

## HEAVY FLOODS ON THE URBAN ROADS OF HYDERABAD FLOODING LOW LYING INHABITANTS OF HYDERABAD METRO CITY – A CASE STUDY

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**Abstract-** The urban population in rapidly increasing world wide similarly the flooding of urban roads also are increasing due to the old drainage system designed limited population. In the case of Hyderabad metro city, the drainage system was developed during 1591 by th King Mohammed Quuli Qutub shah on the bank of river Musi, The urbanisation lead to more catchment area resulting to heavy floods on the roads and low lying areas of Hyderabad. In addition the agricultural lands have been converted to residential agglomerating in the pheriphery of 30km radius thus creating concrete jungle. Due to the development of urbanisation concrete building area and concrete roads area increased to 90% of the city metro area. As surely total rainfall is diverted to runoff with out increasing the ground water of the city; thus flooding of roads and low lying bresidential areas. The buildings increased irregularly on the road on the flood zones tributaries of musri river resulting to floodings of residential buildings of the city. The hazards faced by the citizens will be studied and will be find out the solutions this project to study the solutions to the above problem in metro city Hyderabad under GHMC and HMDA

**Keywords :** Drainage System, Runoff, Ground Water, Flooding.

### I. Introduction

Hyderabad is a historic city noted for its monuments, temples, mosques and bazaars. The culture was of its multitude influence shaped the character of the city in the last 400 years. Hyderabad was the capital city Qutubshahi dynasty.

Mohammed Quli Qutub shah of the Qutub shahi dynasty built the city of Hyderabad on the musri river 5 miles (8Km) east of Golconda in 1589.The roads along with the bridge called the purana phool were constructed and the city was formed during the kingdom of Mohammed Quli Qutub Shah. He ruled the city on Golconda fort, which was constructed by the Kakatiya dynasty.He also ordered the construction of iconic monument Charminar in 1591.

Heavy overnight rains created havoc in past of Hyderabad and its suburbs as water entered some residential areas and flooded roads.

The city drainage system was developed in the early 1930 after the disastrous number Musi flood of 1908 which is said to have killed 15,000 people in Hyderabad and made an equal number homeless.Since then, while additions have been made to the drainage and sewage system by successive Government, there has been no revamp.

Hazards due to flooding of Musi River in the urban roads of high density traffic in(High Tech city....

Overflowing drains, Water logging, fallen trees, wall/building collapses.

Large parts of the city were left without electricity and there by communication for several days.

Major traffic blocks suffer due to water logging and transportation of essential commodities will be affected.

Since Hyderabad lapses a separate storm-water drainage system, even mild showers can cause water logging and flooding in the city. The following table depicts the growth of population in the city of Hyderabad over the last fifty years.

Census	Population	%
1971	1,796,000	
1981	2,546,000	41.8%
1991	4,359,262	71.2%
2001	51,637,483	29.3%
2011	7,674,689	36.1%.

The city population in 1897 was 415,039 today the city of Hyderabad, covers an area of 650sq.km (250 sq.miles) has a population of 6.8 million.

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ordinarily, spontaneously condense into drops to form clouds”.

The impact of urban water and air due to flood water and storm water “water vapour doesn’t ordinarily spontaneously condense into drops to form clouds”, says climate scientist Tom Bell, from NASA Goddard space flight centre.

“It needs dirt to form spherical shape. All rain needs aerosols to form clouds “in the natural world cloud – forming aerosols are things like sea salt, dust and pollen all of which are visually smaller and more numerous than natural aerosols. The impact on rain, says Bell, varies depending on where the clouds form. In some cases, urban aerosols from rain, but in others they increase it.

### II. Physical Causes of Flooding

Heavy rainfall, Snowmelt, Steep slopes, Long Periods of rain, Impermeable Routs, Very Wet, Saturated Soils.

#### Reasons for flooding the urban roads and low lying areas:

Flooding occurs when a river discharge exceeds the capacity of its channel to carry the discharge. The nature of the drainage basin has influence on the likelihood of flooding. Some drainage basins are more likely to flood than others. The vegetation soil type and geology of surface and sub soils in areas of the world vegetated by dense forest, interception and uptake by plants reduce the risk of flooding during time of heavy rainfall.

