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EVALUATING IMPACTS OF URBANIZATION ON RECHARGE OF GROUNDWATER RESOURCES: CASE STUDY: BORNOVA PLAIN (IZMIR/TURKEY)

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Abstract: Increasing the World's population and industrialization in parallel with urbanization has created serious problems on water resources. Over the next forty years it is expected to add 2,5 million people on world population. To fulfill the needs of increasing population, the water demand will increase but the increasing of demand towards water is more rapid than increasing of population. Urbanization is a global phenomenon that is quickly altering the physical structure of any region. Bornova plain is located in water basin of İzmir where it is the most important settlement of the Aegean Region from the ancient ages to the current era. In this study, impacts of urbanization and population growth on groundwater resources were analyzed using GIS in Bornova Plain, where it is one of the most important groundwater aquifers and it supports about 16% of domestic water resources of Izmir City. The plain had been used as agricultural lands until the 1950s, while today they have been opened for the university, industry, commerce, and settlement. Especially, Bayraklı district had facilitating conditions for settlement and housing, spreaded their urban habitat areas to an extent in the last ten years. In 1965, Bornova accommodated half of its population in rural areas after receiving so much immigration. It inevitable opened the city-centre to housing and it thus considers the surrounding village areas as urban areas. By the year 2000, the rural population had already been melted into the urban population. The agricultural areas in rural parts of the country will have completely disappeared in 50 years' time. Much of the surface of plain is rendered impermeable by buildings, roads and surface coverings. Because of this covering, groundwater recharge is reduced and it thus causes increasing and accelerating runoff in the Plain. The groundwater recharge from precipitation was about 27 % in 1925, but this amount dropped to 13% in 2012. Groundwater recharge from precipitation will be 1% in 2030.

Keywords: Urbanization, water resources, GIS, groundwater, Bornova plain, Izmir