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Water scarcity, conflict, and migration: a comparative analysis and reappraisal

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Abstract. How should we characterise the relations between environmental scarcity, conflict, and migration? Most academic and policy analyses conclude that scarcities of environmental resources can have significant impacts upon conflict and migration, and claim or imply that within the context of accelerating global environmental changes these impacts are likely to become more significant still. Many analyses admittedly recognise that these impacts are often indirect rather than direct and that there exist multiple ‘drivers’ of conflict and migration, of which environmental stresses are but one. We argue that even these qualifications do not go far enough, however: they still overstate the current and likely future significance of environmental changes and stresses in contributing to conflict and migration and underemphasise a far more important causal pathway—from conflict and migration to environmental vulnerabilities. These arguments are advanced via a comparative analysis of water–migration–conflict linkages in Cyprus and Israel and the West Bank and Gaza.

Keywords: water, conflict, migration, scarcity, Cyprus, Israel–Palestine

Introduction

In recent years there has been renewed academic and policy attention to the question of the relations between environmental scarcities and stresses, on the one hand, and conflict and migration, on the other. Western policy and military establishments, in particular, have expressed mounting concern that climate-change-related environmental changes may foment civil strife, undermine state capacities, exacerbate existing international security challenges, and increase migration flows to the Global North (CNA, 1997; CSIS and CNAS, 2007). Some make far more deterministic claims about this than others: some envisage a future of ‘climate wars’ (Dyer, 2010) and ‘climate refugees’ (Christian Aid, 2007; Myers, 1995), whilst others insist that environmental stresses are unlikely to be more than contributory factors to conflict and migration and that the latter always have multiple drivers (Black et al, 2011a). Yet, for all these important differences in emphasis, most academic literature and virtually all policy discourse on the subject is of the view that there do exist important linkages between environmental change, migration, and conflict—and that these linkages are likely to intensify and multiply in coming decades.

This paper provides a critical assessment of this mainstream ‘environmental security’ and ‘environmental migration’ thinking, on both theoretical and empirical grounds. Theoretically, we build upon existing anti-Malthusian scholarship to argue that most mainstream discourse overstates the current and likely future significance of environmental changes and stresses in contributing to conflict and migration, and underemphasises a far more important causal pathway—from conflict and migration to environmental vulnerabilities. Empirically, we

advance this case by focusing on the one resource which is most often associated with conflict and migration—water—examining the linkages between water, conflict, and migration in two water-short contexts: Cyprus and Israel and the West Bank and Gaza (WBG). The bulk of the paper provides a comparative analysis of these two cases, on the strength of this advancing a series of generalisable conclusions which are very different from those usually enunciated within mainstream environmental conflict and migration thinking.

In the first main section of the paper we review this mainstream thinking and critiques thereof and outline our alternative approach to the study of environment–conflict–migration linkages. Thereafter, we turn to our cases, first providing overviews of the key dimensions of conflict, migration, and water stress in Cyprus and Israel–WBG and then analysing the linkages between water and conflict—and water, conflict, and migration—in these two ‘divided environments’ (Selby and Hoffmann, 2014). In conclusion, we summarise and tentatively explain the major similarities and differences between the two cases and suggest a set of general conclusions with implications well beyond the Eastern Mediterranean.

