

# Visakhapatnam

## Key Findings

- The affects of hydro-meteorological disasters like cyclones, storm surges, flash floods due to torrential rains are increasing in an arithmetic progression with severe fluctuations in occurrence round the year having serious implications for health in terms of burden of diseases.
- The projected rise in annual maximum temperature by 1.75-2.15 °C by the year 2050 may increase the direct impacts on children's health in terms of thermal stress, such as heat exhaustion, heat cramps, sun burns and dehydration, etc.
- Inadequate public and health sanitation personnel (GO: 279), lack of proper toilet facilities, pollution of drinking water resources (both ground and surface water resources), improper management of storm water drains and lack of sewerage treatment facilities are some of the important factors which may hinder the overall growth of the city in the face of changing climate and recurrent disasters.
- Children in the slum pockets near harbour and port areas, hilly terrains and in the fringe villages of the city are the most affected due to continuous exposure to SPM (2.5) from the industries, disease outbreak (malaria, dengue, typhoid, diarrhoea), malnutrition and child labour due to the loss of livelihoods of the parents.

Visakhapatnam is the largest city in coastal Andhra Pradesh occupying an area of around 606 sq. km. The beautiful city with its twin town of Waltair forms a harmonious blend of majestic hills, valleys and golden beaches along the Bay of Bengal coastline. Increase in flash floods due to torrential rains, heat waves, storm surges and waterlogging during monsoon have been identified as the key challenges for the city due to climate change affecting the basic urban services, infrastructure, livelihoods of the people especially of those residing in slums and low income settlements.

***I am a fisherman and have been doing fishing for the last 30 years. Over the years, I am being forced to go deep into the sea for the fish. The cyclones are causing severe damage to our fishing crafts like nets and boats. This is leading to severe loss in our livelihoods and is increasing the burden on our women and children, who are forced to work for daily wages. We do not have other livelihood options as we are not aware of any other work.”***

- Thathiah Babu, Peddajalaripeta fishing hamlet, Visakhapatnam



# quick facts

## Geography

### Geographical Coordinates:

Latitude 17.69 ° N  
Longitude 83.23 ° E

### Height from mean sea level:

126 m

### Area of Municipal Corporation#:

606 sq.km

### Wards#:

72

## Demography

### Population##

1728128

### Decadal Population Growth Rate##

11.6 (from 2001 to 2011)

### Population Density#

3800 persons per sq. km

### Total Households#

5,09,042

### Average Household Size#

4.12

### Slum Population##

1,94,959

### Floating Population##

1,20,000

### Literacy Rate##

81.79 %

### Sex Ratio##

978

## Climate

### Climate

Tropical climate with three main seasons: Summer, Monsoon and Winter

### Annual Rainfall

1118.8 mm

### Major Disasters

Cyclones (moderate), Flood (moderate), Wind (low), Industrial Accident (low)

## Children

### Child Population\*\*

0-6 years: 164129

### Children currently attending school\*\* (Aged 11-14 yrs) %

76

### Children aged 5-14 years engaged in work % (Vizag-Urban) \*\*

2.53

### School Dropout % (Vizag-Urban, Age 6-17 years) \*\*

6.8

### Crude Birth Rate (Vizag-Urban) \*\*

17.5

### Crude Death Rate (Vizag-Urban) \*\*

7.4

### IMR (Vizag-Urban)\*\*

41

### U5MR (Vizag-Urban)\*\*

43

### Sex Ratio at Birth (Vizag-Urban) \*\*

Upper Limit-1020  
Lower Limit-950

### MMR\*

137 Highest in the state (state MMR 110)

### Children Suffering from Diarrhoea (%) Vizag-Urban\*

6.6

### Children Suffering from Acute Respiratory Infections (%) Vizag-Urban\*

0.5

\* India Annual Health Survey, 2011

\*\* Visakhapatnam District Health Bulletin, 2011

\*\*\* Sample Registration System Report, 2011

# Visakhapatnam Smart City Report, 2016

## Census of India, 2011

# Climate Scan of the City:

## Observed Climate

- Tropical climate with three main seasons: Summer, Monsoon and Winter.
- Summer season prevails from March to June and temperature ranges from 23°C to 32°C.
- Heat waves prevail when day time summer temperature rises to 6-8 °C above normal.
- Winter season minimum temperature remains around 16-26 °C.
- Annual mean rainfall is 1118.8 mm.

