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Water Grabbing in Colonial Perspective: Land and Water in Israel/Palestine

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ABSTRACT: 'Water grabbing' and 'land grabbing' have been referred to as a new colonialism, dispossessing small farmers and indigenous people of land and water for the sake of investors. The current 'grabbing' is driven by perceived scarcity of food and sustainable energy, and is enabled by global financial instruments and commodity speculation. In this paper, we argue that while in many ways different, the 'new colonialism' of land/water grabbing may be better understood through analysis of old colonialism. We use actor network and place modernisation theories to analyse the history and practice of Zionist land/water grabbing in Israel/Palestine as an ongoing remnant of old colonialism. While there are clearly unique aspects to this case, there are similarities in processes, such as the narrative of modernising 'barren', 'infertile', and 'undeveloped' land. The ongoing power imbalance in water management and access, the disproportionate burden on Palestinians of growing water scarcity, and the inability of technical fixes to address the problems of relative deprivation may be seen as cautionary tales for current 'water grabbing'.

KEYWORDS: Colonisation, place modernisation, Zionism, actor network theory, water grabbing, Israel/Palestine

INTRODUCTION

> *Water grabbing refers to situations where powerful actors are able to take control of, or divert, valuable water resources and watersheds for their own benefit, depriving local communities whose livelihoods often depend on these resources and ecosystems (Franco and Kay, 2012).*

One of the proposed mechanisms for addressing concerns about the nexus of rising food prices, water scarcity, and growing energy needs is that of large-scale financial investment in 'undeveloped' or 'marginal' land. A confluence of resource challenges, policy changes driving alternatives to fossil fuels, and ongoing concerns by governments about accumulating revenue to pay off debts and pay for social services has spurred interest both from investors, domestic and international, and governments in land deals for the purpose of agricultural development and speculative investment (De Schutter, 2011; Cotula, 2012). These proposals are justified on the grounds that investors will bring with them the capacity to transform 'marginal' into 'productive' land (Deininger et al., 2011).

A study by the International Fund for Agricultural Development (IFAD) states major concerns about this process as follows:

> While there is a perception that land is abundant in certain countries, these claims need to be treated with caution. In many cases land is already being used or claimed – yet existing land uses and claims go unrecognised because land users are marginalised from formal land rights and access to the law and institutions. And even in countries where some land is available, large-scale land allocations may still result in displacement as demand focuses on higher value lands (e.g. those with greater irrigation potential or proximity to markets) (Cotula et al., 2009).

The supporting rationale for foreign land purchases is that agricultural investors have the financial, human and social capital necessary to develop available land to produce more food and bioenergy crops (Cotula et al., 2009). While heralded by some as unleashing the productive potential of the private sector, others have referred to these as 'land-grabs', as a 'new colonialism' (Oakland Institute, 2011; Via Campesina, 2011). Associated 'water-grabs' are similarly viewed as a continuation of a historical process of 'enclosure of the commons', through policies that support increased international investment in ownership and extraction of common pool resources (Shiva, 1997).

The visceral reaction of indigenous rights organisations, small farm organisations and a full range of progressive groups against this form of foreign investment and agricultural modernisation is in part due to a growing number of stories of displaced small farmers and herders (Vidal, 2011; Cotula, 2012). But it is also due to felt similarities to earlier forms of foreign investment in agricultural development, namely, the colonial transformation of landownership and production (McMichael, 2011). Indeed, earlier land transfers during colonialism also involved corporate investment in vast tracts of land, promising modernisation of agricultural potential through technological investments.

One of the points of this paper is that water was often implicated in the colonial schemes to 'modernise' agricultural production – with the intention, of course, that there would be a return on investment for the colonising forces as well as the colonised, as Becker (1994) pointed out in his study of the development of the Office du Niger in Mali in the 1920s. Likewise, the narratives of land as 'terra nullius', 'undeveloped', 'unmodern', or 'marginal' during colonial settlement, bear a striking resemblance to the narratives supporting current 'land investments' (Geisler, 2012).

This paper will begin by providing a theoretical framework for land-grabs, specifically drawing on Lefebvre's (1972) depiction of space, power, and production, and Harvey's (1996) narrative of modernity. We draw on the theory of translation (Callon, 1986; Marsden et al., 1993; Latour, 2005) to frame how these narratives of space and place emerge as socio-technical networks.

We then briefly summarise the literature on land-grabs, specifically alluding to a growing body of literature that relates these to water-grabs. We argue that while the current investment and appropriation of land and water discussed in this volume and elsewhere (Cotula, 2012) are in many ways different from appropriation of water for colonial settlements, there are important aspects that are similar and these are instructive for anticipating the long-term implications. We focus on the Zionist settlement of the Middle East as an example, in part because of the ongoing nature of settlement, land transformation, and water conflict. We conclude by arguing that this linkage makes apparent that land-grabs imply a hydraulic transformation with significant environmental and social implications, including inequity in water access and potential conflict. Drawing on Gasteyer and Flora (2000), we argue that such a legacy is not unique to the Middle East, but rather has corollaries in many other colonial settlement contexts and potential corollaries in the current process of land and water grabbing.

NARRATIVES, SOCIO-TECHNICAL NETWORKS, AND THE POLITICS OF SETTLING LAND AND WATER

Lefebvre's (1972) work on the intersection between space, state, and power posits that access to space is a matter of power relationships. These power relationships define who has access to space and under what conditions. As powerful actors gain currency in society, they are able to use the state to dictate

conditions of access to space often using a rationale of most beneficial use of a particular place. So, it follows that an urban municipality might be swayed by developers to redevelop open space with a particular eye toward attracting those willing to pay ever higher rents and those willing to invest money into the area. Those lacking resources are likely to be excluded, or at least relegated to occupying the space only at particular times.

Building on Lefebvre, one of the striking features of colonial occupations has been the way that occupying authorities have taken space in the form of land and redefined it in terms of its productive value for those engaged in occupation. Harvey (1996) expounds on this point, arguing that modernity provided a narrative for this process. Land was classified according to its productive potential to colonial administrations and settlers. Indigenous populations were deemed more or less modern, based on their use of land in conformity to those determinations.

Many scholars of colonialism, such as Said (2002) and Mitchell (2002) have documented how the narratives of 'backward', 'savage', and 'uncivilised' often applied to local populations be they in the Americas, Africa, Asia, or the Middle East, as the justification for domination of landscapes. Geisler (2012) similarly argues that the current land grabbing has adopted the '*terra nullius*' (empty land) justifications for appropriation of land in Africa, though it is certainly the case that a more subtle argument is often made about how these land deals can increase the value and productive capacity of 'marginal or idle lands' (Borras and Franco, 2012). Using case studies from Iowa in the United States, Palestine, and the Patagonia in Argentina, Gasteyer and Flora (2000) argued that across the national context these justifications were used as a way of systematically re-imagining land as having potential value that had not been realised by the local population. Colonial forces, thus, developed not only justification for expelling the indigenous population from the land, often arguing that these populations were simply not using the land to its best use, but also a narrative of indignation when the local populations reacted violently to land appropriation. This indignation then, in turn, further justified greater disenfranchisement of the indigenous by the settling population.

Two points are important here. First, the transformation of land was carried out through a collective re-imagining by colonists of a landscape that had potential for 'modernisation'. In other words, it was land that could be transformed to produce for the global agricultural supply chain and/or to sustain a settler population (McMichael, 2011). However, this transformation very often required technological investment to (re)engineer the hydrology. In some cases, this would involve moving water off the land to create apparently productive, flat farm fields, as in the case of the Midwestern American Prairie (Bogue, 1991). In other cases, it involved moving water on to the land through irrigation schemes, as in the case of the Argentina's Patagonia Desert (Bendini, 2000). Either way, as land was converted to use by settlers aiming to produce for international markets, hydraulic flows were reworked to make that production possible. As Linton (2010) describes (building on Tuan, 1968), the Western perception of deserts as barren, and I would add perceptions of wetlands as swamps or "buggy marshes" of waste (Vileisis, 1997), justified the (re)engineering of hydraulic flows as a key component of remaking land and production.

Second, building on Gasteyer and Flora (2000), while the colonial project of land appropriation for production involved the construction of a settler society narrative of justification, the state was not the only implementing actor. International corporations, companies, and indeed non-profit (sometimes religious) agencies, played key roles in the settlement and transformation of land and the displacement of native populations. Building on Alatout (2009), we use Callon's (1986) theory of translation and Latour's (2005) subsequent actor network theory (ANT) to help trace the development of techno-scientific and ultimately political networks to explain these processes.

