

Evaluation of the Effect of Surface Runoff on the Urban Growth in the Natural Area of Hebron's Basins Using Geographic Information Systems (GIS) between 2001 and 2014

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Abstract

Studying the runoff network has a crucial impact on urban areas in Hebron basins, in which such natural disasters can lead to negative effects on residential areas financially and on human lives.

This study aims to assess the impact of rainwater runoff network on urban development in natural Hebron basins through identifying the network using ArcGIS software, study the urban growth and trend in the natural basins through following four periodic time (2001, 2007, 2010, and 2014), and study the percentage of urban development increasing and location.

Furthermore, the study will draw the relation between the rainwater runoff network and the location of urban development in the city, and identify the distribution of the building in the Wadis.

The methodology of the study depends on the descriptive analysis approach in addition to historical and cadastral to achieve the objectives of this study. Moreover, the study depends on aerial photos of the years (2001, 2007, 2010, and 2014) to monitor the urban expansion and trends to stratify with the rainwater runoff network.

The result of the study reached that Hebron consists of five rainwater runoff natural basins ranked from 1-5 according to the location of basin in which level 1 is located in upstream, whereas the eastern basin is the largest basin 56.08 m² as a downstream with level 5. Furthermore, the urban expansion is located on the boundaries of the city.

Moreover, the study showed that the number of buildings in 2001 was 25680 buildings occupying an area of 6.09759 KM², whereas in 2007 the number of building became 30111 buildings occupying an area of 7.219568

KM2, however, in 2010 it became 31526 buildings occupying an area of 7.572136 KM2, and lastly in 2014 the number of building reach to 34191 buildings occupying an area of 8.167969 KM2.

The study identified the intersection zones where the rainwater runoff network intersects with the urban areas including residential and commercial areas in which those areas are vulnerable to floods of runoff such as Jaladeh, Al-Salam St., and the old city.

The researcher concludes from several meetings with Hebron municipality officials that the reason behind lack of capability of avoiding the building in wadis in the absence of the master plan for the city.

The study concludes that the number of building affected by natural floods of runoff network was 1229 building in 2001 in an area of 0.42966 KM2, where it was 1510 building in 2007 in an area of 0.563515 KM2, however it reached 1612 buildings in 2010 in an area of 0.602576 KM2, and finally in 2014 it became 1713 buildings occupying 0.604121 KM2.

The Study made a set of recommended measures to decrease the impact of rainwater runoff network on building:

Take into consideration the trail of rainwater surface runoff network while urban planning, including land use plans.

The improving of cooperation between residents and governmental bodies to decrease the impact of continues floods on residential areas.

Assign a specific committee to follow-up the damaged zones due to rainwater floods.

In addition, build a drainage system aligned with the existing and future master plan.