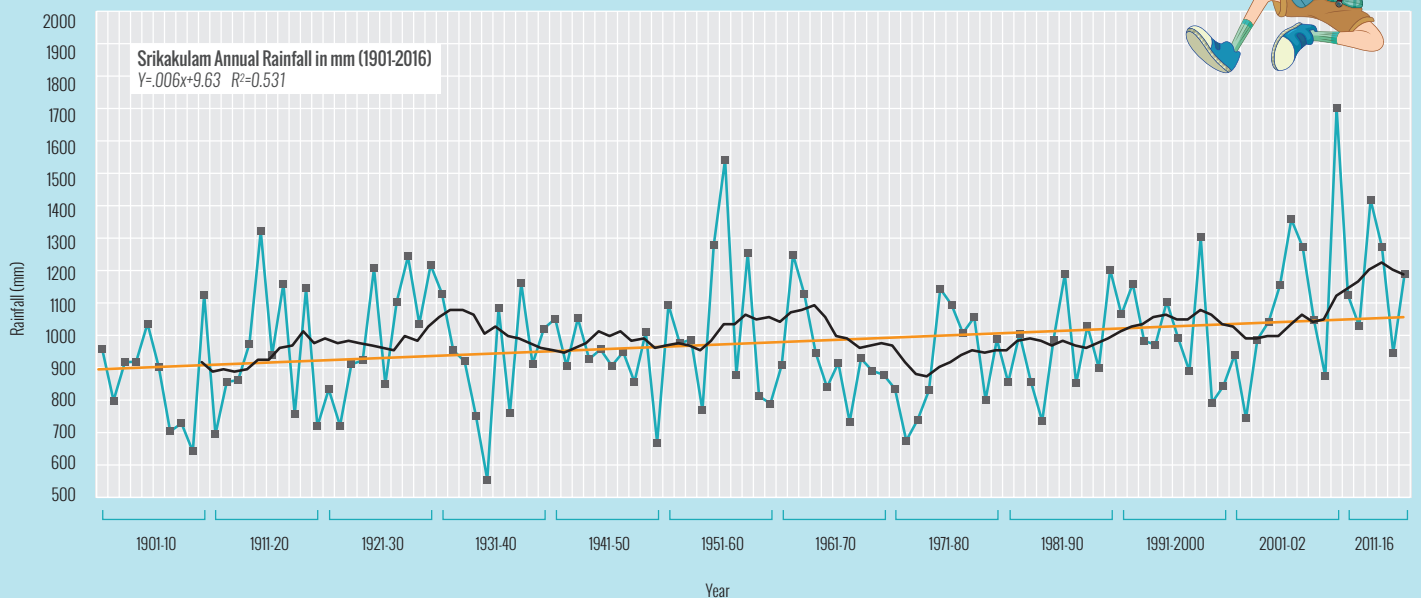


- Sri Kakulam is a coastal city situated in the extreme northern east of Andhra Pradesh.
- Climate of this place is tropical and humid to sub humid conditions
- prevail throughout the year. Average humidity is 70-80%.
- Srikakulam experience both the monsoon i.e. southwest and northeast. SW monsoon contribute 64.7 % of its annual rainfall. NE monsoon contributes 28.55 % of its annual rainfall.
- Four severe cyclones and ten medium cyclones have hit the city in the past 35 years.
- Once in five years drought condition also prevails over the area.



Present Climate Trends

- Annual mean max. and min. temperature shows significant rising trend (0.80 °C /100 yr. and 0.75 °C /100 yr.) respectively.
- Rainfall shows a significant increasing trend (16 mm/decade) during the periods 1901-2016.
- Extreme weather (Rainfall & Temperature) events are increasing post 1990.
- Sea level rise is 0.70mm/year in last 50 year, due to thermal expansion of warmed ocean.