ANT (Latour, 2005) builds on Callon's (1986) theory of translation and argues that technologies are implemented based not only on scientific merit but on enrolled socio-technical networks that involve both human and non-human actors. These actors range from scientists, to technical assistance experts, to farmers, business owners or others who implement the technology, but critically also include organisms (plants, animals, soil) that either become part of the network or resist it. Callon's (1986) case

study of the introduction of high-yielding Asian Scallops to Mediterranean fisheries demonstrated the four-part process of technological innovation and diffusion involving the following:

> 1) *intéressement*, where the lead actors consolidate their network through convincing others of their view; 2) *enrôlement*, which organises the relationships within the network; 3) *mobilisation*, which stipulates understanding of the network itself, enhances the legitimacy of representatives of actors within the network, and brings together disparate social entities and actors within the network; and finally 4) *dissonance*, in this case when, first, the scallops (by not surviving in the coastal waters of southern France), and then, the fishers, refused to stay in the network (Gasteyer, 2008).

Marsden et al. (1993) employed ANT to describe socio-technical and political networks at play in landscape change in the UK countryside. The socio-technical network to implement farming and other land changes was influenced significantly by a socio-political network (including academics) that tried to influence the narrative of values and opportunities. Alatout (2009) used a similar frame in discussing the relationship between water and Zionist settlement.

He argues that land and hydraulic flows have been transformed through a continually reconstituted network including: the political, military and economic apparatus to define landscape; and the technology to apply water and remove it from land, to produce on that land, to distribute the products, and to mitigate the negative impacts. Note that like Alatout (2009), we explicitly add political structures to this theory.

We will discuss below how these networks were formed in the context of Zionist settlement of Palestine and the subsequent development of Israel. A key point of this paper is that colonisation has replicated these processes in much of the world. We will use these theoretical frameworks to describe: a) colonial era land grabbing and its similarity or difference to the more modern iteration; b) how land grabbing relates to water grabbing, in the context of colonial settlement as in the current context; c) the social and ecological consequences of these transformations.

Water grabbing may be considered most significantly as relating in the present day to the diversion of surface water and groundwater resources to crop production that feeds the constructed international need for food and energy. Much of this hydraulic diversion is proposed and carried out to render marginal land productive, often to serve the international agricultural market for food or energy products. Franco and Kay (2012) argue that water and land grabbing is about investment in "virtual water" (Allan, 2011) for agribusiness development. Given the water resources that are required to produce agricultural products, global agricultural trade is at a very basic level, about "a gigantic transfer of water, in the form of commodities".

Franco and Kay (2012), however, point out that this trade in "virtual water is not unique to agriculture, but encompasses the water used to produce and trade in all manner of goods and services". It is also related to increasing international financial interests in the value of water that has been captured in a now enormous literature on water privatisation (see, for just one example, Bakker, 2010).

The concept of water grabbing is also associated in history with facilitating new human settlements – most famously in the development of Los Angeles, California, where water was diverted from Owens valley and the Colorado river through a network of pipelines designed by William Mulholland to create the second-most populous city in North America (Reisner, 1993; Franco and Kay, 2012; Barringer, 2012). This concept is easily extended to describe more modern cases of water appropriation to support urban development both in the global north and south (Varis et al., 2006). Examples include the appropriation of rural supplies to support urban demand in and around Hyderabad, India (Celio et al., 2010), Hermosillo, Mexico (Scott and Pablos, 2011), and the appropriation of Imperial valley water to supply San Diego (Jenkins, 2004). Understanding water grabbing (and its relationship to land) involves

understanding complex and historical linkages to settlement and socio-technical imaginaries[1] of optimal resource use, productivity and resource rights.

NARRATIVES AND COLONIAL VESTIGES

Small farmer and anti-corporate globalisation activists have expressed significant concern about this process. La Via Campesina, for instance, has been working on this issue for many years, along with other organisations such as Foodfirst Information and Action Network (FIAN) and the multi-sectoral social movement called International Planning Committee for Food Sovereignty (IPC) – both of which are very much mobilised around the issue of the right to food. As posted on their web site:

> La Via Campesina urgently requests all governments to condemn the practice of land grabbing that is currently displacing millions of peasants and small-scale producers around the world. Land grabbing is causing massive violations of human rights, whilst destroying land, society, environment and food sovereignty. Today, over 400 million small-scale food producers are suffering from hunger and malnutrition caused by over half a century of ill-conceived land and rural development policies. [S]tates [should] reform current land policies that are exacerbating hunger, and opening the door to land grabbing around the world (Global Justice Ecology Project, 2012).

This response to land grabbing is in part because advocates see this new foreign investment as bearing similarity to more blatant forms of colonialism that likewise used narratives about the ineffectiveness, lack of productivity, and inefficiency of indigenous farming, herding and hunter-gatherer populations.[2] These sorts of narratives were applied to settled landscapes across continents: Latin America, North America, Africa, Asia, and the Middle East (Gasteyer and Flora, 2000; Mitchell, 2002; Davis, D.K., 2011). Land was described as barren, unproductive, and inefficiently managed – with the result of dire consequences in terms of famine, floods, and untold human suffering. The narrative was that more effective land management through capitalisation by foreign investors could add increasing value to land, and could benefit the local population as a whole through modernisation.

While land and its productivity represented a basis of the rationale, in many cases, water was the critical variable in making barren land valuable. Thus, colonial settlement, often through foreign-financed investment, with the military force of the state to back up that investment was the driving force in long-term land changes around the world. Opponents argue that this practice has only been expanded with the most recent development of land/water grabbing. Below, we explore how this process has been carried out in Israel and Palestinian territories.

ZIONIST SETTLEMENT, LAND AND WATER

The case of water grabbing in the context of Zionist settlement, the establishment of the state of Israel, and ongoing occupation of Palestinians is clearly different in many ways from other land/water grabbing addressed in this volume. The goal in appropriating water and land was ultimately to create a Jewish homeland, rather than purely economic gain. Still, the narratives that justified and the processes that enabled Zionist appropriations of land and water resources bear some similarity to current efforts.

[1] Here I am invoking Jasanoff and Kim's (2009) notion of national socio-technical imaginaries as: "collectively imagined forms of social life and social order reflected in the design and fulfilment of nation-specific scientific and/or technological projects." In a globalized world, these imagined forms of social life, social order, and related scientific and technological projects may be associated with initiatives that go beyond the state, per se. Modernisation formed the nucleus of an imaginary of improved humanity through land and water transformation, accompanied by settlement and colonisation. I argue that, while there are differences, water grabbing involves a similar imaginary of energy, food, and water scarcity solved through large scale land investment, resulting in increasingly productive resource use.

[2] Many activists such as Food First's Raj Patel (Ridberg, 2011), the Transnational Institute (TNI, 2011), and Italian journalist Franco Roiatti (Roiatti, 2010) have called land grabs 'new colonialism.' UN FAO General Secretary Jacques Diouf even warned of creating a new colonialism through unregulated land investments.

Further, and in some ways more importantly, the ongoing repercussions in terms of water scarcity and the disproportionate impacts of water scarcity resulting from the 'grabs' associated with settlement and the 'modernisation' of agriculture and water management can be instructive as we think about land and water appropriations elsewhere.

