

Urban Rain Water Logging In Greater Hyderabad - A Spatial Perspective

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Abstract:Urban Centers In India Face An Ironic Situation I.E. On One Hand There Is An Acute Water Scarcity And On The Other Hand The Streets Are Flooded With Heavy Downpour Throwing The Traffic Out Of Gear. Problems Associated Water Logging In Terms Of Traffic Congestion; Break Down Of Vehicles And Worsening Of Road Conditions Immediately After Rain Can Estimate To Run In Lakhs Of Rupees Even In A Day. This Situation Worsens Year After Year Particularly In A Mega City Like Hyderabad Where Water Stagnation Has Attained Notoriety In Combination With Road Digging For Cables, Metro Water Pipe Laying And Other Factors. Water Stagnation Owing To It's Short Lived Nature Is Simply Neglected Aspect In Urban Context. The Problem Of Water Logging Is A Direct Consequence Of Intensity Of Rainfall Compounded By Anthropogenic Factors In An Urban Environment. The Consequence Of Urban Spatial Growth Has Witnessed The Encroachment Of Water Bodies. Nearly 25 Percent Of Water Bodies In And Around Hyderabad Have Been Consumed By Urban Expansion. The Problem Of Water Logging In Hyderabad Is Inching Towards A Crisis. Keeping In View Contemporary Challenge, A Need Is Felt To Delvedeep Into This Grave But Neglected Problem Faced By The City Along With Urban Flooding . It Is Also Important To Note That Rainwater Logging In Hyderabad Is Not A New Phenomenon, But It's Frequency Is Increasing. The City Is Experiencing Water Logging Even If It Rains Little , And Causes Serious Problem In Certain Parts Of The City.In This Paper An Attempt Is Made To Study The Spatial Distribution Of Waterlogging Points Of Greater Hyderabad For The Year 2015

Key Words: Water Logging Points, Arc GIS, Urban Heat Island, GPS

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I Introduction:

Both Urban Water Logging And Urban Flooding Are The Consequences Related To Meteorological Factors And Urbanization . Water Logging Is Mostly Related To Short Time Water Stagnation Specially Along Transportation Arteries In Urban Areas. Water Logging In Urban Areas Can Also Be Termed As “Street Flooding”. In Case Of Water Logging, The City Streets Are Flooded With Water And Therefore , The Roads Will Appear As Streams/ Rivers. Water Logging Is A Recurring Phenomena In Urban Area, Where As Urban Flooding Is Occasional. Water Logging Occurs Both During Rainy And Non- Rainy Season. During Non-Rainy Season, It's Occurrence Is Attributed To Urban Heat Island (UHI) Effect. The Socio-Economic And Physical Impact Of Flooding In Urban Environment Is Much Higher As Compared To Water Logging. Water Logging Being Recurring Phenomena, Will Totally Paralyzed The Traffic Movement And Throw The Daily Life Out Of Gear. The Problem Of Water Logging Is A Direct Consequence Of Intensity Of Rainfall Compounded By Anthropogenic Factors In An Urban Environment. The Consequence Of Urban Spatial Growth Has Witnessed The Encroachment Of Water Bodies. Nearly 25 Percent Of Water Bodies In And Around Hyderabad Have Been Consumed By Urban Expansion.An Attempt Is Made Here To Explore The Nature And Distribution Of Water Stagnation In Hyderabad Which May Be Called As “Mini Urban Flood” Or “Street Flooding”

II Objective:

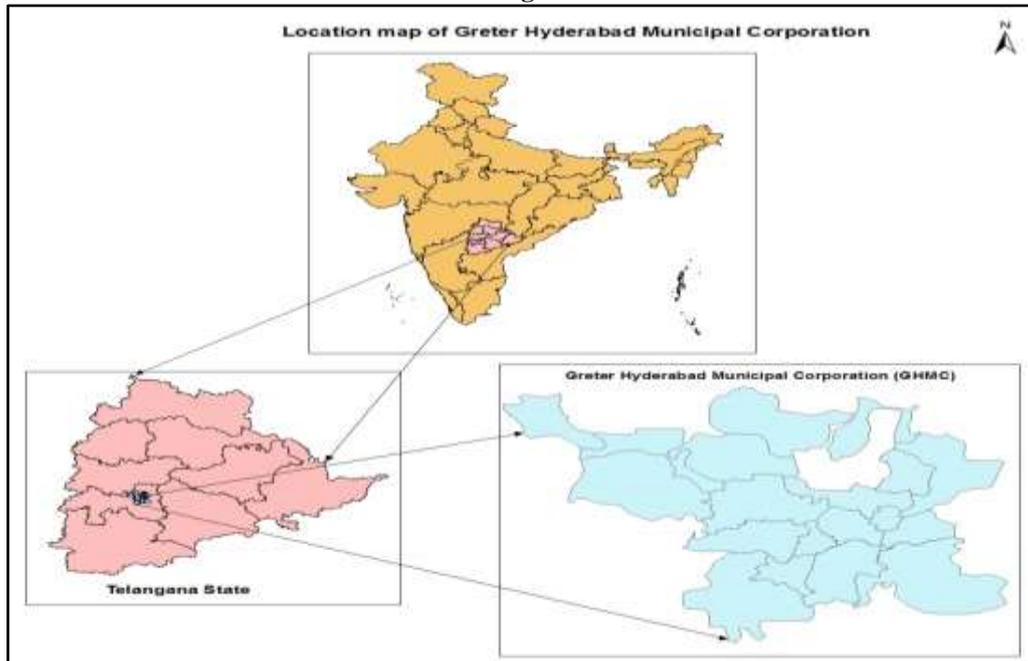
The Main Objectives Of The Study Are:

- To Map The Water Logging Points – More Than One Hour Duration In Greater Hyderabad
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- To Map Major Water Logging Points In Greater Hyderabad

III Study Area:

Hyderabad Is One Of The Fastest Growing Metropolitan City Of The India And An Emerging Mega City. The Mega City Of Hyderabad Is The Sixth Largest Urban Agglomeration In India (2011). The City Of Hyderabad Was Established In The Year 1591 On The Southern Bank Of Musi River, A Tributary Of Krishna River. Hyderabad Is Located At 17^o. 36' North Latitude And 78^o.47' East Longitude. Hyderabad Has A Long Historical Legacy Of Rich Culture And Heritage. Hyderabad Is Often Referred To As “City Of Pearls”. Hyderabad City Is Situated On The Deccan Plateau Region In The Krishna Basin Area. The City Is Located At An Altitude Of 536 Meters Above Mean Sea Level.

Fig 1



Data Base And Methodology:

For The Year 2015, Water Logging Points Are Obtained From The Greater Hyderabad Municipal Corporation. Latitude And Longitude Of This Water Logging Points Is Obtained Using GPS. The Arc GIS Is Used To Map Water Logging Points Of Hyderabad

IV Analysis And Result:

5.1.Distribution Of Major Water Logging Points – 2015:

Major Water Logging Points Are The Critical Stretches Of Water Logging Areas Where The Problem Of Water Logging Is Recurring. The Problem Of Water Logging Can Be Assessed By The Fact That, Nearly 1/4thof The Water Logging Points In Greater Hyderabad Belong To Major Water Logging Points .Out 46 Major Water Logging Points, 20 Points Are Recorded In The Circle V, Constituting 43.74% Of The Total Major Water Logging Points (Table 1).

Least Water Logging Points Are Located In Circle II(1 No) , Circle III (2 No’s) And Circle IV (2 No’s) . It Is Rather Interesting To Note That Circle VI, Which Is A Part Of CBD Of Hyderabad Did Not Registered Any Major Water Logging Points. Out Of 46 Major Water Logging Points, 13 Points Were Located In Surrounding Municipalities Like Kapra, Rajendra Nagar, Malkajgiri, Etc. . Secunderabad Cantonment Registered Highest Number Of Waterlogging Points Among Peripheral Areas Of Municipal Corporation Of Hyderabad (MCH).

