

Impact of seasonal Water Logging Problems and its effect in urban area: A Case Study of Nanded City, Maharashtra

Kannawar S.V.¹, Bhore A.A.² Kulkarni M.P.³

^{1,2,3}*Department of Civil Engineering, MGM's College of Engineering Nanded, 431602*

Abstract: Water Logging is one of the a severe problem now a days urban areas where most of areas are getting congested due to various problems and also population density is more as the demand in urban areas is very more which results the congestion of land and it get and disrupted also. Day by day as demand is increasing and also due to unauthorized site conditions or faulty designs or overloading on existing system, the sewerage and drainage system is disrupting day by day due to unscientific land use system in the city. Due to vast development of various areas, it decreases the amount of open surface and areas like low laying area which goes into submergence due to water logging. As in case of particularly in monsoon season this area get affected and turn into water logging which affect the day today life. Now days Water Logging is common problem in urban areas where population is densely situated and this problem associated with different areas of urban city due to various other problems. This work is dedicated to find out the solution for the extent of urban area which are particularly affected to the water logged conditions and find out the root solution for the same. So the analysis are made on different parameter as from different areas of waterlogged in different zones of urban area, characteristics of basin, levels of adjoining areas, storm water flows from different part of city, urban area flow drainage system and it characteristics of flow and the detail study of zone wise water logged area with the varying depth, urban transportation system and traffic situation get affected by water logging . So it also analyzed the different solutions for a waterlogged area like sump stations, modified sewerage drainage system which results into improve the socioeconomic situation in urban areas

Keywords: Urban area, water logging, drainage system study

INTRODUCTION

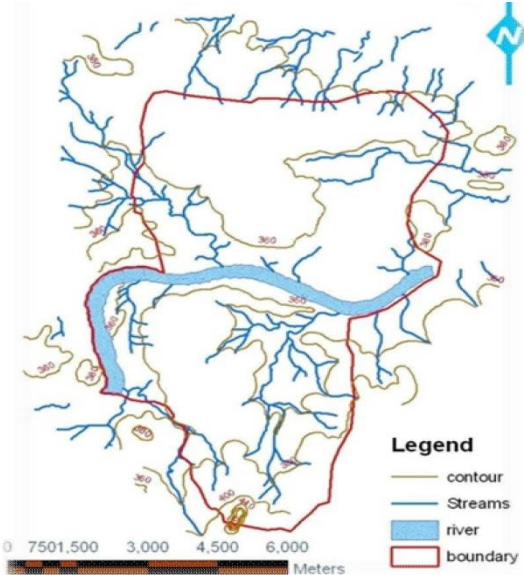
In recent years, the removal of water caused by precipitation has become a common hazard in urban areas. Logging of water is a form of natural flooding that occurs with excessive irrigation, heavy rains and

water rising from groundwater to the surface. This leads to the displacement of water in the soil natural processes in the soil are affected and there is accumulation of toxics in the soil, which can cause problems with plant growth in the immediate area. It also occurs because of non-scientific water management and the obstruction of natural drainage systems by the construction of random embankments by disturbing the equilibrium of water inlets and outlets. The water logged is nothing but referring to soil that is saturated with water and thus cannot keep oxygen between its particles.

More often the excessive rainfall for a period of time creates water-logged situation in areas both the rural and urban areas. Water-logging problem in urban areas results into, not even structure but surround structures, environment, transportation facilities associated with it are also damaged to moderate to severe level. The drainage system which includes artificial and natural drainage helps remove surface runoff and storm water and prevents many problems such as water flow, environmental pollution; etc. Drainage in human settlements has become of considerable importance due to the huge population growth and rapid but random urbanization evident in most countries. The lack of adequate drainage is directly related to the resurgence of malaria, the spread of diarrheal diseases, damage to housing and property, disruption of communications, and environmental degradation. In this paper we have provided an overview of water logging problems at various zones in Nanded city, which is located in Maharashtra state of India. Our aims to do study of the current urban water logging in Hingoli gate area of Nanded City, trying to highlight the main causes behind it, the effects of water logging in the area and the remedial measures to counter act the water logging crises.