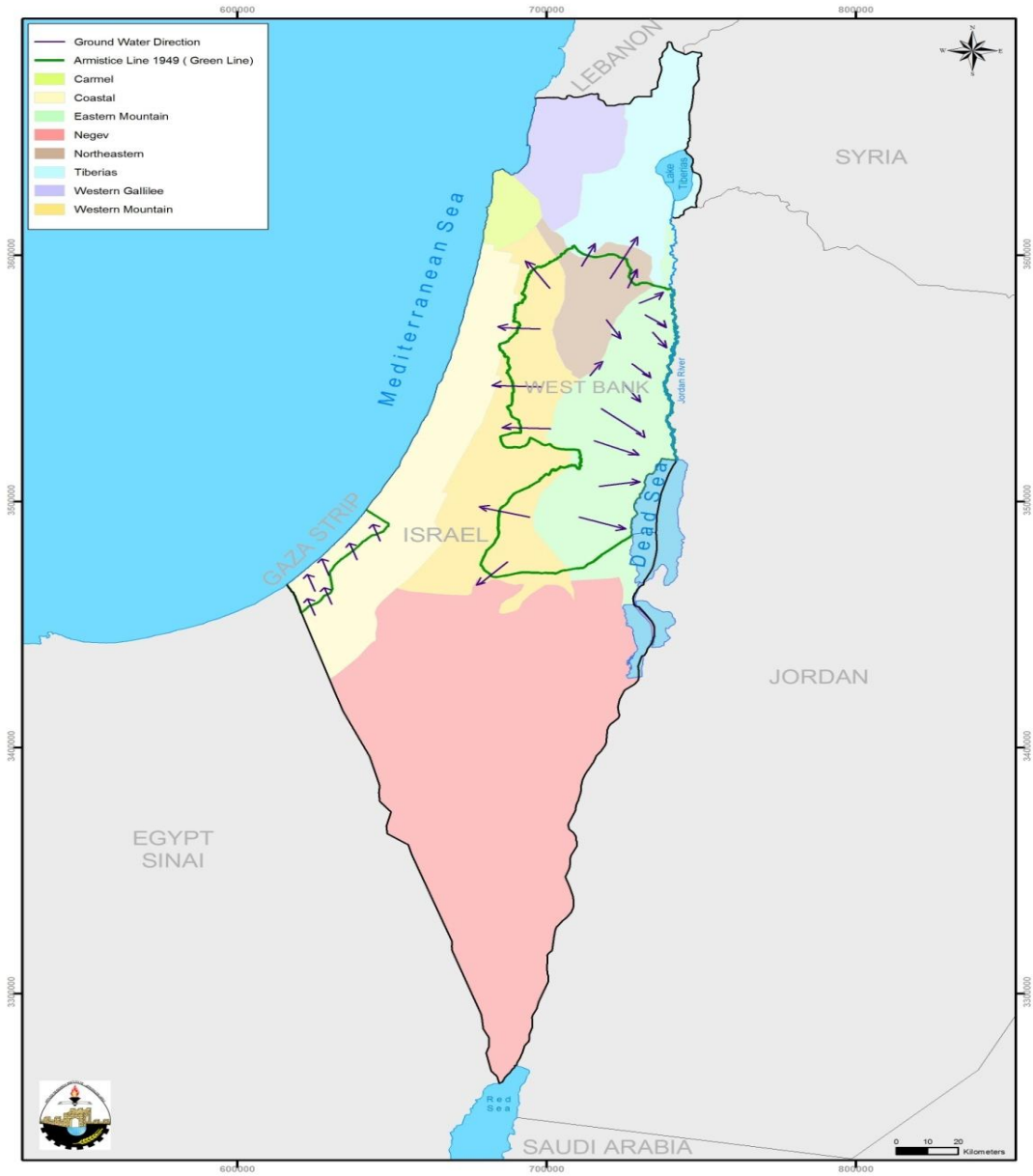
The Ottoman area of Palestine encompasses the modern day entities of the state of Israel and the Palestinian areas of the West Bank and Gaza Strip. In terms of water resources, the Mediterranean sea borders the area to the west, while the sea of Galilee, Jordan river, and Dead sea encompass the border to the east. As figures 1 and 2 demonstrate, groundwater and surface water resources span the political boundaries, making the water resources from these areas shared. Figure 1 demonstrates the relative fertility of the coastal plain, as opposed the West Bank. It also demonstrates how the surface water sources of the sea of Galilee and Jordan river make a border with Jordan.

Early settlements utilised the Coastal Aquifer as part of citrus and other agricultural as well as urban development schemes. With the exhausting of the Coastal Aquifer (after the formation of the State), Israel turned to tapping the sea of Galilee, to provide needed water for development. There is significant conflict now over who has rights to exploit the aquifers that are recharged on the West Bank, as is seen in figure 2.

Figure 1. Palestine territories and Israel (CIA, 1993).

Zionist settlement of Palestine during the Ottoman and British Mandate period, and the occupied Palestinian areas today, is worthy of attention precisely because it exemplifies the socio-technical network through interaction between international, national, and multi-national actors, non-governmental actors, government bureaucrats, local residents, land, water, and biological materials. Since 1948, Israel's control of water resources has been the result of military actions that forced between 700,000 and 800,000 Palestinians into exile and claimed the most fertile part of the territory for the new Israeli state, and subsequent military occupation, with greater or lesser complicity of Palestinian forces over time. There is a longer story of Zionist settlement, however, that has more similarities to the modern day land acquisitions. From the late 1800s through the mid-1940s, Zionist settlement was based on purchase of land, exploiting complicated land tenure arrangements that unduly disenfranchised small farmers (Stein, 1987; Nadan, 2003).

Figure 2. Aquifers that originate in the West Bank and runoff direction (Courtesy of Applied Research Institute Jerusalem).



While much of the concern has been couched in the right to land, academics and Palestinian advocates argue that Israeli settlement has developed in ways that capture scarce and valuable water resources. A critical difference here is that while land grabbing is largely carried out through a combination of non-profit and corporate investment in sovereign nations, the appropriation of land and water in Palestine has taken place since the 1940s through the state apparatus in Israel, aided by internationally sanctioned negotiating processes since the early 1990s (Selby, 2003). Throughout Zionist settlement, land grabbing has been linked to water grabbing. An early example is the efforts by Zionist lobbyists to convince the British to include the upper Jordan river in the territory covered by the Palestine Mandate. The river, of course, constituted a viable water source for agriculture in the imagined state of Israel (Zeitoun et al., 2012).

GENERAL LAND SETTLEMENT IN HISTORIC PALESTINE

Intéressment: The early Zionist movement (including the Christian explorers who toured Palestine as supporters of the movement in the 1800s) built a narrative of settlement potential and untapped abundance, very similar to the recurring narratives of *terra nullius* and marginal land that accompany modern day land/water grabbing (Giesler, 2012). This was, after all, in Biblical terms the 'land of milk and honey' and the land of abundance to which Moses had led the Jews from Egypt. The narrative was also that there was plenty of land to settle, 'a land without a people for a people without a land' (Khalidi, 1997; Muir, 2008). Even if there was recognition that there were people who already lived on the land, the contention was that they were not using the land to its maximum potential (Stein, 1987). Explorers of the Palestine Exploration Fund in the mid- to the late 1800s developed reports and individual travel logs that claimed there to be ample water, fertile land, and a favourable climate for the Holy Land to be 'returned' to the glorious 'land of milk and honey' described in the Bible (The Spectator, 1878). For instance, the explorer C.B. Conder in his volume 'Tent work in Palestine', decried the lack of modern water management in fellaheen (peasant) communities and called for a repair of Roman era drainage and water supply canals, terracing, and more expansive irrigation to use the land more effectively to improve living conditions (Conder, 1878). The Zionists later used a similar argument to counter concerns about 'absorption capacity' for Jewish immigrants with the British Mandate officials (Alatout, 2009), but also negotiated to have the Palestine mandate include the Litani river and other water sources to facilitate development of land for settlement (Zeitoun et al., 2012).

Beyond the desire to 'reclaim' the Holy Land, Zionist leaders were encouraged to search for a Jewish homeland because of the increasingly violent anti-Semitic attacks in Europe. Still, Shilony (1998) documents how the early Zionist leadership explicitly sought to replicate the strategies of other colonial settlement movements.[3] In 1875, it was proposed that such a homeland should encompass Palestine, the Negev and parts of Jordan with their water resources to absorb 15 million Jews (Isaac, 2000).

Enrôlement: Thus, it is not surprising that both the narrative and actions of Zionist exploration and settlement in the early to mid-20th century was modernist – seeking to improve the productivity of the land for the purpose of settlement through applying irrigation, drainage and western agricultural techniques. In short, they sought support for the movement as part of the colonial movement of later 19th century imperialism, as well as a refuge for a 'people without a land' (Anton, 2008; Alatout, 2009).

Early Zionist settlements highlighted their use of water as a way of demonstrating how they were simultaneously modernising and returning the Holy Land to its former glory. The water tower, often behind a settler cultivating the land, became a common symbol in posters advertising the opportunities for Jewish settlement (Shilony, 1998; Azaryahu, 2001). Through this process, they consolidated a network that involved Jewish and non-Jewish scientists, European government officials, and investors.

[3] In particular, Shilony describes how the leaders of the early Zionist movement specifically studied colonisation efforts by Europeans and Americans both inside their borders and in territories under their control. The identification of water for irrigation was critical in drier areas.