Framework and methodology

The dominant line of argument within contemporary academic and especially policy discourse on the relations between the environment, conflict, and migration centres on the figure of ‘scarcity’, understood in Malthusian terms. From a Malthusian perspective, scarcities of environmental resources arising from either supply-side problems (whether induced by environmental shocks like droughts, by secular declines in levels of, for instance, rainfall, or by environmental degradation) or increases in demand (as a result of population growth or increases in per capita consumption) can place significant pressures on social systems—in turn causing or contributing to, amongst other things, conflict and migration. Such arguments have most often been articulated in relation to water scarcities, water being both essential to human existence and in many parts of the world decidedly limited in availability; and also being either a ‘common pool’ resource—in which case unregulated access can generate ‘tragedy of the commons’ scenarios (Hardin, 1968)—or one that can readily be captured by upstream actors, especially states, leading to conflict between upstream and downstream riparians (Gleick, 1993; Lowi, 1995). In recent years such Malthusian thinking has also often been advanced in analyses of the security implications of global climate change. This work has focused above all on the potential impacts of climate change on precipitation levels and patterns and on how either long-term declines in rainfall or short-term droughts may conceivably generate political violence and/or migration (Gleditsch, 2012, page 4). Moreover, much of this work—whether scholarly (IPCC, 2001, page 85; Reuveny, 2007), populist (Dyer, 2010), or policy oriented (Christian Aid, 2007; CSIS and CNAS, 2007)—has emphasised that migration may play a key linkage role between climate-change-induced environmental scarcity and conflict. For instance, Gleditsch et al (2007, page 4) suggest two plausible causal pathways from climate change to migration to conflict, one direct and the other indirect (figure 1); in both models climate-change-caused environmental stresses are considered the defining causal variable.

Notwithstanding the above, there are without doubt many different shades of Malthusianism. Some iterations are highly deterministic, depicting environmental and demographic pressures

Direct effect

Environmental stress → migration from region A → conflict in region B

Indirect effect

Environmental stress → conflict in region A → migration from region A → conflict in region B

Figure 1. Gleditsch et al’s (2007) model of environment–migration–conflict linkages.

as direct and primary determinants of conflict and migration—as indicated by claims that the wars of the 21st century will be about water (Bulloch and Darwish, 1993) and by the use of phrases like ‘climate refugees’ (Myers, 1995). Others portray the links between environmental stresses, on the one hand, and conflict and migration, on the other, as primarily indirect, mediated by changes in ‘intervening variables’ such as economic growth (Koubi et al, 2012), state and institutional capacities (Kahl, 2006), and human security (Barnett and Adger, 2007). Still others emphasise that environmental factors are but one amongst a multiplicity of ‘drivers of change’, alongside other economic, demographic, political, and social factors (Black et al, 2011a). Some analyses are highly alarmist, others much less so. Moreover, while some Malthusian accounts draw upon qualitative case studies, many more recent analyses present large-*N* studies (Gleditsch, 2012). Malthusian reasoning can take many different forms. What is shared right across this literature, however, is its focus on scarcity as causing or exacerbating social and political tensions, including violent conflict and migration.

For all its dominance, this Malthusian mainstream has nonetheless been subject to a range of critiques. Some have argued, on historical grounds, that evidence of environmental conflicts is decidedly thin and, especially in relation to water, that environmental scarcities have tended more to facilitate cooperation than to contribute to conflict (Dinar, 2008; Wolf, 1998). Indeed, some contend, on liberal functionalist theoretical grounds (Mitrany, 1975), that water and environmental cooperation can potentially catalyse and ‘spill over’ into other ‘high political’ spheres of peacemaking, effectively leading to peace (Jägerskog, 2009; Phillips et al, 2006). Liberal political economists have argued that the historical absence of ‘water wars’ derives from the fact that water—far from being a nonsubstitutable, finite, and thereby scarce resource—is readily substitutable, importable, and recyclable: for example, through water treatment and reuse or through the importation of ‘virtual water’ in the form of commodities that are produced utilising water elsewhere (Allan, 2000). Still others have argued that it is high-value resources, from oil to diamonds, which are most associated with and conducive to conflict (Collier and Hoeffler, 2005; Peluso and Watts, 2001), not low-value environmental resources like water, no matter how scarce. Some have critiqued the basic conceptual scaffolding of Malthusianism, especially its emphasis on ill-defined ‘scarcities’, ‘population pressures’, and ‘carrying capacities’ (Metha, 2010; Rao, 1994). Last but by no means least, some have critiqued this mainstream thinking as ideology or myth, arguing that representations of water wars and climate refugees owe more to entrenched Western cultural and policy narratives than they do to dispassionate academic analysis (Hartmann, 2010; Leach and Mearns, 1996).