STUDY AREA

Nanded is a politically and historically a major City in Maharashtra. Shrine of Shri Guru Gobindsinghji is in Nanded City, so it's a Holy Place Nanded is developed on Banks of Godavari River, having Municipal Corporation, Nanded is important center for Fruit, Grains, Cotton Market as well as other general Agricultural Products. Nanded is also having traditional reputation of Handloom cloths; there are many Hand Looms in Nanded as well as power looms also. The average annual rainfall is 1000 mm in city. Nanded city is having a sewerage scheme, which was commissioned in 1967, which was designed with the considerations of Ultimate Stage of year 1994 for population 1, 50,000. It covers only the part of Nanded City. The drainage area



Contour and Stream Map of Nanded City was divided in to two main parts comprising North and South of the Railway line with 5 drainage districts of the whole town. The general Slope of City is towards river from north and south sides of city Altitude of 360 meters above mean sea level

METHODOLOGY

This work relies primarily on multiple data collections. Collection of all the information about Hingoli Gate Area, analyzing and checking of data. That comprises, area of Hingoli Gate, land (steep or flat), location of Hingoli Gate on the city map, No. of hotels, schools, colleges, shops etc. situated in

that area. Data collection from the local authority, i.e. the Municipality of Nanded, which includes the Town of Nanded's plan. Drainage Plan of Hingoli Gate Area, Population of the city & people leaving nearby in that area, Drainage Plan in that area & Average Rainfall of city etc. And Study of existing drainage system and to define new diameter for the drainage pipe.

PROBLEM IDENTIFICATION

- Identify the logging zone through the NWMC. Hingoli gate area in Nanded City is the most water logged area.
- The construction of existing drainage system is improper. Drainage system gets clogged due to heavy rainfall.
- There is improper disposal of garbage waste.
- The existing drainage system is full in off season but during monsoon it get over flow.
- There is defective air circulation. The existing drainage system is open.



Causes of Water-logging Inadequate surface drainage - When the surface drainage is not adequate, the heavy precipitation in the area is not drained off quickly and the rain water remains stagnant over the area for considerable time. This gives rise to heavy percolation and water table rises in the area.

Obstruction of Storm water - There will thus be flooding of land and consequent water Logging, caused due to obstruction to the storm water by irrigation channel, rail or road embankments. Elimination of natural drainage - Sometime the mattocks cultivate up and obliterate an existing natural drainage which results in to stoppage of storm water flow, leading towards flooding and

water Logging. Topography, geological characteristics and precipitation characteristics of an area can be the natural causes of water Logging. Introduction of surface water irrigation facilities disturbs the balance between natural outflow and inflow of ground water reservoir. The main reason behind the exploitation of water is the exploitation of the draining system and plastic bags and throwing of domestic and household waste directly on streets. Heavy rainfall and improper planning of existing drainage system leads to water logging crises the Hingoli Gate area of city. The following picture indicates the Water Logging crisis during rainy season in Hingoli Gate area.

Effects of Water-logging

1. Road sustainability is declining.
2. The roads are off limits and pedestrian must get across the flooded street and especially impoverished cities
3. Malfunction of a route.
4. Sometimes the drain pipe cracks and breaks.
5. People living in lock
6. Defective air circulation
7. Destruction of roads occurred due to reduced bearing capacity of waterlogged soil.
8. Difficulty in cultivation operations.
9. Growth of unwanted wild plants.

Problem	Percentage
Disruption in Traffic Movement	100
Disruption in Normal Life	60
Damage of roads	100
Damage of commercial sector	40

The heavy rains make some parts of the city to suffer from water Logging and Hingoli Gate is one of the area dealing more water-Logging problems. Improper garbage dumping by the public the sewers get choked with garbage which exacerbates water Logging. So, water Logging makes the life of Nanded city dwellers miserable as the roads. The logged water becomes polluted with solid waste, silt and contaminants that are washed off from roads. The increase in volume and rate of logged water causes erosion and siltation. It becomes a burden for the inhabitants of that urban area, leading to unhygienic environment and creating adviser social,

hysical, economical as well as environmental impacts.