It should be noted here that the narratives 'modernisation' of 'marginal' and 'degraded' land have been increasingly contested in more recent scholarship. Sayigh (1979) documented refugee accounts of village life as verdant and productive. Levine (1995) argued that the modernisation narrative was adopted at least in part because it served the interest of British Mandate authorities, who valued the revenue from land sales to Jewish investors. More recently, however, there has been an emergence of Palestinian village and oral histories that document a vibrant agricultural and pastoral system that existed prior to, and through, the eras of Zionist colonisation, the British Mandate, and the establishment of Israel (Davis, R., 2011). Beyond the earlier depictions of a pre-Zionist paradise (Sayigh, 1979), these depictions provide nuanced accounts of Palestinian fellaheen engaged in extensive and multi-year planting cycles that used the micro-climates to nurture diverse agricultural systems that produced both subsistence and cash crops, and livestock. These accounts vary depending on location. Palestinian fellaheen agricultural systems were more intensive in the west and the north of the pre-Israel Palestine, where there was higher precipitation and access to water for irrigation. The systems were more extensive in the south and east (Doumani, 1995; Gasteyer, 1998; Pappe, 2004; Davis, R., 2011; Templin, 2011). Bedouin accounts of transhumance cycles likewise describe an intricate knowledge and use of the drylands and desert areas presumed 'barren' in the European and Zionist depictions (Falah, 1991; Gasteyer, 1998; Davis, D.K., 2011).[4]

Mobilisation: While the rhetoric of settlement is important, the mechanisms through which settlements occurred are equally important. Jewish settlements were enabled through a number of factors that systematically made precarious Palestinian fellaheen (peasant) landholdings, including an artefact of the Ottoman tax code which led to land tenure that was held by landed elites throughout the Levant. Starting in the late 1800s, the Ottoman occupying forces came to see Palestine as an important source of revenue for an empire in financial crisis. Their increasingly burdensome taxes led Palestinian fellaheen to distribute their landholdings to absentee landowners in the urban areas of the Levantine Middle East.

While the system served the interests of elites within the Ottoman Empire, the lack of any real connection to the land meant that these land title holders were subject to temptation from outside investors as various Zionist groups increasingly sought land on which to settle Jews, many of them fleeing increasingly brutal discrimination in Europe (Stein 1987). Adding to this, many Palestinian Arab fellaheen and Bedouin were partially or fully nomadic, as a way of using the micro-climates of Palestine to maximum advantage. While their livelihood depended on this migration, they certainly did not hold title to all the land (again, because of taxes), making the land libel for sale to those wanting to invest (Gasteyer, 1998; Falah, 1991).

As Shilony (1998) documents, efforts at exploration of Palestine in the early 1900s involved a network of actors that included private investment companies and technical experts looking for land that would be productive. These included the Anglo-Palestine Company Bank (APC), and, eventually, the Palestine Land Development Corporation (PLDC), established to finance Jewish settlement both through the Jewish National Fund (JNF) and the private sector. Even as there was significant interest in cooperative forms of settlement espoused by the European socialist movement, early tours of Palestine by the JNF explicitly sought land that could yield a return on investment, and maps were developed to identify ideal locations in proximity to water resources for irrigation. In the mean time, other Zionist organisations worked with the international community, including the Ottoman authorities to secure support for settlement in the territory.

This early quest for land and water grew over the British Mandate period. In 1922, for instance, the Jewish Agency formed a special technical committee to conduct studies of the utilisation of water and

[4] It should be noted that literature on early 20th century Palestinian village life depicts significant hardship resulting from treatment by the Ottoman army as they attempted to defend Palestine against the allied forces in World War I, and indeed deterioration of agricultural systems due to high levels of conscription of able-bodied men into the Ottoman army (Tamari, 2011).

irrigation of unarable land. In 1926, the British High Commissioner granted an operating permit to the Jewish-owned Palestine Electricity Corporation, founded by Pinhas Rutenberg, a 70-year concession to utilise the water of the Jordan and Yarmouk rivers to generate electricity (Reguer, 1995). The role of water and water infrastructure as part of a national aspiration, however, only became clear in the 1930s. Alatout (2009) argues that this was in part a reaction to the decision by British Mandate authorities that levels of immigration would be related to so-called 'absorptive capacity'. The plans for the Mekerot (the National Water Company) were only made public in 1937 as a means of demonstrating that through modernisation there was significantly more capacity for absorption of Jewish settlers than projected in British planning documents.

The Mekerot was established in 1937 by the Histadrut [the Zionist labour organisation], PLDC, and the JNF for the purpose of "planning, executing and running water-works for irrigation and consumption" (Muenzner, 1947, cited in Alatout, 2009). This was significantly after the first waves of Jewish migration to Palestine, but still more than a decade prior to the establishment of the state of Israel. But Alatout goes on to point out that this marked a shift of water management to a national project, that was in part about fuelling a bourgeoning export industry of citrus and other horticulture crops. Indeed, there was a confluence of interests between Zionist leaders and British Mandate officials, who saw irrigation and agricultural production as a means of bringing in revenue through further Jewish acquisition (Levine, 1995). In service of this, Mandate officials indeed commissioned a hydrologist to study the water resources and irrigation potential of the Jordan valley basin. This study served as the main reference in the preparation of the proposed United Nations Partition Plan of Palestine (Smith, 1949).

While the rhetoric of agricultural Zionist settlement favoured small collective agricultural systems such as Kibbutzim, the bulk of the agricultural investment during the Mandate era was in private sector citrus operations that existed in the western coastal plains – notably mimicking the citrus production systems in the American West. These were able to produce for the international market and provide needed revenue to the Zionist state apparatus that was developing as the British grew weary of administration of Palestine (Karlinsky, 2000).

Once the state was established in 1948, the JNF worked with Israeli Prime Minister David Ben Gurion and the new government to implement the Mekerot and launched a 'Seven Year-Plan' aimed at diverting the Jordan river water south toward the Negev desert, specifically through damming the freshwater sea of Galilee (effectively diverting inflow to the Jordan river) and diverting that water to serve irrigation, industrial development, and domestic development, as well as in the new nation (Selby, 2003). International partners were a key part of this initiative. In 1955, for instance, the United States presented the Johnston plan for allocating the Jordan river waters among its riparian entities (Alatout, 2011).

Anton's (2008) study demonstrated how a modernist narrative was used to justify international investment of money, technical expertise, and support for draining the Hula wetlands, which involved displacing the Arab population of that area. The water from the swamp, would ultimately also be diverted to the Mekerot – and thus further support the irrigated agriculture – much of it the citrus production. A public health narrative was likewise used, arguing that the fetid swamp waters bred mosquitoes responsible for high rates of malaria in the area (Anton, 2008).

In short, a coalition formed in support of draining Hula that promised agricultural production on the exposed land, improved overall public health, and water in service of greater agricultural productivity, both for the internal and international markets. The Hula was eventually drained and the local Arab population of the area displaced. Mosquitoes and malaria were eradicated through spraying DDT some years later. *Dissonance* emerged in the form of the exposed land that proved less productive than hoped, but water was diverted into the Mekerot system. Eventually a small portion of land was restored as swamp and natural wildlife sanctuary (Anton, 2008).

Thus, for Israel, the colonial project up through the beginning of statehood was based on a narrative of modernisation – a transformation of land through irrigation or drainage. Zionist land grabbing, aimed

at settling Jews, was carried out through land purchases that, like in the current era, were made possible through vague claims to land tenure for fellaheen and Bedouin. While settlement was in part aided through the development of a Zionist parastatal apparatus that was established to create the conditions of statehood after 1920, the infrastructure supporting settlers came from private sector and non-profit sources, and through this infrastructure, settlers were able to marshal resources that fellaheen were unwilling or unable to devote to improve productivity on the land.

A socio-technical network (Latour, 2005; Alatout, 2009) enabled the land grabbing in this era, including the water that could be exploited to support settlement, land and crops that would respond to irrigation, international markets for citrus production that could, in turn, provide investment dollars, and political forces that worked to ultimately support, but periodically resist, Jewish settlement. In the next section, I will briefly describe the impacts of this process on the environment, and the Palestinian population.

