Abstract

The excessive withdrawal of groundwater with drought has led to a sharp decline in groundwater levels In the meantime, many comments have been focused on increasing irrigation efficiency and investment in water and water saving technology Revision of Operating license for groundwater extraction and blocking unauthorized wells, Increasing energy prices and paying attention to the crop pattern and strategic products, are all scattered cases, that are ongoing, But even among experts, there is no consensus on how effective they are. In addition, many of these measures, in addition to the need for a large amount of funding, may have contributed to social dissatisfaction and are not economically feasible. In this study, to investigate the effect of the measures taken to reduce the deficit of groundwater reservoirs in five districts of Khorasan Razavi province, the water extraction and consumption in agricultural sector was simulated and the effect of these measures in the form of 12 main scenarios and more than 100 sub-scenarios, was investigated. Simulated model after calibration and estimation of coefficients, was designed as a positive mathematical programming model (PMP_GME), and the effects of scenarios, were examined in addition on the deficit of groundwater reservoirs, were examined on the crop pattern, production, net imports, employment, net social benefits, cost Government, farmers' income and cost and benefits of each of the scenarios for protecting groundwater. The results of the study showed that, even in the current situation, agriculture in these areas is in stress and faced to low irrigation about 30.

Investigating the effect of rising water price (by increasing energy price) showed that although this policy has different results in different regions due to the amount of reservoir deficits and the pattern of cultivation, but on average, and under the control of the domestic price of agricultural products, employment, income of farmers And social costs are reduced by 26%, 63% and 50% respectively, and the cost of import increases by 23%. In this method, the cost per cubic meter of saved water will be 5750 Rials. Reducing the discharge of water from wells with 5 scenarios, reduced the level of cultivation about 9 -21 percent, employment 7-18 percent, imports 9-16 percent, farmers' income by 8-15 percent, and the cost of implementing this policy for Each cubic meter water saved will

be between 4540 to 6360 Rials. The policy of reducing the acreage of non-strategic crops in the best way would reduce employment, cropping and income of the farmers by 20, 17 and 32 percent, respectively, and increase imports by 36 percent. And the cost per cubic meter saved water will be 13020 Rials. Increasing irrigation efficiency in case of no increase in cultivated area can in some places reduce up to more than 100 percent of the deficit of groundwater reservoirs, and the cost per cubic meter of water saved will be 100 Rials. However, if the control of cultured area does not take place, meanwhile cultivated area increase 27%, the deficit of groundwater reservoirs at least 29% and on average 53% decrease. Replacement of new irrigation method instead of traditional methods and preventing an increase in cropping area could be reduced at least 59% and on average 94% of the deficit of groundwater reservoirs. And its social benefits will be more than costs. Government investment in increasing the transmission and distribution efficiency on condition of controlling cultured area, meanwhile reducing energy consumption about 30% is completely economical. Therefore, the emphasis on increasing efficiency along with cultured area control is the best solution and if we do not succeed in increasing efficiency, we will have no choice except to reduce water extraction which, increase social costs (in the form of increasing imports, lower income or higher domestic prices).

Keyword: Reservoir Deficit, Groundwater, Price Policy, Irrigation Efficiency, Economic Appraisal, Water Extraction Control

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Evaluation and comparison of water pricing policy with alternative options and their impact on the production, trade and crop pattern in Khorasan Razavi province

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