

Estimation of Water Footprint Components in Barley Production at National and Provincial Scales

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Abstract

Food security, drought, environment protection, and industrial development have made efficient water resources management necessary. The concept of (virtual) water footprint (WF) has a considerable potential to help improve water resources management, especially in agriculture. In this research, WF of barley production in 15 major barley-producing provinces of Iran was estimated. WF consists of green (effective precipitation), blue (net irrigation requirements), gray (to dilute pollutants to the maximum acceptable concentration level) and white (irrigation losses) components. The results show that the average total WF in Iran's national barley production for the period 2005-2011 is around 9172 MCM/year, of which the share of green, blue, gray and white WF were 37%, 19%, 17%, and 27 percent, respectively. Nearly 44 percent of total WF was related to the gray and white components, which is a considerable amount. Around 85 percent of the total WF in barley production is consumed in 15 major barley-producing provinces. Khorasan, Isfahan, and Fars provinces have the highest values of total WF in barley production, with 2364, 518 and 489 MCM/year, respectively. Among the 15 selected provinces, the average total WF in irrigated lands was estimated at around 3209 m³/ton with the contribution of green, blue, gray, and white components being 20%, 26%, 18%, and 36 percent, respectively. For rainfed lands, the average total WF was 2594 m³/ton with 89% and 11 percent of green and gray WF, respectively.

Keywords: Gray water, White water, AGWAT, Water requirements.

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