

عنوان مقاله:

Optimizing the well depth and discharge rate to sustain groundwater aquifers

محل انتشار:

اولین کنفرانس بین المللی منابع آب با رویکرد منطقه ای (سال: 1388)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

In arid and semi-arid regions, agriculture relies on groundwater resources. Aquifers are gradually depleted as a result of over production. The controlling policies on groundwater exploitation set up by the Water Authorities are usually inefficient and impossible to be implemented. Among many management practices an efficient practice is to control the well discharge by optimizing the well penetration depth, which is not possible to be changed by the well owners after the well, is constructed and completed. A partially penetrating well with a certain depth has a maximum possible steady discharge rate. This rate depends on the well characteristics such as penetration degree, the water depth in the wellbore, length of seepage face and etc. The maximum flow rate to a partially penetrating well in an unconfined aquifer with variable saturated thickness is numerically calculated taking into account the flow from the seepage face. Variations of flow rate as a function of well penetration depth, the water table elevation in the wellbore and the radius of influence are investigated. A set of dimensionless curves and their corresponding equations are presented which may be used to predict the flow rate to partially penetrating wells with know penetration depth and water level depth in the wellbore. These curves and equations may also be used to design the degree of penetration for which the maximum allowable steady pumping rate is attained for a given allowable minimum depth of water in the wellbore. The designed degree of penetration will assure the sustainability of the aquifer, and can be used as an effective .management criterion for issuing drilling well permits by groundwater protection authorities

کلمات کلیدی:

Partially penetrating well, MODFLOW, Steady state flow, Seepage, Type curve

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