Study of water resources optimal allocation in agriculture sector (Case study: Mashhad Plain)

Abstract

Scarce of appropriate water resources has led to increase methods of resources optimal allocation in different activities. Considering the critical role of agriculture sector in national economy, employment generation and community food security, it is necessary that resources and product tools is optimally used in this sector to reduce the consumption of resources and increase profitability and welfare of farmers. In the current study, has surveyed water resources optimal allocation in agriculture sector of Mashhad plain. First agricultural owners divided into homogeneous groups based on different regions and soil types, then were provided technical coefficients of each group by using agricultural information in 1380–1385 and performed optimal allocation of available water resources between different agricultural products to maximize profit of agriculture sector by using deterministic and chance constraint linear programming models in conditions without risk and risks of 50, 70 and 90 percent in agricultural available water and also considering the efficiency of irrigation 50, 75 and 90 percent. In the end of study, model sensitivity analysis has been done with regard to different scenarios of available water in agriculture. The results showed that by performing optimal cultivation patterns and water optimal allocation in agriculture sector of Mashhad plain increase profitability, decrease water consumption and stabilize water resources in this sector. Also, results showed that increase of risk in availability of agriculture water lead to decrease water consumption and net income in agriculture sector and increase of irrigated water efficiency also lead to decrease water consumption and increase net income in agriculture sector of Mashhad plain.

Keywords: Water Resources Allocation, Optimal Cropping Pattern, Deterministic Linear Programming, Chance Constraint Linear Programming, Mashhad Plain

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