

Virtual water trade patterns in relation to environmental and socioeconomic factors: a case study for Tunisia

Hatem Chouchane, Maarten Krol, and Arjen Hoekstra

WEM, University of Twente, Enschede, Netherlands (hatemchouchane1@gmail.com)

Water scarcity is among the main problems faced by many societies. Growing water demands put increasing pressure on local water resources, especially in water-short countries. Virtual water trade can play a key role in filling the gap between local demands and supply. This study aims to analyze the changes in virtual water trade of Tunisia in relation to environmental and socio-economic factors such as GDP, irrigated land, precipitation, population and water scarcity. The water footprint is estimated using Aquacrop for six crops over the period 1981-2010 at daily basis and a spatial resolution of 5 by 5 arc minutes. Virtual water trade is quantified at yearly basis. Regression models are used to investigate changes in virtual water trade in relation to various environmental and socio-economic factors. The explaining variables are selected in order to help understanding the trend and the inter-annual variability of the net virtual water import; GDP, population and irrigated land are hypothesized to explain the trend, and precipitation and water scarcity to explain variability. The selected crops are divided into three baskets. The first basket includes the two most imported crops, which are mainly rain-fed (wheat and barley). The second basket contains the two most exported crops, which are both irrigated and rain-fed (olives and dates). In the last basket we find the two highest economic blue water productive crops, which are mainly irrigated (tomatoes and potatoes). The results show the impact of each factor on net virtual water import of the selected crops during the period 1981-2010.

Keywords: Virtual water, trade patterns, Aquacrop, Tunisia, water scarcity, water footprint.