The assessment of land use change impact on watersheds runoff using SWAT: case study of Urmia Lake in Iran

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Lake Urmia, long counted among the world's largest saltwater lakes, contains only 5% of the amount of water it did just 20 years ago. The decline is generally blamed on a combination of drought, increased water diversion for irrigated agriculture within the lake's watershed and land use mismanagement. It has been believed that land use changes in Lake Urmia basin is one of the most important factors in shrinkage of Urmia Lake in recent decades. Transforming the traditional agricultural practices (i.e. wheat) to the more water consuming practices (i.e. apple orchards) is one of the most important reasons increased agricultural water consumption in the watershed.

In this study we assessed the effect of the land use changes of watershed in hydrological runoff processing in the Nazloo chai watershed, one of the most important river basins of the Urmia Lake basin. Actually the rapid and at the same time unreasonable transformations of land use in farm lands of Urmia lake sub basins, extremely has been raised the amount of blue water (surface or groundwater) consumption in watershed which leads to dramatic decrement of watershed runoff amounts. One of the most unfavorable consequences of land use change was changing the blue and green (rainwater insofar as it does not become runoff) water usage patterns in watershed, in addition to water use increment. The soil and water assessment tool (SWAT), one of the most important and reliable models which was used to model the rainfall runoff, has been used in current study. The land use maps were extracted from Landsat images archives for the most severe turning points in respect of land use change in the recent 30 years. After calibrating the model, several land use patterns of historical data were used in the model to produce the runoff. The results showed the strong relation between land use change and runoff reduction in the Lake Urmia basin.