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Analysis

How Does Virtual Water Flow in Palestine? A Political Ecology Analysis

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ABSTRACT

There is an exhaustive literature on Israel, Palestine and water, which has documented how the asymmetric power of Israel in the Oslo negotiations ensured its control of land and water over Palestine. Less attention however has been paid on the interface of water, trade and agriculture, and the ways in which controlling trade, Israel controlled the virtual flows of water too. The concept of virtual water makes the water-agriculture-trade relationship visible, shedding light on agricultural trade flows in terms of water. Applying a political ecology approach, this paper shows how socio-ecological conditions are sustained by and organised through both social and metabolic-ecological processes. A biophysical analysis - the agricultural flows of virtual water from and to Palestine in the Post-Oslo period - is combined with the examination of the power relations that governed these flows. The analysis reveals that virtual water flows are not static but instead evolve within the (geo)political-economic context in which they are embedded, bringing to light Israel's control over the flow of Palestinian agricultural virtual water. We argue that a political ecology approach to virtual water offers a theoretical basis to move beyond the currently techno-managerial emphasis in the virtual water literature, illuminating the link between the control of virtual flows and the consolidation of political and economic power.

1. Introduction

A core contribution of ecological economics is the identification and assessment of the hidden resource and energy flows that sustain final consumption. Ever since Howard Odum's (1973) conceptualization of 'Emergy', that is the energy embedded in final goods and services, ecological economists have been on the forefront of developing new indicators and quantifying the 'rucksacks' and the indirect material flows that sustain an economy. Concepts such as the 'ecological footprint' (Rees, 1992), the water footprint (Hoekstra and Hung, 2002), or the material footprint of nations (Wiedmann et al., 2015) have their origins in the conceptual innovation of ecological economics in seeing the economy not as the aggregation of monetized goods and services within the borders of a single country, but as the totality of energy and materials that support the production and consumption of a social system. Virtual water (VW) is an indicator that reflects the hidden water flows of social metabolism (Martinez-Alier, 2005). VW refers to the amount of water required for the production of a good or service (Allan, 2001). Whereas ecological economists have contributed to the quantification of the virtual water moved through trade and the water footprint of nations or regions (Aldaya et al., 2010, Ercin et al., 2013), they have paid less attention in elucidating the political and economic dynamics that govern these hidden flows of water.

The study of power relations and the way they affect access to and use of resources, and the distribution of environmental goods and bads, is the domain of political ecology. Political ecology and ecological economics are 'sister' communities that have evolved together (Martinez-Alier et al., 2010). In the spirit of integrating further political ecology with ecological economics (see Martinez-Alier et al., 2010, Kallis et al., 2013), this article advances a political-ecological economic approach to the study of virtual water, quantifying hidden flows, while contextualising them and explaining them by understanding political and power dynamics (Beltrán and Velázquez, 2015).

Palestine is an emblematic place for studying power and water. The role of water in the Palestinian-Israeli conflict has been analysed by Kally and Fishelson (1993), Lonergan and Brooks (1994), Elmusa (1997), Selby (2003a, 2003b, 2011, 2013), Trottier (1999, 2007), Zeitoun (2008) and Glover and Hunter (2010), to name a few, who argue that the asymmetric power of Palestine in the Oslo negotiations has ensured Israel's domination over water allocation in Palestine. Studies have also shown how Israel-Palestine trade relations have influenced the deterioration of Palestine's agricultural productive capacities, resulting in the decline of the agricultural sector's contribution to the economy (de Pascale, 1996; Cottier and Paunatier, 2000; Haj Khalil, 2009; Taghdisi-Rad, 2011). Despite this exhaustive literature on Israel, Palestine and water, less attention has been paid on the interface of

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water, trade and agriculture, and the ways in which controlling trade, Israel may have controlled the virtual flows of water too.

The concept of virtual water, developed by Allan (2001), is extremely useful to make this water-agriculture-trade relationship visible, as it sheds light on agricultural trade flows in terms of water. Allan (ibid.) promoted this term to underline how Middle Eastern countries' water requirements have exceeded available resources since 1970. In other words, water scarcity in these countries was being managed by importing VW in the form of agricultural products from the international market. While VW was defined as a theoretical indicator, the water footprint (WF) emerged from the methodological attempt by Hoekstra and Hung (2002) to estimate VW, defined as the "volume of water needed for the production of the goods and services consumed by the inhabitants of the country" (Chapagain and Hoekstra, 2004, 11). Amidst many other methodologies (see Velázquez et al., 2011 for an overview), WF remains the most widespread. Suffice to say that VW and WF have been popularised and numerous studies on virtual water flows of economies worldwide have shown the increase in virtual water trade around the world (Chapagain and Hoekstra, 2004; Chapagain et al., 2006; Hoekstra and Chapagain, 2008).

In terms of the Palestine case, previous studies have implemented methodologies capable of estimating VW flows in the West Bank (Nazer et al., 2008) and quantifying the effects of VW trade on water management in Palestine (Nassar, 2007; Hamdi, 2014). However, there is an ongoing debate over the contradictions generated by the VW indicator when it comes to providing information for implementing water and trade policies (but see Wichelns, 2010, 2011, 2015). And most analyses on VW flows are undertaken from a quantitative perspective while the wider socioeconomic and environmental context is absent (Chenoweth et al., 2014).