The approach adopted herein builds upon these various critiques, but offers a distinctive contribution in four respects. First, instead of focusing solely on the impacts of environmental change on migration and conflict—that is, analysing environmental stresses as the independent variable, and migration and conflict as dependent variables—we consider environment–migration–conflict relations in the round, allowing for the fact that all three of these variables may affect one another and, indeed, that the causal impacts of environmental change may be much less significant and weighty than those of the other two. It is for this reason that our empirical analysis starts not with environmental migration but with a brief elucidation of the basic contours of political conflict in Cyprus and Israel–WBG. Second, our analysis is theoretically rooted in historical–materialist political ecology—accepting to a degree liberal critiques of Malthusianism but insisting on the structured nature of patterns of environmental insecurity; their determination by equally structured patterns of power inequalities, uneven development, state formation, geopolitics, and conflict; and the historical and social specificity of different developmental and political trajectories (Peluso and Watts, 2001). Third, as against the case study and large-*N* research quantitative analyses which dominate the contemporary academic literature, we adopt a qualitative comparative method, analysing two comparable

cases of water–conflict–migration relations, identifying significant differences and similarities between them, and on the strength of this suggesting some general conclusions about environment–migration–conflict relations. Finally, while the two cases compared here—Cyprus and Israel–WBG—have individually been the subjects of large volumes of research, their water politics have not yet been subjected to comparative analysis.

Cyprus and Israel–WBG are selected here for comparison partly because they are both home to serious problems of water stress but also because of their comparable political and economic contexts and histories. They are both often represented as areas of extreme water scarcity (WDD, 2003a, page 3) which will face deepening scarcities as a result of climate change (Maguder, 2010)—climate change being expected by many to result in marked declines in precipitation levels across the Eastern Mediterranean (Brauch, 2011). Both have historically been sites of ‘high political’ conflict and extensive forced displacement and voluntary in-migration and out-migration. They thus represent useful cases for assessing historical, current, and likely future environment–conflict–migration linkages.

Conflict

The primary axes and causes of conflict in both Cyprus and Israel–WBG are modern nationalisms, and attendant exclusivist and violent processes of state building. Geopolitical developments—the retreat of the Ottoman and, later, British empires; the Cold War; and more recently the War on Terror—and alignments with great powers have been important contextual factors.

The Cyprus conflict is historically rooted in the rise of mutually reinforcing Greek and Turkish nationalisms during the 19th and early 20th centuries, and in the corollary emergence of Greek Cypriot and Turkish Cypriot national identities. Independent Cyprus’s first constitution of 1960 provided for the political representation and participation of the 20% Turkish Cypriot minority. However, within three years intercommunal violence had led to the widespread internal displacement of Turkish Cypriots and their withdrawal from state institutions; and in 1974, in the immediate wake of a Greek junta-inspired coup d’état deposing the elected Cypriot President, Turkey invaded and occupied the north of the island, leading to the expulsion and flight of 200 000 Greek Cypriots, plus 34 000 Turkish Cypriots living in the south. Since then, Cyprus has been de facto divided between the internationally recognised Republic of Cyprus (RoC) on 62% of the island and an internationally isolated Turkish Cypriot administration in the north (hereafter, Northern Cyprus). Almost all Greek and Turkish Cypriots have gradually been displaced into their respective realms, and a territorial and political stalemate has prevailed. In 2002 UN Secretary General Kofi Annan produced a comprehensive plan for reunification, which was accepted in Northern Cyprus but was rejected through referendum in the RoC. Talks between the two communities’ leaders are ongoing, but are yet to yield tangible results.

Since independence, the RoC has evolved into an economically successful state, with especially strong finance, tourism, and shipping sectors and a GDP per capita of over US\$31 000 (World Bank, 2011a). Northern Cyprus, on the other hand, is by virtue of its international isolation effectively dependent on the Turkish state, even though it also features a sizeable tourism industry. Its GDP per capita is around half that of the RoC, just under US\$15 000 (TRNC SPO, 2011). Northern Cyprus is heavily militarised, housing 30 000–40 000 Turkish troops (Bray, 2011, page 79)—this is in comparison with the much smaller number of national guards and Greek troops in the RoC. Total fatalities from the Cyprus conflict between 1963 and 1974 numbered around 6000; there have been no fatalities since 1974.

