

Water Logging and its Preventive Measures for Pune City

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Abstract— Stormwater is the water flow generated from rainfall. Rainfall that flows over the ground surface is created when rain falls on paved surfaces like road, parking lot, rooftop and other concrete surface that do not allow water to soak into the ground. This research focuses on high intensity storm rainfall and runoff in the Pune city and the problems due to lack of proper drainage system and insufficient management. It also includes water logging problem, its cause and its effect and living style of the city. The major issue because of this problem is traffic and loss of income potential for road dwellers. The storm water becomes polluted as it is mixes with various solid waste, domestic waste and other human wastes. Such lack of cleanliness can result in epidemic and health disorders.

Keywords: Runoff, Water Logging, Paved Surfaces, Land Use, Urban Flooding

I. INTRODUCTION

The world's human population is increasing at an unprecedented rate with much of this growth taking place in urban areas. At the turn of the century, almost half the population lived in urban areas. This is expected to increase up to 60% by 2030. Major interest in the relationship between urban development and water began during 1960s when accelerating urban growth began to generate a wide range of hydrological problems.

A land is said to be waterlogged when the soil pores within the root zone of the plants get saturated, and the normal growth of the plant is adversely affected due to insufficient air circulation. The waterlogged land results in reduction of agricultural production.

The problem of waterlogging is a world-wide phenomenon which occurs mainly due to the rise of ground water table beyond permissible limits. The problem of waterlogging has already affected about 6 million hectares of culturable land in India.

Water logging is one of the major problems of land degradation in India. Unscientific management of soil, water and crops in irrigated lands and obstruction of natural drainage systems by various developmental activities are the main factors responsible for disrupting the balance of inflow and outflow of water, leading to water logging. While irrigation has increased by leaps and bounds, its attendant problem of water logging is now plaguing substantial area of agricultural lands.



II. LITERATURE REVIEW

A. Patil S. K. and Nagarajan R presented a Research paper on "Identification of salinity affected black soil areas and their assessment in semi-arid region"

It concluded that, Soil salinization is one of the problems that affect the crop production from arid and semi-arid as excess irrigation, mono-cropping pattern of water intensive cash crops and chemical fertilizers lead to the development of soil salinity. Black soil in Peninsular India is not known for salinity potential. However, 10 to 20 years of irrigated cultivation has resulted in the soil degradation. The salinity in black soils is observed in discontinuous patches having salt encrustation observable only after harvest or in fallow lands. The objective of this study is identification of saline areas and the assessment of methods with reference to ground conditions.

B. B. P. Godase presented research paper on "A case study of quality distribution of soil chemical in Nira Right Bank Canal area in selected villages of Phaltan district Pune"

It concluded that Soil pH, Electric Conductivity, Organic Carbon, NPK, Potassium, Sodium, Lime, are the essential nutrients, present in soil and helpful to growth of crops. Distribution of nutrients is unequal. In this paper, an attempt has been made to find out the level of nutrients and their distribution. It covers an area 75025 of hectares of agricultural land where 1,87,937 population reside. Area covers 46,683.87 sq. hectars (34%) out of 138248.8 hectares of Phaltan tehsil, where 76 % population are concentrated. Average village wise nutrient level of 400 soil samples from NLBC area of Phaltan is calculated and presented graphically.

C. Walaa Y. El-Nashar presented research paper on „The Combined Effect of Water-logging and Salinity on Crops Yield"

It concluded that Water-logging and salinization continue to cause economic losses in many areas of the world, though farmers and scientists have been aware of these problems and potential technical solutions for thousands of years. Water-logging and salinity problems often require some form of drainage to allow sustainable agriculture production

D. Urban Dynamics: An undervalued issue for water logging disaster risk management in case of Dhaka city, Bangladesh" Sadia Subrina^{a*}, Farahnaz Khadiza Chowdhury^b "1877-7058 © 2018 The Authors. Published by Elsevier Ltd.

In paper - ed wave of urbanization and the rapid population growth are brutally transmuting the urban fabric of Dhaka city, Bangladesh. These rampant growth combined with climatic changes are triggering an increase in vulnerability of communities to hazardous events like flood, earthquake, fire hazards, water logging. In recent years water logging has

become an increasingly prevailing burden for the city dwellers and is creating adverse social, physical, economic and environmental consequences by disruption of regular life, traffic paralysis, infrastructure damage, destruction of flora and fauna.

III. METHODOLOGY

A. Causes of Water Logging

- 1) **Stormwater:** During heavy rainfall, water may enter your premises due to improper stormwater management in your locality or Stormwater outlets are choked by encroachment, dumping of garbage or silt. Ensure the desilting of the storm water drains are done in your neighborhood and taken measures to eliminate the cause of flooding.
- 2) **Basement flooding:** Common problem in the apartment during monsoon is basement flooding and this may be due to municipal storm and drain sewers gets overloaded or due to improper downspouts.
- 3) **Improper Rainwater Harvesting:** Some apartments have successfully installed rainwater harvesting system, but they are improperly managed.

B. Methods to Control Water Logging

1) Adequate Surface Drainage:

Quick removal of rain water by suitable surface or open drain is very important measure.



2) Efficient under-drain:

Providing tile drains at suitable depths below the surface of the ground to dispose of excess of subsoil water.



3) Controlling loss of Water by Seepage from the Canals:

This includes lowering the F.S.L of the canal. By lining the canal with suitable impervious material. By using irrigation water economically and keeping the intensity of irrigation flow.



4) Increasing the Outflow and Preventing the Inflow:

This is effected by improving the flow conditions of the existing natural drainage and providing artificial open or subsurface grid.

IV. CONCLUSION

This problem can be concluded as we have to prevent the impacts of stormwater. To provide sustainable, economic, social and safe practices for our environment. This can be achieved by adopting Green Infrastructure and utilization of resources in a proper and sustainable way. For most of the paved covered area which is impermeable there we have to provide Permeable paving which is one of the most important prevention to be done to avoid this major problem.

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