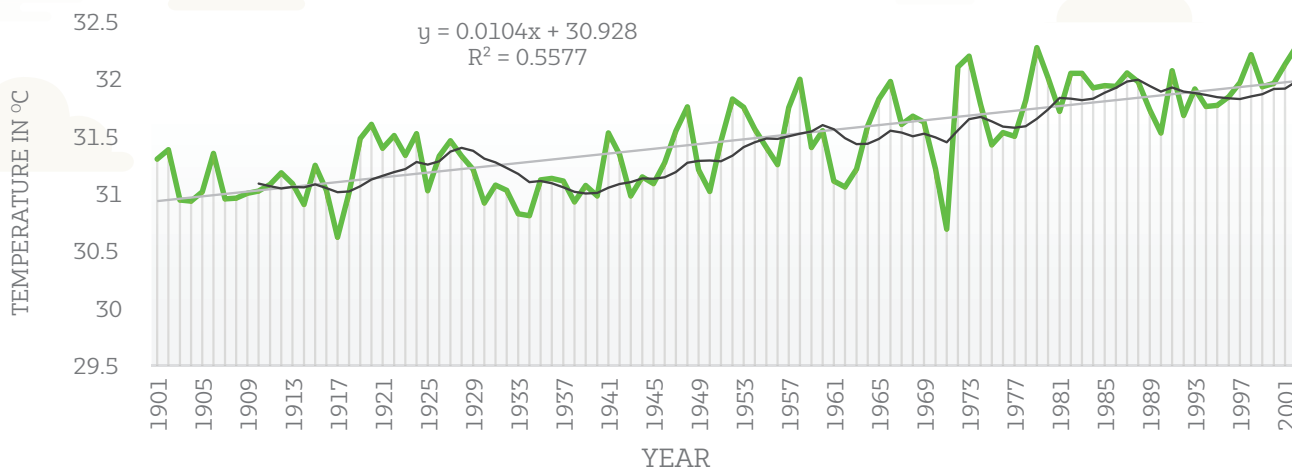
## Annual Climate Change Trend

- Significant increasing trend has been found in the mean annual maximum temperature (1°C during the last century).
- The maximum increase in annual mean maximum temperature was observed after 1980.
- Annual mean minimum temperature has significantly increased in the last century over Visakhapatnam i.e. 0.09 °C/decade.
- Increased occurrence of summer rainfall than winter rainfall has been observed.
- A clear trend in sea level rise has been observed over Visakhapatnam coast at 0.70 mm/year in the last 53 years.