In light of these gaps, we propose that a political ecology approach to VW offers powerful theoretical bases to contextualise and politicise environmental knowledge (Forsyth, 2003). Political ecologists recognize the biophysical roots of environmental problems, but also focus on the link between ecological problems and their political dimension showing how socio-ecological conditions are sustained by and organised through both social and metabolic-ecological processes (Swyngedouw, 2006). In this vein, we argue that the estimation of VW flows should be explained considering the political, social and territorial implications of these flows – that is, who benefits and who suffers from VW flows, or non-flows. This approach means that VW flows are not just the flow of a resource, but the manifestation of the political and social relations that exist between water, agricultural production and trade in the Palestinian Territories.

The purpose of this paper is thus twofold. Firstly we examine the social and political mechanisms that affected the flow of agricultural VW in Palestine during the Post-Oslo period. Secondly, we quantify these VW flows and then relate them to their broader social and political context. The analysis reveals that VW flows evolve along with the political context in which they are embedded, bringing to light the power geometries that affect the flows of VW.

The findings suggest that Israel reduced the flow of Palestinian agricultural virtual water exports and diverted virtual water imports from Palestine to itself. This contextualised VW approach illuminates the link between the control of VW flows and the consolidation of Israeli political and economic power over Palestine through water.

This paper, in this light, explores the relevance of combining biophysical analyses with the examination of institutional and political relations that both coexist with and affect virtual water flows. Following this introduction, the second section describes key elements in the Oslo Protocol, the Peace agreement signed between Israel and Palestine in Oslo in 1993, and how this affects water, land governance and agricultural trade. The third section unpacks VW and the methodology we used to estimate it, explaining how VW can be approached from a political ecology perspective. The fourth section presents the quantitative analysis of Palestinian agricultural VW flows from 1997 to 2013 and examines how the political and social context has conditioned these flows. The per capita agricultural virtual water imports and exports of the Palestinian Territories are compared to those of the adjacent countries (Israel, Jordan, and Egypt) in order to provide a regional perspective on the Palestinian case. Section 5 draws conclusions from this research and what it contributes to the study of virtual water and political ecology.

2. The Oslo Agreement: The Economic Dimension of Peace

The controversial application of the Peace Agreement signed in Oslo between the Palestinian Territories and Israel in 1993, initially planned for five years and subsequently extended, marked a crucial turning point in Palestine history. Analyses of this framework which has since governed Israeli-Palestinian relations have shown the vital role trade has played in the survival of the Palestinian economy as well as the latter's long term dependence on Israeli policies (Arnon and Bamya, 2015; Office of the Quartet Representative, 2013). The economic effects of restricted access to land in the West Bank and of restrictions on Palestinian water sector development have, furthermore, been significant (United Nations Conference on Trade and Development [UNCTAD], 2011, 2012a; World Bank, 2009a, 2010). These studies, alongside those looking at Israeli imposed movement restrictions within the West Bank (UN Office for the Coordination of Humanitarian Affairs [OCHA], 2011), illustrate the importance of Palestine's agricultural sector for socio-economic development and poverty reduction within complex Israeli regulations and procedures that have ultimately undermined the development of Palestinian agriculture (UNCTAD, 2012a).

The Paris Protocol, signed in 1994, was part of the Oslo Agreement, and was designed to serve as a temporary protocol on economic relations between Palestine and Israel. More than twenty years after the implementation of this Protocol the overarching objective of the Israeli Authorities to ensure control over the Palestinian Territories has taken the form of an imposed trade integration between these two countries. By ensuring that Israeli exports flow smoothly to Palestine while Palestinian exports to Israel and other countries are controlled, Israel preempts any possible competition between Palestinian and Israeli producers (Taghdisi-Rad, 2011).

The agricultural sector has not been an exception; restrictions to land and water resources as a result of Israeli policies have had long-term implications for Palestinian agricultural production in general and for agricultural trade in particular. The creation of administrative Areas (A, B and C) in the West Bank dictating Israeli and Palestinian Authority powers under the Oslo process and import-export policy have led to significantly increased trading costs and reduced mobility for Palestinians; these realities have a comparatively greater impact on agricultural trade due to its time-sensitivity. To lay bare these issues we briefly examine three different aspects of the Oslo Accords: 1) Palestinians' land access and movement; 2) Israeli-Palestinian water governance relations and 3) Israeli-Palestinian agricultural trade relations. We will then illustrate how these three aspects influence the performance of the Palestinian agricultural sector, before exploring how these factors influence agricultural VW flows.

2.1. Administrative Areas in the West Bank: Palestinian Mobility and Land Access

The Oslo Accords, signed in 1993 and 1995, were intended to temporarily divide the West Bank into three administrative zones, called areas A, B, C (see Map 1). Area A, 18% of the West Bank land area, consists mostly of the main towns such as Ramallah, Hebron, Bethlehem and Jericho under full Palestinian Authority (PA) civil and security control. In Area B, around 22% of the West Bank, the PA has control over civilian services such as planning, but only joint security control with the Israeli military. Area C is the largest administrative area of the West Bank,