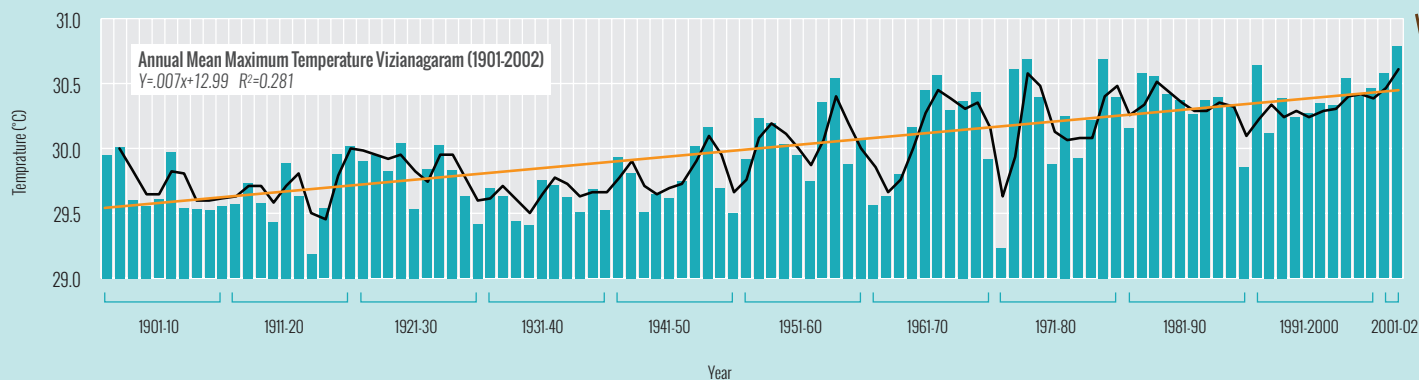


Future Climate Change Projections

- Mean maximum and minimum temperatures are likely to increase by 1.9 to 2.2 °C & 1.6 to 2.0 °C by the end of the fifth decade of this century.
- An increase of 10-20% in summer monsoon rainfall is indicated by the year 2050. Similarly annual rainfall is likely to increase by 10-15 %. NE monsoon also likely to increase by 3-7 % by 2050.
- Extreme rainfall events might increase by 10-20 % by 2050.
- Hot days and warm night might increase.
- Sea level rise expected 0.21 to 0.48 meter by 2100.

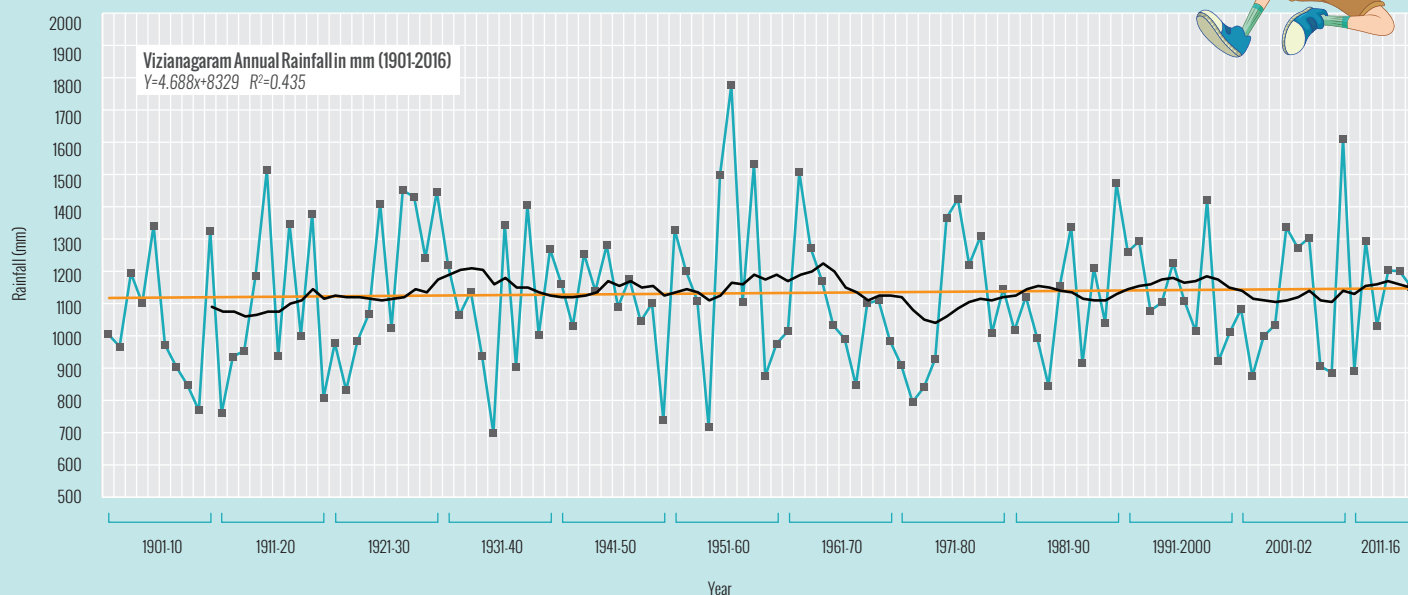


- The city is situated in north coastal Andhra Pradesh.
- Climate of this place characterized by high humidity all round the year.
- Vizianagaram experience both the monsoon i.e. southwest and northeast. SW monsoon contribute 67 % of its annual rainfall. NE monsoon contributes 22 % of its annual rainfall.



Present Climate Trends

- Annual mean max. and min. temperature shows significant rising trend (1.0 °C /100 yr and 0.90 °C /100 yr) respectively.
- Rainfall shows a significant increasing trend (5.1 mm/decade) during the periods 1901-2016.
- Extreme events are increasing post 1990.
- Sea level rise is 0.70mm/year in last 50 year.