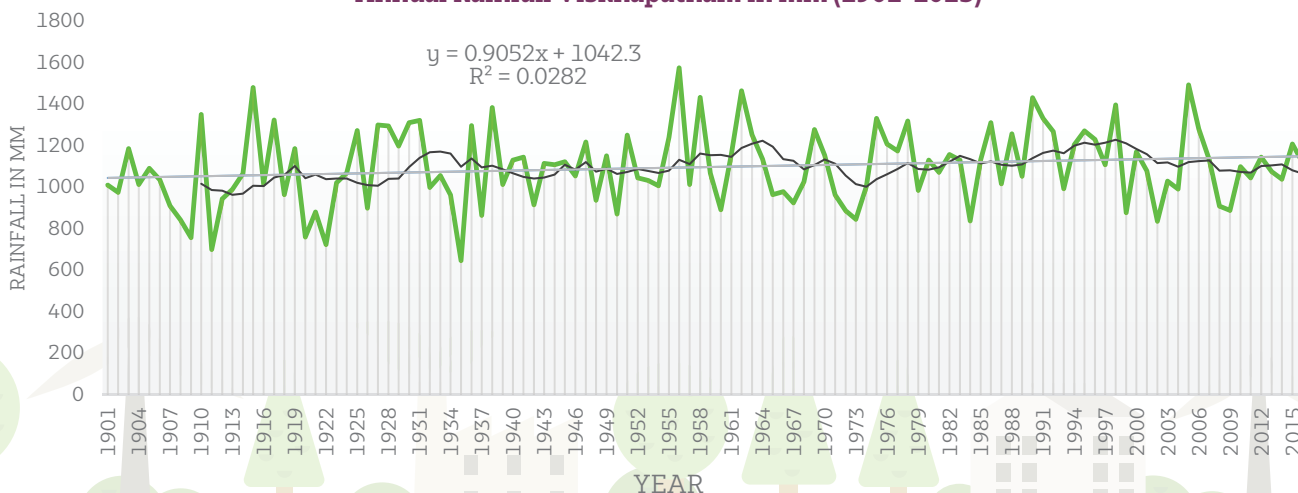
## Future Climate Change Projections

- Annual maximum temperature is projected to increase by 1.75-2.15 °C by 2050.
- Annual minimum temperature is projected to increase by 1.6-2.0 °C by 2050.
- Hot days and warm night might increase.
- The probability of occurrence of mild to severe cyclones is high.
- Mean annual rainfall is likely to increase by 10-12 per cent by 2050.
- Mean monsoon rainfall is likely to increase by 13-22 per cent by 2050.
- Extreme rainfall is expected to increase in frequency and intensity. 2050 projections show an increase of 70 mm for maximum 1-day rainfall and 90 mm for maximum 5-day rainfall.
- Sea level might increase by 0.21 to 0.48 meter by 2100.

**Annual Mean Maximum Temperature, Visakhapatnam (1901-2001)**



**Annual Rainfall Viskhapatnam in mm (1901-2015)**

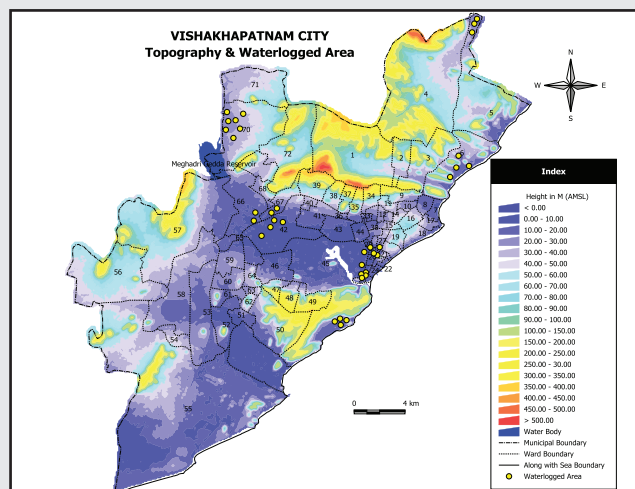


# RISK FRAME OF VISAKHAPATNAM CITY



Visakhapatnam is a highly dynamic area with many risks ranging from natural to anthropogenic as well as climatic stresses to developmental stresses, which lead to increased risk of exposure of marginal population to various vulnerabilities which may turn into disasters, if proper attention is not accorded to them. The plain land around the city is under tremendous pressure of urbanisation (residential development including societies, private houses and slums) and is becoming a scarce natural resource day by day. Rapid industrialisation in the southern part of the city has replaced agricultural lands. Due to lack of land within the city, significant illegal constructions have occurred on the hilly regions disturbing the natural slope morphology including natural drainage, soil cover, slope vegetation and slope stability. Climatic stresses like cyclones, storm surges and extreme rainfall are the major vulnerabilities with increasing incidence both in numbers and intensity. Increase in the incidence of rainfall (100 mm rainfall in a day) during both monsoon seasons, increased occurrence of cyclones have led to increased vulnerability of the city. With breaching of coastline norms, the mangrove belt along Visakhapatnam

which is a protective gear against climatic hazards like cyclones and floods is getting wiped out. The combined effect of such human, natural and development factors are resulting into enhanced vulnerability of the city in the events of climate variability (current & projected future) leading to enhanced shocks and stresses of urban people and hence increased risks in the city. These shocks and stresses are further aggravating poor children's vulnerabilities, adversely impacting their health, education, water & sanitation aspects, nutrition and physical protection.