The Israeli–Palestinian conflict, by contrast, is rooted in a settler–colonial encounter—in the Zionist movement’s settlement of Palestine with British imperial support; in the subsequent displacement and dispersion of the indigenous Arab population; and in the reactive emergence of Palestinian nationalism (Rodinson, 1973; Shafir, 1989). Reflecting its European

origins, ever since the 1930s, the Zionist movement has always had at its disposal far superior economic, diplomatic, and military resources than its Palestinian counterpart. Thus, following the hasty termination of British rule in 1948, the state of Israel was established on 78% of Mandate Palestine, with the remaining areas coming under the administration of Jordan (the West Bank) and Egypt (the Gaza Strip) and over 750 000 Palestinians, or 85% of the native population, being displaced from the area that became Israel (Hurewitz, 1968, pages 319–321). In 1967 WBG was occupied by Israel, along with the Sinai and Golan Heights. Following the 1993 Oslo Agreement between Israel and the Palestine Liberation Organisation (PLO), the Palestinian Authority (PA) was established, with security and civil powers in the Gaza Strip plus 40% of the West Bank (the remaining 60% remaining under exclusive Israeli control). Despite the 2001 collapse of the Oslo peace process, these ‘interim’ arrangements remain in effect. Since 2007 the PA has been split between an internationally recognised Fatah administration in the West Bank and an internationally isolated Hamas administration in Gaza.

Israel has consolidated into an economically successful state, with especially important high-tech, military, and diamond industries. It remains a heavily militarised and nuclear-armed though existentially insecure society. It has regularly been embroiled in interstate and cross-border wars (1948–49, 1956, 1967, 1973, 1982–2000, 2006) and, since its 1967 capture of the WBG, in protracted civil conflict with Palestinians under occupation (especially 1987–93, 2000–04, 2008–09). For its part, ever since the PLO’s emergence in the 1960s, the Palestinian nationalist movement has been poorly institutionalised, often fragmented, and financially and politically dependent on the patronage of outside powers (mainly oil-producer states up to 1990; mainly Israel, the US, and the EU since then). It has witnessed large-scale armed conflict not only with Israel but also with neighbouring ‘host states’ (Jordan 1970–71, Lebanon 1975–90) and internally between Palestinian factions (especially 1983, 2007). Whereas contemporary Israel has a GDP per capita of over US \$28 500, the equivalent figures for the West Bank and Gaza are only US \$2000 and US \$1100, respectively (World Bank, 2011b; 2012).

In sum, there are striking similarities as well as differences between the two cases. Both conflicts are rooted in modern nationalisms and bear the legacies of Ottoman and especially British rule. Both have resulted in, and continue to have at their heart, large-scale population displacement (see next section for more detail). Both cases have witnessed territorial division, internationally recognised occupations, the international isolation of particular territories, and so-far-unsuccessful peace processes. On the other hand, there are two key differences. First, with regard to local balances of power, while the Cyprus conflict is characterised by a rough symmetry (or ‘double asymmetry’: the RoC’s international recognition and economic prosperity being counterbalanced by Turkish military power in Northern Cyprus), the Israeli–Palestinian conflict is highly asymmetrical—in economic, political, and military terms and also in relation to patterns of settlement and displacement. And, second, the Israeli–Palestinian conflict has been marked by far higher levels, frequency, and persistency of violence than the Cyprus conflict. These two key differences are clearly related.

Migration

Over the last century Cyprus and Israel–WBG have both been witness to forced displacement, state-sanctioned settlement, internal voluntary migration, and international economic and refugee migration. Forced displacement has been one of the defining features of the Cyprus and Israeli–Palestinian conflicts. The Palestinians are a nation of refugees, home to “by far the most protracted and largest of all refugee problems in the world today” (UNHCR, 2006, page 116). In addition to the 750 000 displaced in 1947–49, around 300 000 Palestinians were displaced during the Six Day War of 1967. There are currently 4.8 million registered Palestinian refugees, over 2 million of them residing in Jordan and the remainder in Syria, Lebanon, and the WBG (UNRWA, 2010); in addition, there are large though contested

numbers of both unregistered refugees and internally displaced Palestinians within Israel (Rempel, 2006). Of the current 2.5 million population of the West Bank, over 750 000 are refugees; of the current 1.5 million population of the Gaza Strip, 1.1 million, or 73%, are refugees (PCBS, 2011; UNRWA, 2010).

