Changing Climate and Sustainability of Built Environment

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Abstract

Humanity faces increasing depletion of energy and material resources and an increasing number of natural disasters. Buildings, infrastructure and entire built environment should be better prepared for changing climatic conditions – as they should be sustainable and resilient. The energy consumed during operation of built environment is one of the most significant sources of CO_2 emissions. Considering these development trends, it is necessary to modify existing principles and methods of building and infrastructure design and adequate techniques of construction to enhance them to guarantee comfortable and safe operation for the whole population in the future. The buildings and infrastructure for sustainable future should be better prepared for the new conditions; they should be sustainable and more resilient.

1 Introduction

Earth existed long before humans developed and will exist long after the conditions on the Earth will not be suitable for human life. Sustainability is about preservation of environmental, social, and economic conditions on our planet in the form which will enable survival of biological diversity (including humans) and productivity on the Earth as long as possible [1].

Changing of the climate on the Earth is innate and everlasting process; environmental conditions are continuously changing due to continental drift followed by volcanic and seismic effects. Human life conditions are modified – and therefore biodiversity is irrecoverably changed. This process was in previous periods very slow, enabling consecutive adaptation of life forms (incl. humans) to changing environmental conditions. However, nowadays environmental conditions are changing faster, particularly caused by human activities.

Recently the world faces increasing number of natural disasters and increasing economic and social problems and challenges. New research results have shown how global climate changes are happening faster than anticipated. Generally, the impact on different regions of the World differs considerably. Floods, tropical storms, hurricanes, tornados, wildfires, heat and cold waves, longer periods of drought etc. are more and more frequent and with higher intensity. Because of the increasing risks due to climate change the probability of natural disaster is now nearly 5 times higher as it was in the 1970s, (Figure 1, [2]).

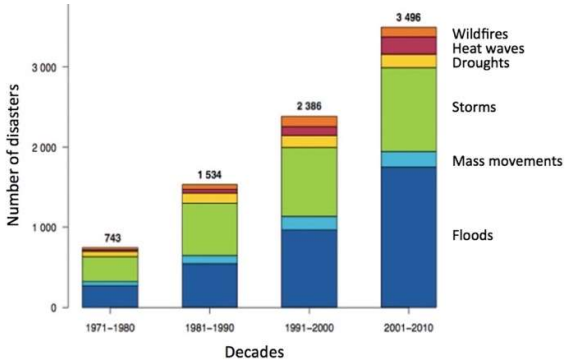

Figure 1. Increasing number of disasters by hazard type since 1970; data source WMO [3]

https://doi.org/10.2749/newdelhi.2023.0034