

Chapter 56

Integration Between Urban Planning and Natural Hazards for Resilient City

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ABSTRACT

Analyses and syntheses conducted before the urban planning process are significant. Accurate analysis and synthesis enable to determine proper site selection and the proper site selection is the basis of a sustainable urban plan. In this sense, fundamental analysis inputs of the proper site selection could be indicated as the related parameters of the earth sciences. The interpretation of these inputs require the essential analyses and syntheses of initially the geological and geotechnical research with geophysics, tectonic, topography, mineral and natural resources, hydrogeology, geomorphology and engineering geology. Synthesis maps composed of these inputs especially provide guides for natural thresholds consisting of landslide, flood, inundation, earthquake etc. for land use planning and site selection parts in the urban planning processes. In this regard, this chapter of the book contains the relation between the earth sciences parameters with the urban planning and the way these parameters lead the way of urban planning processes.

INTRODUCTION

The mass urbanization of the human race is a relatively new phenomenon in the history of civilisations (Urban geology and emerging discipline, Wilson and Jackson, 2016) in 1900, when geology was maturing as a science only ten percent of the global population lived in urban settings; now, this proportion

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has surpassed 50 percent, fed by both overall population growth and rural -to-urban migration (Wilson and Jackson, 2016). People are having difficulty finding suitable settlement areas, because of that this rapid increase in the urban population and the accompanying plot and land demand to meet housing needs. With rapid and unplanned urbanization, people have begun to settle unconsciously in areas where settlement is inappropriate. This has also increased urban vulnerability while reducing urban livability, natural hazard safety and disaster sensitivity countries and urban areas, which are located on the active tectonic belt, are vulnerable in the context of natural hazards, as earthquakes, volcanic eruptions, tsunamis, landslides etc. Not only the developing countries, but also the developed ones, including Japan and USA have higher risks in that sense.

Dangers caused by natural processes and the transformation of these dangers into risks might affect urban living areas and make them unlivable places. However, the main aim of the urban planning is to provide safe, sustainable, healthy and happy living spaces and resilient city for people.

Besides enhancing the existing situation, the discipline of urban planning is responsible for developing applicable methods, which eliminate the vital problems which might be faced in the future, in the context of an anticipated projection. These goals should provide solutions arising from short, medium and long term projections. Geological, tectonic, hydrogeological, geomorphological, geotechnical and other related data, which are belonging to the cities, are included in the analyses and syntheses related with the site selection process in the context of urban planning comprises the first stage of the urban planning and in this stage, urban planner should consider the conservation-usage balance, natural hazards and sustainability concepts. The content and scope of these analyses and syntheses might change in the context of planning hierarchy (from upper scale to lower scales) and should be support themselves. Additionally, a feedback process should be developed through upper scales to lower scales.

In the process of analysis and synthesis, the most significant threshold and restrictions are arising from the topographical, geological, geomorphological, geotechnical, hydrogeological, geographical and lithological characteristics of the urban land. Therefore, the evaluation of all of these geological data, determination of the thresholds, transforming the disadvantages to advantages, determination of the opportunities and threats in the physical context are the essential part of the urban land use planning. On the other hand, it is not possible to develop sustainable and hazard sensitive urban areas.

In this context, studies related with urban geology field have gained significance in the world, especially after the industrial revolution. However, even in the developed countries, this field could not reach its well-deserved place (Wilson and Jackson, 2016).

The mass urbanization of the human race is a relatively new phenomenon in the history of civilization (urban geography as emerging discipline) in 1900, when geology was maturing as a science, only 10 percent of the global population lived in urban settings; now, this proportion has surpassed 50 percent, fed by both overall population growth and rural to urban migration. And by 2030, it is expected to reach 60 percent (from Wilson and Jackson, 2016). This increasing population in the world cities is especially dramatic in the context of the developing countries. Rapid increase in the population growth rate is getting ahead of urbanization rate and this situation might cause the unplanned configuration in the cities. This causes the problems, as inappropriate site selection, squatting, as well as underestimating geological and physical environment. Therefore, it is impossible to prevent from the undesired consequences of earthquakes, floods, landslides and other related natural hazards. Vital resources, as water, soil, forest, mines etc. fall short of and this situation might threaten the future generations, as well as the biological lifetime of the world decreases.

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