In Cyprus the two major episodes of forced displacement occurred in 1963, when 25 000 Turkish Cypriots (24% of the minority population) were displaced into territorial enclaves (Sert, 2010, page 240); and in 1974, following the Turkish invasion, when far larger numbers were displaced. The RoC considers 208 000 people, or 23% of its population, to be internally displaced (IDMC, 2010), while there are estimated to be 65 000 internally displaced Turkish Cypriots from 1974 (King and Ladbury, 1982). Both the Northern Cyprus administration and the UNHCR consider Cyprus' internally displaced people settled, however.

Both Cyprus and Israel–WBG have also been important sites of politically inspired and/or state-led immigration and settlement. Israel is no less than the product of Zionist immigration and settlement, first from Europe and subsequently from the Middle East, North Africa, and the former Soviet Union. Of the current Israeli population of 7.7 million, 6 million are Jewish immigrants or their descendents (ICBS, 2011). Moreover, many of the most distinctive features of Israeli politics and society are products of the specific form taken by Zionist colonisation and settlement (Shafir, 1989). Zionism's settler-immigrant ideology has been extended since 1967 into the West Bank (including East Jerusalem), where, with direct and indirect state support, over 120 Jewish settlements have been established with a total population of over 500 000 (FMEP, 2011). Similarly, since 1974 Turkish government support has resulted in extensive immigration from Anatolia to Northern Cyprus. As a result, according to the most recent census in 2006, over 27% of Northern Cyprus's 250 000 population are Turkish citizens, and over a third of all Turkish Republic of North Cyprus citizens are of Turkish origin (Hatay, 2007, page 30). Both Israel's and Turkey's movement of populations into occupied territories are widely accepted as contravening international law.

Internal voluntary migration within Cyprus and Israel–WBG has been quite limited. Because of both territories' small size, population centres are readily accessible even from rural peripheries, and rural–urban migration has thus been relatively low. Palestinian day labour within Israel, which at its peak employed 36% of the WBG labour force, has significantly declined since Israel introduced closure policies in the early 1990s, Palestinian labour within Israel having been largely replaced by foreign workers. By contrast, Cyprus's 2004 EU accession has forced the RoC to open its labour market to Turkish Cypriot day labourers, of whom there are around 2000 (Bray, 2011). There has been some locally significant internal migration within the West Bank, relating to Israeli closure policies, the construction of its 'separation wall', and restrictions on development in the 60% of the West Bank under its control.

International labour immigration is increasingly important within the RoC and Israel. Over most of the period since independence, Cyprus has been a net exporter of migrants. Owing to its recent economic prosperity and labour shortages, however, the RoC has become a destination for labour migrants from Asia and Eastern Europe, these numbering just under 15 000 in 2008 (Trimikliniotis, 2010, page 63). Israel, likewise, has since 1990 witnessed a sharp increase in foreign workers, chiefly from China and South and Southeast Asia, currently numbering 220 000, 7.5% of the total labour force (Cohen and Cohen, 2011, page 154). In addition, both the RoC and especially Israel are home to small but significant international refugee populations of around 9000 (UNHCR, 2011) and 35 000 (Furst-Nichols and Jacobsen, 2011), respectively.

In many respects, then, there are extensive similarities between the migration patterns of Cyprus and Israel–WBG, as one would expect of such proximate territories. However,

there do exist significant differences in patterns of migration relating to conflict. Where in the Israeli–Palestinian context there is a striking asymmetry in migration experiences—Zionist immigration and settlement contrasting starkly to the record of Palestinian displacement—in Cyprus there has been rough equivalence, with minorities from both sides being displaced (where there is an asymmetry in Turkish government-backed immigration from Anatolia, there being nothing equivalent to this within the RoC). Moreover, while migration, settlement, and displacement have been both consequence and constitutive of the Israeli–Palestinian conflict, this is not the case in Cyprus.