#### The impact of human activities on flooding:

- Population growth and urbanisation has led to demand for land to build on-flood plains illegally.
- As the pavement materials like cement concrete roads, bituminous roads which are being developed in the city are impermeable materials, the runoff will increase at a rapid rate
- Often surface water is channelled directly into drains and sewers, so runoff reaches the river much more quickly.

#### Deforestation:

Owing to the cutting of trees for developmental works like roads, road widening and building, there is a great risk of erosion and fast flowing of runoff without interception and without percolation in the urban areas increase the floods.

#### River Management:

The main aim of river management is to reduce the likelihood of flooding. However, in some circumstances it can actually increase the risk.

Flood embankment have been built along river banks. They are designed to increase river capacity with due protection

but in the urban cities like Hyderabad no protection to the banks of Musi river were provided.

It is predicted that global warming will result in reduced rainfall in some areas, but on the other hand counter heavy rain fall will be precipitated without notice.

Higher temperatures will result in increased evaporation over the seas and oceans, leading to greater precipitation such an increase will inevitably cause more rivers to flood, particularly since most flood plains have become heavily urbanised over the last one century.

#### Hyderabad Climate:

Heavy rains lashed the city of Hyderabad in September and October. The areas as under Falakanuma, Ramnagar, Madhapur, Chandanagar, Darulshifa, Dabeerpura and Jama Masjid, Punjagutta, Jubli hills, Raj Bhavan Road, Nagole, Ramanthapur T.V Studio Road, Krishna nagar, Madhapur, Asifnagar, Bahadurpura, Ramnagar, Singodikunta, Ambrepet, Habisguda, Shiva Rampalli, Begumbazar, Mozamjari market, Christian colony, Vanastalipuram, Thopkhana, Nagamaiah kunta, Mehidipatnam, Gachibowli, Pathabasthi during September and October 2017.

Transport networks economic activity was hampered by stopping the movement of goods and light vechiles by the flood water in many areas of Hyderabad city.

Flooding, especially as a result of intense precipitation, is the predominant cause of weather related disruption to the transport sector and to the inhabitants of Hyderabad urban city.

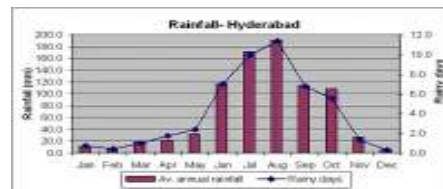


Fig 2.1 Rainfall intensity of Hyderabad



Fig 2.2 punjagutta road

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Fig 2.3 Gachibowli junction

**III. Analysis**

As the city is developing rapidly with cement concrete buildings, impervious roofs resulting to less water percolation into the ground. This increasing the run off and decreasing the ground water level. The flood plains of streams and rivers are encroached with the urban buildings restricting the vent way of the floods. As the vent way is decreased the Highest Flooding Level (H.F.L) increases entering's into residential buildings causing heavy loss to the properties and food items.

**Effects:**

On the movement of the public for food items and for discharging their duties at times of floods wading in rain water causes allergies, creating severe itching sensation on the skin of the human bodies.

The rain water is contaminated due to sewage water from the manholes and storm water over flooding in the city. The combined flow of storm water and sewage water is also making the health hazards.

Due to the storm water floods, water pollution and air pollution creating viral fever, cough, cold and viral diarrheare causing health hazards.

The impact of floods on the urban roads of Hyderabad specially high density traffic areas like Kondapur leading to Model House, Falakanuma, Ramnagar, Madhapur, Chandanagar, Darulshifa, Dabeerpura and Jama Masjid, Punja gutta, Jublihills, Raj Bhavan Road, Nagole, Ramanthapur T.V Studio Road, Krishna Ragar, Madhapur, Asifnagar, Bahadurpura, Ramnagar, Singodikunta, Ambrepet, Habisguda, Shiva Rampalli, Begum Bazar, Mozamjari Market, Christiancolony, Vanastalipuram, Thophkhana, Nagamaiah Kunta, Mehidipatnam, Pathabasthi.

**Impacts of Floods on Transport:**

- Rain fall can reduce driver visibility, reducing the speed as a precautionary measure.
- During extreme floods, the goods carried in the transport vehicles may be damaged.
- There is every risk of transport vehicles completely overturning due to submerged road conditions.
- The light vehicles may be over turned with life risk due to heavy flood.