LAND, WATER AND SETTLEMENT: THE CASE OF MODERN DAY SETTLEMENT

The State of Israel was founded in 1948 following Britain's decision to end the British Mandate era and a war that established statehood, but also expelled more than 700,000 Palestinians from their homes. A socio-technical network was formed devoted to settlement of new, Jewish immigrants and associated agricultural and industrial development, all layered on a continuation of the modernisation narrative. This included draining the Hula swamp (above), and the damming of the sea of Galilee to divert water to the Mekerot. Agriculture was expanded through water extraction throughout coastal semi-arid and arid southern Israel. As Israel's first Prime Minister Ben Gurion famously wrote: "[f]or those who make the desert bloom there is room for hundreds, thousands, and even millions" (Ben Gurion, 1954). By the 1950s, water in the Coastal aquifer and Coastal plain was badly overdrawn and polluted, leading to water transport to support these enterprises. According to Tal (2006):

> Beginning in 1964, water has been conveyed from Israel's relatively wet northern Galilee (precipitation up to 700 mm/year) to depleted central aquifers and to the arid southlands (precipitation 20 to 200 mm/year) via the Mekerot (figure 1). Although this undertaking led to a large increase in cultivated land and harvests in the country's semiarid regions, it also exacerbated salinity problems and, to a lesser extent, raised turbidity levels in water.

Since the sea of Galilee is slightly saline, there was a need to add fresh water to make it ideal for agriculture and human consumption. This was accomplished as well by the diversion of saline springs that entered it (Kolodny et al., 1999). The JNF was a key part of the network, planning settlement of land inside Israel to harvest water and divert it into the Mekerot (Tal, 2006). Others in the network included international hydrologic and agricultural universities that helped in the development of technology to foster this agricultural expansion. While the land and crops (specifically horticulture crops both for domestic production and export) were enrolled in this network through responding to irrigation, by the early 1960s, there was wide recognition that water scarcity was becoming a major issue. Adapting technology that was originally developed in Australia to perfect it for the Mediterranean environment, Israeli scientists developed modern drip irrigation systems to improve water use efficiency (Ciriacono, 1998).

With Israel's victory in the 1967 War, it became the occupier of the Palestinian West Bank and Gaza Strip, as well as the Golan Heights. By this time, there were already signs of *dissonance* as the levels of the coastal aquifer were beginning to decline and water quality had significantly deteriorated. In response, Israeli agronomists created water resources management systems, including water conservation and water reuse and other technologies designed to mitigate water shortage (Dwek, 2010; Tal, 2006).

Following the 1967 war, Israel secured its control over the headwaters of the Jordan river but also control of groundwater. Before 1967, the Palestinians had 217 groundwater wells for agricultural and

domestic purposes. Soon after the occupation, Israel imposed a number of military orders to control Palestinian water resources. On August 15, 1967, the Israeli military commander issued Order No. 92, in which water was considered as a strategic resource. This order was followed by numerous other orders aimed at making basic changes in the water laws and regulations in force in the West Bank. Under Military Order No. 158 of 1967, it became impermissible for any person to set up, assemble, possess, or operate a water installation unless a license has been obtained from the area commander. This order applied (and continues to apply) to all wells and irrigation installations. The area commander can refuse to grant any license without the need for justification. Despite the rapid increase in population and demand on water since 1967, Israel has granted Palestinians of the West Bank very few permits for new water wells, all except 3 of them to be used exclusively for domestic purposes. In addition, the Israeli policy of metering all Palestinian wells served as another mechanism to restrict water use by Palestinians (Isaac, 2000).

In the occupied Palestinian areas, the Israeli government launched early settlement under the so-called Alon Plan, which established civilian security outposts. Even these settlements were nominally committed to agricultural production. Settlement outside the Alon Plan grew through the 1970s, and dramatically increased in the 1990s and 2000s. According to the Applied research Institute-Jerusalem (ARIJ, n.d.), through the middle of 2011, there were 199 Israeli settlements and 232 'outposts', established in the West Bank. There were 628,000 settlers living in these areas (267,000 in East Jerusalem), and their growth rate, according to the Israeli Central Bureau of Statistics has been around 4.9 percent, compared to 1.9 percent in Israel proper.[5] While certainly a portion of settlement is ideologically motivated, many move into settlements simply because of high land and rent costs inside Israel (B'Tselem 2011b). Again, while there is significant *dissonance* in the form of movements against West Bank settlements, the settlements are rationalised as an extension of the settlement of the land of Israel, often through a modernisation narrative. As a scientist who was also a settler in the Southern West Bank said of Palestinian farmers prior to Israeli settlement in 1967: "[t]hey farmed in a way that was not really civilised, if you will. It was one man in the fields with oxen and donkeys. You see this from the photographs from the 1940s" (Gasteyer, 1998).

But settlement and occupation has been accompanied by restrictions aimed at ensuring control of water resources as well. Among the first military orders governing the Palestinian West Bank and Gaza strip placed limits on water withdrawals and access to the Jordan river and Dead sea by Palestinians. Many argue that the effect has been significant injustice in terms water rights for Palestinians. For example, Haddad (2009), reports Palestinians had access to about 10% of the annual recharge capacity of the West Bank water system. The World Bank (2009) and the Palestine Central Bureau of Statistics (PCBS) (2009) report that as of 2008, 325 Palestinian wells were operational in the West Bank, compared to 774 wells in 1967. Beyond restrictions on irrigation, Palestinians suffer shortages of domestic water, especially in the summer months, when water from the Mekerot will only be available once every 2 weeks (B'Tselem, 2011a).

On a per-capita basis, water consumption by Palestinians is approximately 73 litres per capita per day (l/c/d) compared to about an average of 300 l/c/d for Israelis in general and 369 l/c/d for settlers. In other words, the per-capita consumption in Israel is 4 to 5 times higher than the Palestinian per-capita consumption in the Palestinian areas. Further, Palestinians struggle to connect the remaining 26% of Palestinian communities to the water network, while Israeli settlers receive continuous water supply, largely from groundwater wells in the West Bank. Palestinians in the rural communities in the West Bank survive on far less than even the average 70 l/c/d; in some cases, use may not exceed 20 l/c/d (Isaac, 2009; Gasteyer and Araj, 2008).

[5] These figures vary slightly from other data on Israeli settlement. B'Tselem (2011b), for instance, estimates 498,000 in settlements and outposts on the West Bank, 186,646 in East Jerusalem. The reason for this disparity may be that ARIJ constantly updates demographic data on settlement.

Water became one of the major points of negotiation between Israel and the Palestinians in the early 1990s (Smith, H., 2011). While Israeli and Palestinian representatives did negotiate about water management both through the Madrid and Oslo processes, scholars have recognised that these negotiations were based on the reality that Israel by that point controlled all water resources in the West Bank and Gaza and were disinclined to cede that control (Lowi, 1993; Wolf, 1996; Frederikson, 2005). While the Oslo negotiation process did set up Joint Supervision and Enforcement Teams and, eventually a Joint Management Committee between Palestinian and Israeli governing entities, Israel maintained the upper hand in these entities through controlling access to information, and water itself. As Selby (2003) states: The water accords of the Oslo II Agreement merely formalised a supply management system which had been in operation for years, presenting it, misleadingly, as part of an egalitarian-sounding 'joint' and coordinated 'management system'.

Even after years of negotiations on allocation, Palestinians argue that they are systematically denied rights to water, so that there is adequate water to serve Israel's agricultural, industrial, and domestic needs (PMNE and ARIJ, 2011; Selby, 2003). (See, table 1, below). The World Bank (2009) reported that Israel consistently exceeded the allocation of groundwater from aquifers shared with the Palestinians (determined through the 1995 round of Oslo negotiations). According to B'Tselem (2011a), this groundwater extraction of 871 million cubic meters (Mm^3), in part to ensure water for agricultural development in Israeli settlements in the Jordan Valley, not only exceeded the agreed allocation under the Oslo accords by 389 Mm^3, but it depleted the aquifer reserves and limited Palestinian extraction to 91.5 Mm^3 in 2008 (PMNE and ARIJ, 2011; PCBS, 2009).

Table 1. Allocation of water from the main groundwater aquifers in the Palestinian territories (PMNE and ARIJ, 2011).