Water availability and management

While both Cyprus and Israel–WBG are often depicted as areas of extreme water scarcity, this is at best only half true. Both have primarily Mediterranean climates with highly variable interannual precipitation. Nonetheless, annual rainfall reaches 1100 mm in Cyprus' central Troudos massif, with Nicosia, for example, having annual precipitation of 324 mm. Moreover, northern Israel, the Golan Heights, and West Bank receive amongst the highest levels of rainfall in the Middle East: Jerusalem has annual precipitation of 550 mm, equivalent to that of London.

This is not to deny that hydrology does pose significant problems, however. While Cyprus receives decent levels of precipitation per capita, it nonetheless has no perennial rivers and faces natural storage problems owing to the small size of the island and water loss to the Mediterranean. Resources are also unevenly distributed, being naturally sparser, given topography and precipitation patterns, in Northern Cyprus than in RoC-controlled territory. Israel–WBG face less extreme problems of water storage (Lake Tiberias and the West Bank Mountain Aquifer serving as large storage reservoirs), but receive significantly less precipitation per capita than Cyprus. In addition, water resources are naturally much more unevenly distributed in Israel–WBG than in Cyprus, being most abundant in northern Israel and the West Bank, and least abundant in the south, including in the Gaza Strip and Negev Desert (where rainfall falls to 30 mm). Finally, a far higher proportion of Israel–WBG's water resources are transboundary, this including the two most important sources: the Jordan River (to which Lebanon, Syria, and Jordan are also riparians) and the West Bank Mountain Aquifer. In each of these respects, Israel–WBG face much the more difficult hydrological circumstances.

Natural shortages are currently mitigated through a range of technological and other means, especially in Israel and the RoC. Israel has a highly integrated national supply network, which conveys water from the northeast of the country to the coastal plain and Negev Desert in the south. The RoC, for its part, has a reservoir capacity of $330 \times 10^6 \text{ m}^3$, in per capita terms the highest such capacity in the world, reflecting its natural storage problems. Wastewater recycling is increasingly used to provide water for irrigation in Israel and the RoC. Desalination already provides Israel with $264 \times 10^6 \text{ m}^3$ per year (Feitelson and Rosenthal, 2012) and the RoC with $52 \times 10^6 \text{ m}^3$ per year (WDD, 2003b, page 3) with further expansion planned: Israel is currently constructing a raft of major desalination plants which, once complete, are planned to provide $750 \times 10^6 \text{ m}^3$ per year (Feitelson and Rosenthal, 2012), more water than provided by the Jordan River, while in the RoC desalination is planned to rise to $106.8 \times 10^6 \text{ m}^3$ per year (Manoli, 2010, page 36). Turkey has started the construction of reservoirs for a suspended water pipeline, with an annual capacity of $75 \times 10^6 \text{ m}^3$, from its southern shores to Northern Cyprus.⁽¹⁾ Cyprus and Israel–WBG also rely heavily on the import of virtual water to maintain their overall water balances. By one calculation (for 1999) Israel's net virtual water imports amount to $6.7 \times 10^9 \text{ m}^3$ annually (Hoekstra and Hung, 2005, page 51), over three times its consumption from local natural water sources. Finally, since 1967 Israel has been able to mitigate natural shortages by limiting Palestinian access to the Mountain Aquifer, as well as Arab state access to the River

⁽¹⁾ Author's personal communication with local residents.

Jordan, ensuring that it receives the lion's share of water from these two key transboundary resources (Lowi, 1995; Zeitoun, 2008). To different degrees, then, both the RoC and Israel have been able to adapt to natural water shortfalls. For a range of political, economic, and institutional reasons, this is not the case in Northern Cyprus or the WBG.

The result of the above is that both Israel and to a lesser degree the RoC have, for the most part, adequate water provision. Domestic consumption in Israel, 293 litres per capita per day, is almost twice as high as in the UK (HSI, 2009; ICBS, 2011).⁽²⁾ Excess Israeli desalination water has until recently been used for irrigation. Indeed, so plentiful are water supplies within Israel that the Israeli government now provides, and is legally obliged to provide, water to nature (IMEP, 2005). Domestic consumption in the RoC is also high, at around 188 litres per capita per day (Iacovides, 2010, pages 24–25). Moreover, irrigated agriculture accounts for around 60–70% of total water consumption, the majority of this being for citrus farming, despite its limited economic value (Elkiran and Ongul, 2009; WDD, 2010, page 46).