# Climate change vulnerabilities of urban poor children

Key Issues	Responsible Factors	Special Categories of Affected Children
<p><b>Health:</b> Heat stress; Vector borne diseases like malaria, dengue (in post monsoon); Water borne diseases: typhoid, diarrhoea; Respiratory diseases: asthma, bronchitis and allergies; infections due to groundwater contamination, mental stress among children</p>	<p>Increasing temperature extremes, increase in air pollution (factories/port activities/traffic), storm surges and waterlogging, pollution of water bodies, poor hygiene conditions in slums, extreme weather events and coastal erosion affecting economic and physical activities</p>	<ul style="list-style-type: none"> <li>• Children in slum settlements</li> <li>• Children in the fringe areas of the city</li> <li>• Children living near port area in slum like settlements</li> </ul>
<p><b>Education:</b> Lack of school facilities in slum areas, age old existing school buildings, burden of diseases after disasters affecting school attendance, absenteeism due to involvement of children as labour, high dropout rate during the monsoon season, lack of interest in higher education</p>	<p>Floods, waterlogging, heat waves and cyclones affect access to education, inadequate school infrastructure in terms of safe drinking water, proper sanitation facilities and sufficient toilet facilities results in absenteeism, loss of livelihoods of parents due to climate change induced disasters leading to lack of willingness to send their children to schools, substance abuse among children</p>	<ul style="list-style-type: none"> <li>• Children at tourist places mostly involved in labour</li> <li>• Floating children (climate change induced migration)</li> </ul>
<p><b>Nutrition:</b> Diminishing availability of food crops from peri-urban areas, nutritional deficiencies leading to birth deformities, stunted growth, poor muscle growth and lack of immunity against the prevalent diseases</p>	<p>Loss of livelihoods, increasing water stress leading to decreased food production, diversion of peri-urban agricultural lands for non-agricultural uses, lack of awareness about nutritious and balanced diet, unhygienic food intake habits</p>	<ul style="list-style-type: none"> <li>• Children living on hilly terrains</li> </ul>
<p><b>WASH:</b> Lack of potable water, water borne diseases, increasing malnutrition, open defecation, skin rashes, heavy metal poisoning from contaminated water</p>	<p>Flash floods and waterlogging during storm surge, inadequate sanitation infrastructure, inadequate sewerage treatment infrastructure and lack of operation and maintenance of existing infrastructure, diminishing drinking water quality due to less rainfall and heavy metal contamination of water due to industrial, agricultural and biological effluents, poor infrastructure to hold and store drinking water and construction in the catchment areas of major drinking water sources, lack of health and hygiene awareness among parents and children.</p>	
<p><b>Child Protection:</b> Stress among floating children population due to migration, child labour - hotels, factories, port area and harbour activities, drug abuse.</p>	<p>Loss of livelihoods due to climate change impacts (higher unemployment), merger of surrounding villages into GVMC limits, domestic violence due to unemployment and displacement of people during disaster, lack of education and awareness among parents about child safety issues, involvement of children in the high risk jobs at the harbour</p>	

# Strategic directions to build climate resilient and child friendly Visakhapatnam City

Health	Education	WASH	Nutrition	Child Protection
<ul style="list-style-type: none"> <li>- Maintaining green belts in the city and in peri-urban areas to mitigate pollution and heat stress.</li> <li>- Conservation of peri-urban agriculture.</li> <li>- School timings can be changed to avoid extreme temperatures; Time and days modification for schools (April and May should be vacations).</li> <li>- Awareness on water, vector and food borne diseases.</li> <li>- Awareness among parents and children on ill effects of climate change and disaster on health for better preparation.</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation and up gradation of school safety plans.</li> <li>- Renovation of old buildings and construction of new disaster resilient school buildings.</li> <li>- Awareness among school children on climate change and disasters and essentials of self safety</li> <li>- Involvement of children in the local awareness programs and sensitizing them on the issues.</li> </ul>	<ul style="list-style-type: none"> <li>- Rainwater harvesting</li> <li>- Provision of adequate infrastructure to maintain adequate quality and quantity of drinking water</li> <li>- Treatment of drinking water at household/ school level - to be taught to children.</li> <li>- Development of integrated underground sewerage system in the city.</li> <li>- Development of effluent treatment plants and sewerage treatment plants in the city.</li> <li>- Awareness among children on good hygiene practices.</li> </ul>	<ul style="list-style-type: none"> <li>- Awareness building on seasonal and local fruit consumption.</li> <li>- Awareness on utilising the meal schemes provided by the government.</li> <li>- Encourage children to follow a proper diet.</li> </ul>	<ul style="list-style-type: none"> <li>- Strict enforcement of laws relating to child safety and protection.</li> <li>- Creation of special awareness drives to reduce child labour and levying of fines.</li> <li>- Awareness among parents and children on issues of self safety and protection during disasters.</li> <li>- Monitoring of children and youth in the migrating and floating population.</li> </ul>

## Climate Change and Disaster Resilience for Urban Children:

An Initiative of UNICEF, India and Gorakhpur Environmental Action Group, Gorakhpur, Uttar Pradesh

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