Abstract

Due to the crisis and water scarcity and contamination of water resources in most countries of the world and IranAnd given that Iran is the largest consumer of water in the agricultural sector,Water resources management is particularly important in this area. The purpose of this study is to optimize crops cultivation and maximize green water utilization and conservation of water resources with virtual water approach. Green virtual water and total virtual water for crops using crop year data 2013-2014 for 13 major cities of Golestan provinceIncludes Gorgan, Aliabad, Aqh ghla, Kalaleh, Galikesh, Gonbad, Minoodasht, Bandarghs, Kordkoy, Maraveh Tapeh, Azadshahr, Ramian and Bandar Turkmen.And the export value of these products was calculated. Then two objective functions have been developed for optimization of crop area and optimal allocation of water resources which has been solved by using Grasshopper Optimization Algorithm. The optimization results show that there is a significant difference between the current cultivated area and the optimized cultivated area. And given that in most cities in the current situation the priority of cultivation is cereal crop, but after optimization it is observed that the priority of cultivation has changed in most cities. And other products such as bean, vegetables, etc. have replaced cereals. In addition, in the whole province of Golestan, the area under cultivation of cereal crops and rice crops decreased by 398549 and 6844.1 hectares, respectively, while the area under bean and vegetable crops increased by 22573.39 and 7165 hectares, respectively.

Keywords: Virtual water, Golestan province, Grasshopper Optimization Algorithm, water resources optimal Allocation

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