**Table.1
Greater Hyderabad – Major Water Logging Points - 2015**

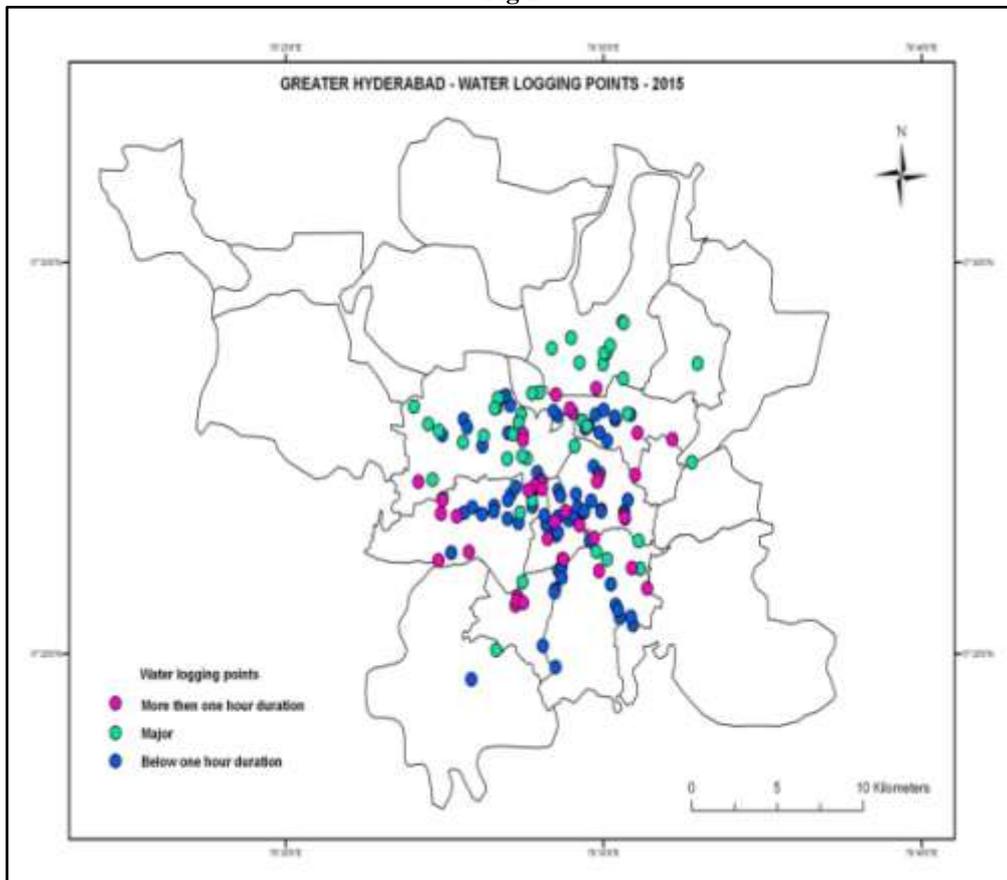
Circle	Place	No's	%
I	Municipal Corporation Of Hyderabad	3	6.52
II	Municipal Corporation Of Hyderabad	1	2.17
III	Municipal Corporation Of Hyderabad	2	4.34
IV	Municipal Corporation Of Hyderabad	2	4.34
V	Municipal Corporation Of Hyderabad	20	43.74
VI	Municipal Corporation Of Hyderabad	-	-
VII	Municipal Corporation Of Hyderabad	5	10.86

VIII	L.B.Nagar	-	-
XI	Quthbullapur	-	-
X	Patancheruvu	-	-
XI	Alwal	-	-
XII	Kukatpally	-	-
XIII	Kapra	1	2.17
XIV	Uppal	-	-
XV	Rajendra Nagar	1	2.17
XVI	Malkajgiri	1	2.17
XVII	Serilingapally North	-	-
XVIII	Serilingampally South	-	-
	Secunderabadcantonment	10	21.73
	Total	46	100

Source: Compiled And Computed Based On Greater Hyderabad Municipal Corporation (GHMC)

The Spatial Distribution Of Major Water Logging Points Revealed That Circle V Registered Highest Concentration Of Major Water Logging Points (20 No's) .Which Includes Posh Residential Localities And Upmarket Commercial Centers. The Major Water Logging Points In The Central And Old Parts Of The City Were Very Low. Outside MCH Limit, Secunderabad Cantonment Recorded Highest Number Of Major Water Logging Points.

Fig 2



Source: Based On GHMC Data Using GPS

5.2. Distribution Water Logging Points – Below One Hour – 2015:

The Water Logging Points Which Takes Less Than One Hour To Drain Off Water In Greater Hyderabad Were 75 In Number . These Water Logging Points In Greater Hyderabad, Are Those Which Takes About One Hour To Get Cleared From The Problem Of Waterlogging .The Problem Of Water Logging Is Maximum In Circle III Which Includes Densely Populated Area In The Core Of The City. This Circle Is Located In The Downstream Area Of Hussainsagar.

Table.2
Greater Hyderabad – Below One Hour Water Logging Points - 2015

Circle	Place	No's	%
I	Municipal Corporation Of Hyderabad	7	9.33
II	Municipal Corporation Of Hyderabad	6	8
III	Municipal Corporation Of Hyderabad	17	22.7
IV	Municipal Corporation Of Hyderabad	15	20
V	Municipal Corporation Of Hyderabad	10	13.3
VI	Municipal Corporation Of Hyderabad	7	9.33
VII	Municipal Corporation Of Hyderabad	11	14.7
VIII	L.B.Nagar	1	1.33
XI	Quthbullapur	-	-
X	Patancheruvu	-	-
XI	Alwal	-	-
XII	Kukatpally	-	-
XIII	Kapra	-	-
XIV	Uppal	-	-
XV	Rajendra Nagar	1	1.33
XVI	Malkajgiri	-	-
XVII	Serilingapally North	-	-
XVIII	Serilingampally South	-	-
	Secunderabadcantonment	-	-
	Total	75	100