Future Climate Change Projections

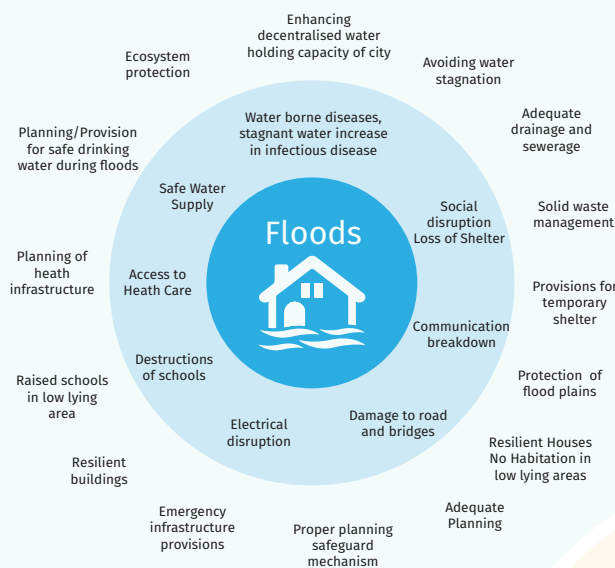
- Mean maximum and minimum temperatures are likely to increase by 1.6 to 1.9 °C & 1.5 to 2.0 °C by the end of the fifth decade of this century.
- An increase of 10-12% in summer monsoon rainfall is indicated by the year 2050. Similarly annual rainfall is likely to increase by 10-15 %. NE monsoon also likely to increase by 2-6 % by 2050.
- Extreme rainfall events might increase by 10-20 % by 2050.
- Hot days and warm night might increase in future.
- Sea level rise expected 0.21 to 0.48 meter by 2100.

UNDERSTANDING CITY'S VULNERABILITIES AND RESILIENCE OPTIONS

Droughts, Floods and Heat waves are the major threats in these three cities impacting the urban poor communities, especially children.

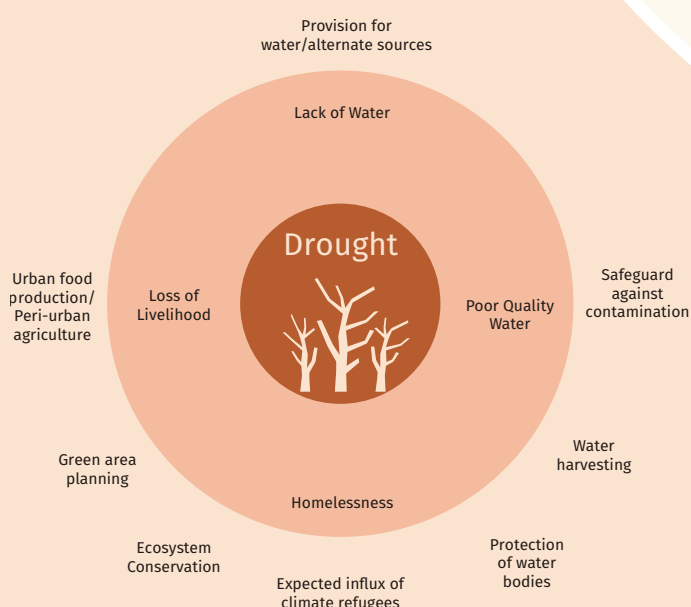
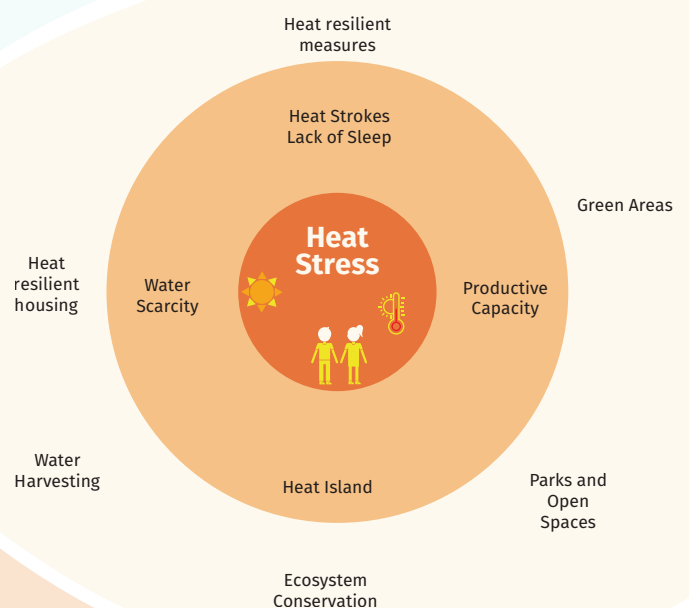
Potential Impacts of Climate Change on Children

The inner circle of the diagram represents the direct and indirect impacts of changing climate on children and marginalised population in the cities. The outer circle of diagram represents the suggestive resilience options that can be adopted to build resilience and the planning aspects that need to be integrated at this level.