Aquifer	Potential (Mm^3/year)	Palestinian allocation[6] (Mm^3)	Proposed Palestinian allocation[7] (Mm^3)	Palestinian abstraction 2008 (Mm^3)
Eastern	172	74.5[8]	172 (100% of 172)	
North-eastern	145	42	116 (80% of 145)	
Western	362	22	181 (50% of 362)	
Total/ year	679	138.5	469	91.50

Further, Palestinians have been largely prevented, at first by the Israeli 'Civil Administration', and since 1995 through the Oslo II Agreements signed by the Palestinian Authority, but enforced through the Israeli Defence Forces, from drilling in the Western aquifer, despite growing Palestinian municipal demand. A 2009 World Bank report argued that although recharge is almost entirely in the West Bank, Israel consistently exploits the highly productive Western aquifer from within Israel, and has denied Palestinian Authority requests for increased well-drilling permits. Israel has offered to 'sell back' the water extracted from the Western aquifer to meet growing urban demand and potential irrigation and industrial demands in the West Bank. Since 1967, Israel has developed wells in the Jordan valley and elsewhere in the West Bank and linked a water network serving settlements into the Mekerot. The settlements consume about 44 Mm^3 of water extracted from wells within the West Bank (World Bank, 2009; PNME and ARIJ, 2011). According to B'Tselem (2011b), "[i]n 2008, only 144.4 million m^3 were accessible to the 2.44 million Palestinians living in the West Bank. That same year, less than 10,000

[6] This is the allocation according to Article 40 of the Oslo II Agreement of September 18, 1995.
[7] The proposed allocation was considered according to the aquifer location and recharge area.
[8] This is including an extra 20.5 million cubic meters of 'immediate needs' to be developed for Palestinian use from Eastern Aquifer.

settlers in the Jordan valley and northern Dead sea area had access to almost one-third that amount – 44.8 million m^3".

PMNE and ARIJ (2011) estimated that this has major impacts in terms of lost agricultural and industrial production potential and public health. Major international institutions and domestic Israeli, Palestinian and international development and human rights groups have dissented significantly from the network supporting this project – including those who argue that these policies are having lasting environmental effects – specifically to the Dead sea and Jordan river, whose levels have fallen significantly since the 1960s (see, for instance, EcoPeace, 2011).

In an effort at *mobilisation*, the techno-scientific network for Israeli water use has developed a new narrative around breakthroughs in water reuse, desalination, and other water technologies that are used to maintain the modern goals of 'civilisation' in arid southern Israel (Tal, 2006; Dwek, 2010). As Dwek (2010) states, playing on the Green Line of the 1949 armistice demarcation that outlines the western, northern and southern boundaries of the West Bank:

> This Green Line shows up in contrasts: dark green areas in Israel where sophisticated environmental programs in forestation, desalination and dryland agriculture have succeeded in rehabilitating semi-arid lands that stand in stark contrast to the dark, dry areas of the West Bank. An even sharper line can be seen along the border between Egypt and Israel that runs between the Sinai and Negev deserts.

Dwek (2010) goes on to mention the work of the Blaustein Institute for Desert Research at Ben Gurion University, as well as the private sector entities that are engaged in modern techniques to improve water efficiency in irrigation. These new technologies have fostered significant resources for Israeli companies and patent holders. As a further example of *mobilisation*, Cutright (2011), the editor of the technical magazine Water Efficiency states in a glowing editorial based on participating in the WATEC Exhibition Press tour:

> In 1948, David Ben Gurion, Israel's founding father, declared that the new nation's goal was to make the desert bloom. More than 60 years later, Israel has made good on this promise, creating and managing an efficient, innovative water system that has helped this desert nation meet domestic demands, while allowing water intensive industries – including agriculture – to thrive (Cutright, 2011).

Neither Dwek (2010) nor Cutright (2011) mentions the significant land and water grabbing associated with settlement of land, nor the structural constraints that may account for less green Palestinian land in the West Bank.

DISCUSSION, THEORETICAL INSIGHTS, AND CONCLUSION

The land/water grabbing for the purpose of pre- and post-state Zionist settlement can illuminate a historical perspective on the land/water grabbing in Africa, Asia, and Latin America today. There are certainly differences – the goal of the Zionist endeavour was primarily the establishment of a Jewish homeland, and only incidentally return on investment, for instance. But the justification for settlement and colonisation in the late 19th through the 20th centuries was that the new settlers made more optimal and efficient use of land – specifically through the use of irrigation to 'make the desert bloom' (George, 1979).

In this sense, the modernisation narrative was very similar to those heard today about how large scale investment in land and water resources can increase efficiency and productivity in lands that are marginal, barren, and *terra nullius* (Gasteyer and Flora, 2000; Said, 2002; Giesler, 2012). The rationale and rhetoric of the civilising influence on the land (Mitchell, 2002) have persisted and this narrative has been extended to justify water management schemes such as large dams for irrigation and hydropower to 'improve' agricultural productivity, food security, and energy security (Mehta, 2007).

We used ANT, along with the literature on the politics of place, to help identify how land-/water grabs could be seen as socio-technical projects to modernise Palestine dating to the mid-1800s. The

acquisition of land, investment in technologies to apply water to the land to make it productive, the creation of Jewish settlements, the eventual establishment of a Jewish state with at least a core commitment to 'agricultural' Zionism, the expansion of agricultural settlements and irrigated areas, and significant water infrastructure to make those viable demonstrate the basis of a successful network and initiative. *Mobilisation* was carried out through engaging international researchers in co-developing technologies for more modern and efficient application of water, especially as the narrative of abundance was replaced by a narrative of scarcity. The JNF has forged international partnerships on water and arid land management (Shilony, 1998). Israel is now known for agricultural water conservation technology (specifically drip irrigation); wastewater reuse; and desalinisation (Tal, 2006; Dwek, 2010; Cutright, 2011).

Significant *dissonance* has arisen both through political mobilisation and through failure of the land to be mobilised. As Anton (2008) documents, the draining of the Hula swamp was a failure in terms of making land more productive, and led to a 'nature reserve' set aside to demonstrate the ecological consequences of progress. Further, irrigation to make the desert bloom soon ran into significant obstacles in the form of water scarcity (George, 1979). The ability to maintain the techno-scientific network of development necessitated *mobilisation* in the form of justifying Israel's water policies through showcasing modern management techniques (Tal, 2006; Dwek, 2010; Cutright, 2011) that obscure the extent to which maintenance of the production system is built on the systematic denial of rights to water for Palestinians. In other words, we should take this as the cautionary tale of water grabbing.

Exploitation of water resources for development often leads indeed to real scarcity. This occurred in Israel/Palestine some time ago. While Israel has worked to develop new technologies (from drip irrigation to wastewater reclamation), there is an underlying reality that water is scarce and scarcity is increasing. But it is notable that the suffering for Israelis, whether in Israel proper or settlements, is minimised, while Palestinian municipalities, industries, farmers, and households regularly suffer water shortages (PMNE and ARIJ, 2011; B'tselem, 2011a, b, c).

While the structures of enforcement are quite different, one could imagine the future scenario for those living on the 'marginal' lands to be appropriated for agricultural development. Presuming that these investments do produce a profit, governments might well prefer to protect profitable agricultural establishments from localised scarcity, passing the costs of scarcity on to less politically powerful local residents. As the case of Israel demonstrates, the development of new technologies may not be sufficient to forestall inevitable shortages.

Lefebvre (1972) in his discourse about the politics of space helps to frame the analysis. Those in power often define land in such a way that some have access to land while others do not. Harvey (1996) helps us to understand that the tools for exclusion may be associated with modernist production and technologies that are viewed as 'improved'. While clearly there is an ideological component to Zionist proclamations of right to settlement dating back more than a century (related to the need for a Jewish homeland in the land of Biblical Israel), the narrative of settlement (in Palestine as elsewhere at the beginning of the 20th century) was a narrative of improved agricultural productivity and progress through settlement and implementation of modern agricultural techniques. In the arid Middle East this meant use of water for irrigation, as became the iconic dream of the first leaders of Israel, to make the desert bloom (Ben Gurion, 1954; George, 1979). But the potential of the blooming desert also enticed investors in production of citrus and other horticultural crops for international markets. Given these prospects, investors were willing to underwrite these land purchases and development (Shilony, 1998; Karlinsky, 2000; Anton, 2008).

The point is that colonial settlements, whether in Africa, the Americas, Asia, or the Middle East followed this pattern of a narrative of modern development of 'barren' landscapes, settlement for production, displacement of the local population, and expansion on to the land designated for that population over time. The current land grabbing does not involve the settlement of European peoples,

but does involve a similar pattern of foreign investment and significant allocation of land and water resources to ensure a return on those investments.

The implications of this history are that: a) land grabbing in arid areas is very likely to involve significant allocations of water resources – and thus accompanying water grabbing; b) ecologies and access to land could be permanently altered; c) the negative effects are likely to be felt by the local population, preserving productive potential for the outside investors.

None of this is to imply that all external investment in land and productive potential is prima facie bad, or that there is no opportunity for the application of modern technology to improve productivity. It is to say that there are good reasons to be sceptical and suspicious about proscriptions for world hunger and energy alternatives that are based on those investments. It is not only that 'land grabbing' is likely to implicate water resources in a significant way but that the above history demonstrates that the benefits and costs are likely to be profoundly inequitably distributed.