At Bio diversity center in Kondapur the major vehicles junction traffic leading I.T.Corridor are being delayed on the roads due to heavy water flooding.

Recently, Greater Hyderabad Municipal Cooperation GHMC, proposed to construct a culvert with a length of 215 m with an estimated cost of Rs.2.20 crores to solve the above problem permanently.

**Causes:**

The factors initiating the rising of flood levels of nalas/stream are as follows.

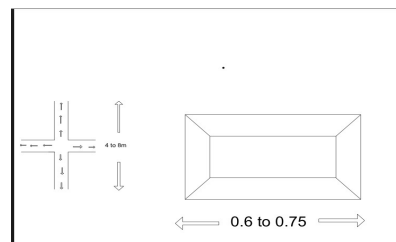
Every year illegal construction come up on the nalas/drain decreasing the vent way of the streams .The flood level in the buffer zone increases and entered into residential building creating hazzards.

GHMC and Hyderabad Metropolitan Development Authority, have regularised the illegal and structures which fills their coffers with the penalty money.As such the problems remain stand still.

The total nalas in GHMC limit is 173. All the Nala are fully or partially encroached.

The Kirlosker committee submitted a decade ago, had clearly recommended that storm water drains/nalas to be widened for the free flow of rain water in GHMC limits. Totally 28000 illegal constructions on 173 Nalas/drains required to be dismantled which will be costing around Rs.15000,crores towards compensation .As such this matter was kept in abeyence by the Govt as heavy budget was involved.

This problem is main cause of all the hazards in 826 tanks basins (Catchment Area) of . GHMC.



**IV. Conclusion**

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- Flooding is a major environmental phenomenon creating severe impacts on the socio-economic and environmental aspects of human endeavour.
- It is prominent in highly built-up and low lying areas especially where little or no attention was paid to proper planning and development of infrastructure (road transport and buildings).
- At present, the over flooded water in flowing areas are being pumped to high level areas where the water scarcity is more. This water is being used for gardening, irrigation and for domestic purposes. This process is becoming costlier to maintain every year with recurring expenditure.
- Green roof gardens can be developed to absorb the rainfall and runoff
- The flood plains of streams and rivers are encroached with urban residential buildings restricting the vent way of the flood. As such the buildings, structures which are constructed in the flood plains may be removed and rehabilitated in other safe zones.
- The rainwater has to be separated from the sewage system, thereby overloading of the sewage treatment system can be avoided. The pollution of lakes like Hussainsagar, Himayatsagar etc., can be avoided. In addition, air pollution can also be avoided in the twin cities of Hyderabad and Secunderbad.
- The ground water in the twin cities is in degradable condition and sub-surface water is not available even upto 150 m depth in the city zones in densely populated areas. The public deciding in high rise buildings are facing scarcity of ground water.
- The ground water in the high densely residing populated areas of the city likes Banjara hills, Jublie hills is decreasing year by year. The unexpected down pour of heavy precipitation with high intensity of 8 to 12 hours is creating heavy floods resulting to hazards. Due to the concrete jungle the rate of percolation into the ground is very less, and the entire runoff is diverted to Musi river in the urban city Hyderabad.
- The Nalas of 173 and 826 tanks are encroached to 40%. This problem is main cause of all the hazards in 826 tanks and 173 Nalas. The dismantling of illegal construction require huge budget of Rs.5000 crores. It is proposed to divert flood water into the water harvesting pits in the upper reaches of each basin at the junctions of the roads as per the flooding quantity. The water harvesting pits may be constructed parallel to the roads with restricted width of 0.6 to 0.75 m to a depth of 5m to 8m so that adjacent building foundations are not effected by using pre fabricated Reinforced Cement Concrete rectangular walls.

The flood water floating from D.L.F, Gachibowli, P.T.R nagar, Cyber hills, Diamond hills is rushing to biodiversity junction creating traffic jam for 8 to 20 hrs during the flood days in Oct and Sep 2017. This main road will lead into I.T corridor having more traffic. The GHMC authorities proposed to construct a culvert at biodiversity junction of Kondapur village for a length of 215 m with an estimated cost of Rs.2.20 crores to solve the above problem.

In the future the apartments having more than three floors must have their own septic tanks at each residential building, so, that the sewers will not be float out and mix with sewage water.

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Fig Hyderabad map