CONCLUSION

The underground drainage system and storm water drainage which are provided at and nearby Hingoli gate area are to be studied in details. As it is coming in low laying area in monsoon season and heavy rainfall days the diameter and slope of study area maintained through drainage system. The proper system is to be provided to enter runoff water into drainage system and designed drainage should be closed. With this proper screen bars are to be provided in storm drainage line so that it reduce water clogging due to waste like paper, thermacol plastics etc. The low laying area patches are identified and adequate pumping arrangement into proper disposal facilities are to be arranged. The details studies have identified situation of water logged area and its varying depth, water logged under pass road and traffic congestion and people have been suffering from water borne diseases. Many alternatives are done by NWMC but situation is getting worst day by day. With this also sump well is also to be proposed to nearby area and maintain drainage and sewerage system. In mansoon season water logging is relatively function between structure, soil types, slope, drainage density etc. the existing drainage system and storm water drain need to be clean at regular interval.

REFERENCE

1. Christen EW (1994) The feasibility of using mole drainage to control waterlogging in irrigated agriculture. PhD thesis. Silsoe College, Cranfield University, England
2. Belford R and McFarlane D (1993) Managing waterlogging and inundation in crops. Department of Agriculture and Food, Western Australia. Farmnote.
3. Bouwer H (1978) Groundwater Hydrology, In McGraw-Hill series in water resources and Environmental Engineering, Library of congress, Washington DC, 1978, PP.294-299
4. Jeffery S, john E (1990) Geographic Information System, an introduction, Prentice-Hall, Inc., Upper Saddle River].

5. Kaiser M F K, Rayes A, Geriash B (2013) GIS Data Integration to manage waterlogging problem on the eastern Nile delta of Egypt. Geology Department, Suez Canal University, Egypt, International Journal of Geosciences, June.
6. Khalequzzaman M (2001) Flood Control in Bangladesh through Best Management Practice, Department of Geology and Physics, Georgia south-western State University, Americas, GA 31709.USA
7. Lilleasand T M., Kiefer R W (2000) Remote Sensing and Image Interpretation, John Wiley and Sons, New York, 2000
8. Mutlu O, Yang A Y (2010) George and C. Chelsea, "Remote sensing of Irrigated Agriculture: Opportunities and challenges", Remote Sensing, Vol. 2, No. 9, 2010, pp.2274-2304. doi:10.3390/rs209227
9. Anisha N F, Hossain S (2014) A case study on waterlogging problems in an urban area of Bangladesh and Probable analytical solution. International Conference on Advance in Civil Engineering 2014. Chittagong, Bangladesh. December 26-28
10. Bouwer H (1978) Groundwater Hydrology, In McGraw-Hill series in water resources and Environmental Engineering, Library of Congress, Washington DC, 1978, PP.294-299
11. Jeffery S, John E (1990) Geographic Information System, an introduction, Prentice-Hall, Inc., Upper Saddle River
12. Khalequzzaman M (2001) Flood Control in Bangladesh through Best Management Practice, Department of Geology and Physics, Georgia south-western State University, Americas, GA 31709.USA
13. Lilleas and T M., Kiefer R W (2000) Remote Sensing and Image Interpretation, John Wiley and Sons, New York, 2000
14. Mutlu O, Yang A Y (2010) George and C. Chelsea, "Remote sensing of Irrigated Agriculture: Opportunities and challenges", Remote Sensing, Vol. 2, No. 9, 2010, pp.2274-2304. doi:10.3390/rs209227



Ms.S.V.Kannawar
Working as an
Assistant Professor
from last 16 years
of specialization in
water resources and
management



Mr.A.A.Bhore
Working as an
Assistant Professor
from last 17 years of
specialization in
Civil Engineering



Ms.M.P.Kulkarni
Working as an
Assistant Professor
in from last 12
years of
specialization in
water resources
and management