REFERENCES

Alatout, S. 2011. Hydro-imaginaries and the political geography of the Jordan river: The Johnston mission, 1953-1956. In Davis, D.K. and Burke, E. III, (Eds), *Environmental imaginaries of the Middle East and North Africa,* pp. 218-245 (Ch. 8). Athens, Ohio, USA: Ohio University Press.

Alatout, S. 2009. Bringing abundance into environmental politics: Constructing a Zionist network of water abundance, immigration, and colonization. *Social Studies of Science* 39(3): 363-394.

Allan, J.A. 2011. *Virtual water: Tackling the threat to our planet's most precious resource.* New York: I.B. Tauris.

Anton, G. 2008. Blind modernism and Zionist waterscape: The Huleh drainage project. *Jerusalem Quarterly* Issue 35: 76-92. http://www.jerusalemquarterly.org/ViewArticle.aspx?id=21 (accessed 23 May 2012)

ARIJ (Applied Research Institute Jerusalem). n.d. Israeli settlements and outposts in the West Bank. http://proxy.arij.org/outposts/ (accessed 23 May 2012)

Azaryahu, M. 2001. Water towers: A study in the cultural geographies of Zionist mythology. *Cultural Geographies* 8(3): 317-339.

Bakker, K. J. 2010. *Privatizing water: Governance failure and the world's urban water crisis*. Ithaca, NY: Cornell University Press.

Barringer, F. 2012. The water fight that inspired 'Chinatown'. In Environment: Green – A blog about energy and the environment, *The New York Times*, April 25, 2012, online, http://green.blogs.nytimes.com/2012/04/25/the-water-fight-that-inspired-chinatown/(accessed 23 May 2012)

Becker, L. 1994. An early experiment in the reorganisation of agricultural production in the French Soudan (Mali), 1920-40. *Africa: Journal of the International African Institute* 64(3): 373-390.

Ben Gurion, D. 1954. Why I retired to the desert. *The New York Times Magazine*, 28 March 28, p.47.

Bendini, M. 2000. Transhumant communities and agroecosystems in Patagonia. In Flora, C. (Ed), *Interactions between agroecosystems and rural communities,* pp. 103-115 (Chapter 8). Boca Raton, Florida, USA: CRC Press.

Bogue, A. 1991. *From prairie to cornbelt: Farming on the Illinois and Iowa prairies in the nineteenth century*. Ames, IA: Iowa State University Press.

Borras, S. Jr. and Franco, J. 2012. Global land grabbing and trajectories of agrarian change: A preliminary analysis. *Journal of Agrarian Change* 12(1): 34-59.

B'Tselem. 2011a. Water crisis: The shared water resources and control over them. B'Tselem. www.btselem.org/water/shared_sources/ (accessed 23 May 2012)

B'Tselem. 2011b. Settlements and land: Land expropriation and statistics. Jerusalem: B'Tselem. www.btselem.org/settlements/statistics/ (accessed 23 May 2012).

B'Tselem. 2011c. Dispossession and exploitation: Israel's policy in the Jordan valley and northern Dead Sea. Jerusalem: B'Tselem. www.btselem.org/publications/summaries/dispossession-and-exploitation-israels-policy-jordan-valley-northern-dead-sea/ (accessed 23 May 2012)

Callon, M. 1986. Eléments pour une sociologie de la traduction: La domestication des coquilles Saint-Jacques et des marins-pêcheurs dans la baie de Saint-Brieuc. *Année Sociologique* 36: 169-208.

Celio, M.; Scott, C.A. and Giordano, M. 2010. Urban-agricultural water appropriation: The Hyderabad, India case. *The Geographical Journal* 176(1): 39-57.

CIA (Central Intelligence Agency). 1993. Occupied Territories map. (Adapted). In *CIA Atlas of the Middle East*. Washington, DC: US Government Printing Office.

Ciriacono, S. 1998. *Land drainage and irrigation*. Brookfield, VT: Ashgate Press.

Conder, C.B. 1878. *Tent work in Palestine* (2 volumes). London: B. Bentley and Sons Press.

Cotula, L. *Forthcoming* (2012). The international political economy of the global land rush: A critical appraisal of trends, scale, geography and drivers. *Journal of Peasant Studies.* DOI:10.1080/03066150.2012.674940 (accessed 23 May 2012)

Cotula, L.; Vermeulen, S.; Leonard, R. and Keeley, J. 2009. Land grab or development opportunity? Agricultural investment and international land deals in Africa. London: IIED; Rome: FAO, IFAD. www.ifad.org/pub/land/land_grab.pdf (accessed 23 May 2012)

Cutright, E. 2011. WE editors blog: The 'next generation oasis'. *Water efficiency: The Journal for Water Resources Management*, August 9, 2011. www.waterefficiency.net/blogs/we-editors-blog/the-next-generation-oasis-84687.aspx (accessed 23 May 2012)

Davis, D.K. 2011. Imperialism, orientalism, and the environment in the Middle East. In Davis, D.K. and Burke, E. III, (Eds), *Environmental imaginaries of the Middle East and North Africa,* pp. 1-22 (Ch. 1). Athens, Ohio, USA: Ohio University Press.

Davis, R. 2011. *Palestinian village histories: Geographies of the displaced.* Stanford, California: Stanford University Press.

Deininger, K.; Byerlee, D.; Lindsay, J.; Norton, A.; Selod, H. and Stickle, M. 2011. Global interest in farmland: Can it yield sustainable and equitable benefit? Washington, DC: World Bank. http://siteresources.worldbank.org/INTARD/Resources/ESW_Sept7_final_final.pdf (accessed 23 May 2012)

De Schuter, O. 2011. How not to think of land-grabbing: Three critiques of large-scale investments in farmland. *Journal of Peasant Studies* 38(2): 249-279.

Doumani, B. 1995. *Rediscovering Palestine: Merchants and peasants in Jabal Nablus, 1700-1900*. Berkeley, CA: University of California Press.

Dwek, R. 2010. The other green line and the sweetest tomato in the world. Science Reference Services, the Library of Congress. www.loc.gov/rr/scitech/greenline.html (accessed 23 May 2012)

EcoPeace. 2011. *Roadmap for the rehabilitation of the lower Jordan river.* Tel Aviv: Friends of the Earth Middle East.

Falah, G. 1991. Pre-state Jewish colonization in northern Palestine and its impact on local Bedouin sedentarization 1914-1918. *Journal of Historical Geography* 17(3): 289-309.

Franco, J. and Kay, S. 2012. The global water grab: A primer. Amsterdam: The Transnational Institute. http://www.tni.org/sites/www.tni.org/files/download/watergrabbingprimer-altcover.pdf (accessed 23 May 2012)

Frederikson, H. 2005. Return Palestinian water rights if not land: A proposal. *Middle East Policy* 12(1): 72-78.

Gasteyer, S. 2008. Agricultural transitions in the context of growing environmental pressure over water. *Journal of Agriculture and Human Values* 25(4): 469-486.

Gasteyer, S. 1998. *Manathar ta'bia'i*: Perceptions of landscape change in the southeastern West Bank. MSc thesis. Iowa State University, USA.

Gasteyer, S. and Araj, T. 2008. Empowering Palestinian community water management capacity: Understanding the intersection of community cultural, political, social, and natural capitals. *Community Development: Journal of the Community Development Society* 40(2): 199-219.

Gasteyer, S. and Flora, C. 2000. Modernizing the savage: Colonization and perceptions of landscape and lifescape. *Sociologia Ruralis* 40(1): 128-149.

Geisler, C. 2012. New *terra nullius* narratives and the gentrification of Africa's 'empty lands'. *Journal of World Systems Research* 18(1): 15-29.

George, A. 1979. 'Making the desert bloom': A myth examined. *Journal of Palestine Studies* 8(2): 88-100.

Global Justice Ecology Project. 2012. Land grabbing: La Via Campesina urges States to act. Climate Connections, 10 May 2012. http://climate-connections.org/2012/05/10/land-grabbing-la-via-campesina-urges-states-to-act/ (accessed 23 May 2012)

Haddad, M. 2009. Palestinian water rights: Past, present and future. In Messerschmid, C. (Ed), *Water: Values and Rights*, pp. 41-52. Ramallah: Palestine Academy Press.

Harvey, D. 1996. *Justice, nature and the geography of difference*. Oxford: Blackwell Publishers.