Source: Greater Hyderabad Municipal Corporation (GHMC)

A Circle Wise Analysis Of Water Logging Points Below One Hour Revealed That, They Are Mostly Concentrated In Circle III. Circle III Recorded 17 Points Constituting 22.70 % (Table 2) Of Water Logging Points Below One Hour Duration. Circle III Is Followed By IV (15 No's). Least Number Of Water Logging Points Below One Hour Is Noticed With Circle II In The Municipal Jurisdiction Of Hyderabad And The Surrounding Municipalities Like L.B.Nagar In The South East And Rajendranagar In The South West Recorded One Each Water Logging Points . Circle III Includes The Core Of The City, Recorded Highest Number Of Water Logging Points With Less Than One Hour Duration Followed By Circle IV In The West. It Seen That Other Peripheral Municipalities Falling In GHMC Area Did Not Registered Any Water Logging Points Below One Hour Duration. It Is Seen From The Spatial Analysis Of Water Logging Points With Less Than One Hour Duration That, Circle I, II In The Hyderabad South I.E. Old Parts Of The City And Circle VI In Hyderabad North Are Among The Circles With Least Number Of Water Logging Points. The Problem Of Water Logging Is Also Least In Densely Built Up Area Of Hyderabad North (Circle VI) Which Includes Central Parts Of The City. The Problem Of Water Logging With Less Than One Hour Duration Is Least In Older Parts The City In Hyderabad South (Circle I&II).

5.3. Distribution Of Water Logging Points - Above One Hour Duration – 2015:

As Compared To Water Logging Points With Less Than One Hour Duration, The Number Of Water Logging Points With More Than One Hour Duration Are Less But They Pose Lot Of Problem To Traffic Movement. Highest Number Of Water Logging Points With More Than One Hour Duration , Falls In Circle V (9 No's) Which Houses High Class Residential Localities And Up Market Arras .

The Next Circle With Highest Number Of Water Logging Points Is Seen In Circle III And VI, Which Is The Densely Built Up Area In The Core Of The City, With Major Transportation Nodes. Least Number Of Water Logging Points (3 No's) Were Associated With Circle I In Hyderabad South (Table3).

Table.3
Greater Hyderabad – Rain Water Logging Points – Above One Hour Duration

Circle	Place	Abo-1h-2015	%
I	Municipal Corporation Of Hyderabad	3	7.69
II	Municipal Corporation Of Hyderabad	4	10.25
III	Municipal Corporation Of Hyderabad	6	15.38
IV	Municipal Corporation Of Hyderabad	5	18.82
V	Municipal Corporation Of Hyderabad	9	23.07
VI	Municipal Corporation Of Hyderabad	6	15.38
VII	Municipal Corporation Of Hyderabad	4	10.25
VIII	L.B.Nagar	-	-
XI	Quthbullapur	--	-
X	Patancheruvu	-	-
XI	Alwal	-	-
XII	Kukatpally	-	-

XIII	Kapra	-	-
XIV	Uppal	-	-
XV	Rajendra Nagar	-	-
XVI	Malkajgiri	-	-
XVII	Serilingapally North	-	-
XVIII	Serilingampally South	-	-
	Secunderabad Cantonment	2	5.1
	Total	39	100

Source: Compiled Based On GHMC Data

The Overall Spatial Distribution Analysis Of Water Logging Points With Above One Hour Duration Revealed That :

- Circle V Located In The North-Western Part Of The City Emerged As An Area With Highest Number Of Major As Well As Water Logging Points With > 1 Hour Duration. Therefore, This Circle Has Emerged As “Critical “ Area In Terms Of Problem Of Water Logging
- The Densely Built Up Area In Hyderabad South I.E. The Historic Core And The Central Part Of City Emerged As Areas With “Least” Problem Of Water Logging
- Outside Municipal Limits, The Problem Of Water Logging Is Severe In Secunderabad Cantonment Area.

V Conclusion:

During 2015, Circle V, With Upmarket Areas, IT Firms And High Class Residential Locales, Emerged As Worst Affected In Terms Of Water Logging . The Historic Core Or Older Parts The City Emerged As Areas/ Circles With Low Risk In Terms Of Water Logging Whereas The Newly Developed Localities Falling In Circle V Registered More Risk In Terms Of Number Of Water Logging Points .

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