Floods threaten children's survival and development. Direct impacts include injuries and death by drowning. Sanitation facilities are damaged leading to water contamination affecting children's well-being.

During heat waves, studies have shown that children under 12 months old are particularly vulnerable. Exposure to abnormal or prolonged amounts of heat and humidity without relief or adequate fluids can cause various types of heat-related illnesses.



Children of poor families are the most vulnerable to the effects of drought. Income loss and food supply shortages caused by droughts can lead to nutritional deprivations that can have both immediate and lifelong impacts.

EVOLVING RESILIENCE PLANNING OPTIONS IN STUDIO CITIES

With the above orientation the students were given assignments/group activities to identify the climate related vulnerabilities of the cities and provide innovative ideas (housing, infrastructure and environment etc) on climate and disaster resilient and child friendly urban development planning which are shown here.

OUTCOMES OF GROUP ACTIVITIES

RESILIENCE PLANNING OPTIONS IN STUDIO CITIES

LAND-USE

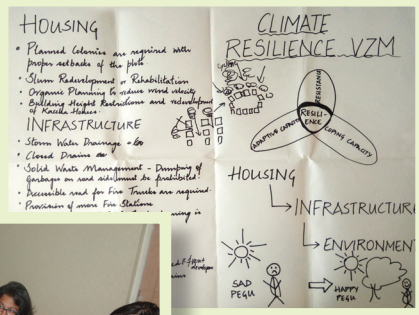
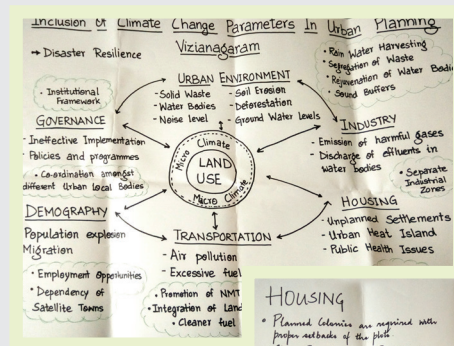
- Land suitability analysis (SWOT)
- Conservation of recharge areas and natural depressions
- Allotting land for open spaces and green parks in neighbourhood for reducing urban heat island (UHI) impacts

FLOODS

- Growing plants/trees like Eucalyptus that absorbs water in water-logged and flood prone areas
- Development of high capacity closed drains
- Road designing using modern technology
- Stilt parking in apartments
- Higher Plinth
- Flood resistant building material like bamboo

HEAT STRESS

- Afforestation
- Wetland protection
- Using a mixture of hardscape and softscape material in pathways for example grass pavers in place of concrete paths
- Development of shaded pedestrian walkways
- Use of algae based bio fuels which can absorb CO₂



THE WAY FORWARD

Resilience is a characteristic of systems, agents, and institutions that are alive and evolve dynamically over time. The innovative ideas on child-friendly and resilient city planning evolved in a short-term through this intervention will be crucial for addressing climate vulnerabilities of urban poor communities like children and women.

Planning for child-friendly climate resilient development also demands ability to respond to uncertainty and

complex situations. Planners are therefore, required to deal with a range of challenging problems, like climate change and climate-induced disasters. Experiences also suggest that the practice of incremental planning will be insufficient and that transformations via developing deliberate adaptive pathways will be necessary which will require planners to develop their capacity for adaptive learning. As planners have to deal with an array of challenges at any given time, the emergence of a new

challenge, such as climate change adaptation, on the planning agenda and the adaptive learning that planners are required to undertake to build their capacity to respond, is not a new phenomenon for the planning community. It is critical that urban planners have a sound understanding of the importance of the environmental components of sustainable development and the ability to negotiate this within the context of other competing interests.

Climate Change and Disaster Resilience for Urban Children –
An Initiative of UNICEF, India and Gorakhpur
Environmental Action Group, Gorakhpur, Uttar Pradesh
For further information, please contact:

Gorakhpur Environmental Action Group (GEAG)

Delhi Office:

A-187, First Floor Shivalik, Malviya Nagar,
New Delhi 110017
Phone: +91 11-41667754
Email: geagdelhi@geagindia.org

Gorakhpur Office:

HIG First Phase 1/4, Siddharthpuram, Tara Mandal,
Gorakhpur, Uttar Pradesh 273001
Phone: +91 551 2230004; Fax: +91 551 2230005
Email: geagdelhi@geagindia.org

