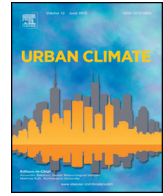




ELSEVIER

Contents lists available at ScienceDirect

Urban Climate

journal homepage: <http://www.elsevier.com/locate/uclim>

# Nature, the built environment and perennial flooding in Lagos, Nigeria: The 2012 flood as a case study

Augustine O. Israel\*

Department of Geosciences, University of South Florida, Tampa, FL, USA

## ARTICLE INFO

### Article history:

Received 19 July 2016

Received in revised form 29 April 2017

Accepted 29 June 2017

Available online xxxxx

### Keywords:

Flooding

Impervious surface

Built urban environment

Rainfall

Landscape

Outgoing longwave radiation

## ABSTRACT

Flooding as a problem often associated with the built urban environment is well established. Large scale impervious surfaces reduce the land area available for water to seep into the ground to augment ground water. But often, flooding is induced or exacerbated by man's interference in nature's way of draining its catchments or basins, thereby upsetting the balance. This paper examines the recurrent flooding in Lagos with the June 27, 2012 episode as a case study in order to project similar occurrences into the future and determine how interfering with the landscape has contributed to this and other flood events. It was noted that developments along major natural water pathways create bottlenecks which may be transmitted upstream along tributaries, especially if those also have been interfered with via development, or waste dumping. Among others, this paper suggests that fixing the city to restore its ecological balance, and adopting modern technology for surfacing by utilizing absorbent concrete will restore some sanity to the flooding situation even in the face of single, high-volume rainfall events.

© 2017 Elsevier B.V. All rights reserved.

## 1. Introduction

Flooding is a physical problem in many urban cities of the world particularly when rain falls at such a rate that the rate of accumulation of water at the ground surface is faster than the rate of percolation into underground soil layers, thereby leaving a huge deficit as run-off at the ground surface. Weather phenomena known to produce such high rates of rainfall that inundate the environment include hurricanes (or typhoons), torrential rainfall from deep tropical thunderstorms, and several days of monsoonal rainfall. But flooding in

\* Department of Environmental Science and Policy, School of Geosciences, University of South Florida, 4202 E Fowler Ave., Tampa, FL 33620, USA.

E-mail address: [augustine1@mail.usf.edu](mailto:augustine1@mail.usf.edu).

developing countries appears to be more problematic because of the disorder and lack of coordination in the development of the urban centers.

According to Pincetl (2012), cities are creations of human free-will. For cities to be realized, it requires the complete transformation of the environment and ecological processes – the earth is moved and reconfigured, plants and animals are removed and replaced with buildings, roads, and other infrastructure. So, forests, grasslands, savannah are replaced with gardens, roads, buildings and parks (Whitford et al., 2001). This means that the entire landscape is altered by humans in order to erect the cities, or as noted by McGarigal (2015) “humans are the dominant force of landscape change”. In order to cohabit harmoniously with nature, cities ought to be built in such a fashion that will cause as little alteration as possible to the landscape – the age-long mode through which the environment has maintained a balance with itself. If this attitude is maintained in the development of new cities or of fixing older ones like Lagos, we will thereby ensure ecological balance, and reduce the chances of environmental backlash as witnessed through persistent floods.

Across many countries floods account for a significant number of the total of disasters experienced, and pose grave danger to humans and their property. Nine out of every ten presidential disaster declarations in the U.S. are associated with flooding (Haeuber and Michener, 1998). In their study of the 1998 flood disaster on the Yangtze River, China, Zong and Chen (2000) observed that extensive reclamation of the fluvial islands within the middle basin considerably decreased the natural landscape of the Yangtze basin. This invariably amounts to encroachment of man on nature’s territory and the prize is usually huge.

Persistent flooding in parts of Lagos, a megacity, and Nigeria's largest economic and industrial center has been attributed to a number of reasons which include, persistent rainfall, frequent release of water from the dam in the neighboring state of Ogun as a result of heavy or persistent rains, blockage of drainage channels with municipal waste, construction in floodplains, narrowing of river channels, and intrusion of water from the Atlantic Ocean during high tides into low-lying areas (Olajuyigbe et al., 2012). However, within the existing body of literature regarding the persistent flooding in Lagos, the ways and means of harnessing the fast depleting wetlands, greenways and the natural landscape which form the natural attributes within the Lagos conurbation for flood control has not been given its rightful place in the dialectics of what works and what doesn't since flood control measures (especially structures) over the long term are known to fail (Haeuber and Michener, 1998). This paper is therefore designed to fill this knowledge gap.



**Fig. 1.** A flood scene after the June 27, 2012 rains in Lagos.  
(source: [junglejournalist.wordpress.com](http://junglejournalist.wordpress.com)).

Download English Version:

<https://daneshyari.com/en/article/4762362>

Download Persian Version:

<https://daneshyari.com/article/4762362>

[Daneshyari.com](https://daneshyari.com)