Isaac, J. 2009. *The need to alleviate Palestinian fears of a dry peace.* Bethlehem: Applied Research Institute Jerusalem.

Isaac, J. 2000. The essentials of sustainable water resource management in Israel and Palestine. *Arab Studies Quarterly* 22(2): 13-32.

Jasanoff, S. and Kim, S.H. 2009. Containing the atom: Sociotechnical imaginaries and nuclear power in the United States and South Korea. *Minerva* 47(2):119-146.

Jenkins, M. 2004. Postscript to a water war. *High Country News* 36(4): 3.

Karlinsky, N. 2000. California dreaming: Adapting the 'California model' to the Jewish citrus industry in Palestine, 1917-1939. *Israel Studies* 5(1): 24-40.

Khalidi, R. 1997. *Palestinian identity: The construction of modern national consciousness*. New York: Columbia University Press.

Kolodny, Y.; Katz, A.; Starinsky, A. and Moise, T. 1999. Chemical tracing of salinity sources in lake Kinneret (sea of Galilee), Israel. *Limnology and Oceanography* 44(4): 1035-1044.

Latour, B. 2005. *Reassembling the social: An introduction to actor-network theory*. Oxford, UK: Oxford University Press.

Lefebvre, H. 1972. *Espace et politique*. Paris: Antropos.

Levine, M. 1995. The discourses of development in Mandate Palestine. *Arab Studies Quarterly* 17(1-2): 95.

Linton, J. 2010. *What is water? The history of a modern abstraction*. Vancouver: UBC Press.

Lowi, M. 1993. *Water and power: The politics of a scarce resource in the Jordan river basin*. Cambridge, UK: Cambridge University Press.

Marsden, T.; Murdoch, J.; Low, P.; Munton, R. and Flynn, A. 1993. Locality and power in the analysis of rural change. In Marsden, T.; Murdoch, J.; Low, P.; Munton, R. and Flynn, A. (Eds), *Constructing the countryside*, pp. 129-153. London, UK: UCL Press.

McMichael, P. 2011. *Development and social change: A global perspective*. Fifth edition. New York: Sage Press.

Mehta, L. 2007. Whose scarcity? Whose property? The case of water in western India. *Land Use* 24 (4): 654-663.

Mitchell, W.J.T. 2002. Holy landscape: Israel, Palestine, and the American wilderness. In Mitchell, W.J.T. (Ed), *Landscape and power,* pp. 261-291 (Chapter 9). Chicago: University of Chicago Press.

Muenzner, G. 1947. *Labor enterprise in Palestine: A handbook of Histadrut economic institutions.* New York, NY: Sharon Books.

Muir, D. 2008. A land without a people for a people without a land. *Middle East Quarterly* 15(2): 55-62.

Nadan, A. 2003. Colonial misunderstanding of an efficient peasant institution: Land settlement and Mushā tenure in Mandate Palestine, 1921-47. *Journal of the Economic and Social History* 46(3): 320-354.

Oakland Institute. 2011. *Understanding land investment deals in Africa – Country report: Mali*. Oakland: The Oakland Institute.

PCBS (Palestine Bureau of Statistics). 2009. *Water statistics in the Palestinian territory annual report: 2008.* Ramallah, Palestine: Palestine Bureau of Statistics.

PMNE (Palestinian Ministry of National Economy) and ARIJ (Applied Research Institute Jerusalem). 2011. The economic costs of the Israeli occupation for the occupied Palestinian territory. Bethlehem, West Bank: Applied Research Institute Jerusalem. www.un.org/depts/dpa/qpal/docs/2012Cairo/p2%20jad%20isaac%20e.pdf (accessed 23 May 2012)

Pappe, I. 2004. *Palestine: One land, two peoples.* Cambridge, UK: Cambridge University Press.

Reguer, S. 1995. Rutenberg and the Jordan river: A revolution in hydro-electricity. *Middle Eastern Studies* 31(4): 691-729.

Reisner, M. 1993. *Cadillac desert: The American West and its disappearing water.* New York: Penguin Books.

Ridberg, R. 2011. Creating food sovereignty for small-scale farmers. *Nourishing the Planet* 7 July 2011, http://blogs.worldwatch.org/nourishingtheplanet/creating-food-sovereignty-for-small-scale-farmers-farmers-agriculture-food-security-hunger-africa-biodiversity-conservation-cooperatives-culture-development-diet-economy-extension-farmers-groups-ferti/ (accessed 23 May 2012)

Roiatti, F. 2010. *Il nuovo colonialismo. Caccia alle terre coltivabili*. Milan, Italy: Università Bocconi.

Said, E. 2002. Invention, memory, and place. In Mitchell, W.J.T. (Ed), *Landscape and power,* pp. 241-261 (Ch. 8), Chicago, IL: University of Chicago Press.

Sayigh, R. 1979. *Palestinians: From peasants to revolutionaries.* London: ZED Press.

Scott, C.A. and Pablos, N.P. 2011. Innovating resource regimes: Water, wastewater, and the institutional dynamics of urban hydraulic reach in northwest Mexico. *Geoforum* 42(4): 439-450.

Selby, J. 2003. *Water, power and politics in the Middle East: The other Israeli-Palestinian conflict*. London: I.B. Tauris.

Shilony, Z. 1998. *Ideology and settlement: The Jewish National Fund, 1897-1914*. Jerusalem: Magnes Press, Hebrew University.

Shiva, V. 1997. The enclosure of the commons. Third World Network. www.twnside.org.sg/title/com-cn.htm (accessed 23 May 2012)

Smith, H.A. 1949. The waters of the Jordan: A problem of international water control. *International Affairs* 25(4): 415-425.

Smith, H. 2011. To what extent does the issue of water play a role in the Israel-Palestine conflict? www.arij.org/publications/To%20what%20extent%20does%20the%20issue%20of%20water%20play%20a%20role%20in%20the%20Israel-Palestine%20conflict.pdf (accessed 23 May 2012)

The Spectator. 1878. Palestine and its people. *The Spectator*, 5 October 1878: 1245-1246.

Stein, K. 1987. Palestine's rural economy, 1917-1939. *Studies in Zionism* 8(1): 25-49.

Tal, A. 2006. Seeking sustainability: Israel's evolving water management strategy. *Science* 313(5790): 1081-1084.

Tamari, S. 2011. *Year of the locust: A soldier's diary and the erasure of Palestine's Ottoman past.* Berkeley: University of California Press.

Templin, J.S. 2011. Zababdeh: A Palestinian water history. MA thesis. Logan, Utah, USA: Utah State University.

TNI (Transnational Institute). 2011. Fighting the new colonial resource grab. *Transnational News* 14 July 2011, www.tni.org/simplenews/fighting-new-colonial-resource-grab (accessed 23 May 2012)

Tuan, Y.-F. 1968. *The hydrologic cycle and the wisdom of God. A theme in geoteleology*. Toronto: University of Toronto.

Varis, O.; Biswas, A.K.; Tortajada, C. and Lundqvist, J. 2006. Megacities and water management. *International Journal of Water Resources Development* 22(2): 377-394.

Via Campesina. 2011. Launch of the International Alliance Against Land Grabbing. La Via Campesina CNOP press release. Via Campesina. http://viacampesina.org/en/index.php?option=com_content&view=article&id=1180:launch-of-international-alliance-against-land-grabbing&catid=23:_agrarian-reform&Itemid=36 (accessed 23 May 2012)

Vidal, J. 2011. Leading NGOs lobby for guidelines to protect 'land grab' victims: Organisations petition FAO's committee on world food security for new rules to protect communities affected by land grabs. *The Guardian,* posted Friday 14 October 2011 at www.guardian.co.uk/global-development/2011/oct/14/ngos-lobby-protect-land-grab-victims (accessed 23 May 2012)

Vileisis, A. 1997. *Discovering the unknown landscape: A history of America's wetlands*. Washington, DC: Island Press.

World Bank. 2009. Assessment of restrictions on Palestinian water sector development, sector note. Washington, DC: The World Bank.

Wolf, A. 1996. Middle East water conflicts and directions for conflict resolution. Washington, DC: IFPRI. www.ifpri.org/sites/default/files/publications/pubs_2020_dp_dp12.pdf (accessed 23 May 2012)

Zeitoun, M.; Eid-Sabbagh, K.; Dajani, M. and Talhami, M. 2012. *Hydro-political baseline of the upper Jordan river.* Beirut: Association of the Friends of Ibrahim Abd el Al.