There are major water problems, however. First, there is significant overexploitation of water resources in both Cyprus and Israel–WBG. The upper Jordan River is so heavily exploited that the lower Jordan River now has only 2% of its natural flow; the Dead Sea is consequently disappearing (B'Tselem, 2011, page 30). Israel's Coastal Aquifer is also overabstracted and increasingly saline. Gaza's portion of the Coastal Aquifer is in a critical condition (discussed further below). Aquifers are also being depleted across Cyprus. This is especially the case for the island's largest aquifers in Northern Cyprus, where groundwater abstraction by Turkish Cypriot farmers is not monitored and only sporadically regulated. The Magosa/Famagusta Aquifer has become completely unusable owing to seawater intrusion (Ergil, 2000). The transboundary Morphou/Guzelyurt Aquifer, the largest groundwater resource in Cyprus, shows a deficit of around $30 \times 10^6 \text{ m}^3$ per year, at a safe yield of $37 \times 10^6 \text{ m}^3$ per year (Elkiran and Aysen, 2008, page 3). Total groundwater deficits from overabstraction are estimated at $26.6 \times 10^6 \text{ m}^3$ per year for the RoC (WDD, 2010, page 31) and around $50 \times 10^6 \text{ m}^3$ per year for Northern Cyprus (Elkiran and Ongul, 2009, page 151).

Second, many water resources are heavily polluted, especially in Israel–WBG. The lower Jordan River is now largely sewage. In the WBG neither Palestinian communities nor Israeli settlements have adequate sewage collection and treatment infrastructures (B'Tselem, 2009; Fischhendler et al, 2011). Many Israeli streams and aquifers have until recently been highly toxic.

Third, there have been and remain serious supply shortfalls. In 2008 a dramatic drop in precipitation levels, exacerbated by mismanagement in preceding years, led to an acute water crisis in Cyprus (Pashiardis and Michaelides, 2009). State-operated water supplies to agriculture were stopped altogether, while domestic and municipal supplies were upheld only by water imports from Greece and Turkey. More continuously, since 1967 Palestinian water demand in the West Bank has been suppressed in order to maximise Israeli consumption from the transboundary Mountain Aquifer. Prior to 1995, suppression of demand was achieved principally through military orders (JMCC, 1994). Since then, however, demand has additionally been suppressed through the regulations and decisions of the Israeli–Palestinian Joint Water Committee—which was established as part of the Oslo peace process, but which primarily functions as an Israeli veto mechanism, maintaining the water access inequalities established prior to the peace process (Selby, 2003a). The consequence is that domestic consumption by West Bank Palestinians is 97 litres per capita per day (World Bank, 2009, page 12), only a third of average Israeli consumption. In addition, there are large internal water supply variations between Palestinian communities. While some towns are well served, 200 Palestinian villages are not connected to water networks (WASH, 2005); and most Palestinian towns and villages experience lengthy summer supply cuts, in some

⁽²⁾The figure is for 2007.

cases lasting several months (Selby, 2003b, pages 171–181). Agricultural water use has faced particularly severe restrictions.

The Gaza Strip, finally, is an ecological and humanitarian disaster zone, overabstraction of its shallow Coastal Aquifer having led to the significant intrusion of saline water. Natural recharge in Gaza plus lateral inflow from Israel totals $72 \times 10^6 \text{ m}^3$ per year, but current abstraction is more than double this (Vengosh and Amer, 2005, page 4). This overabstraction is a product of three factors: high population density stemming from Gaza's large refugee population; poor regulation, especially since the establishment of the PA in 1994 (since when over 5000 shallow wells have been drilled in Gaza); and the negligible volume of water supplies received from Israel ($5 \times 10^6 \text{ m}^3$ per year). Gaza's groundwater is also highly contaminated with sewage and, as a result, nitrates. In consequence, only 5–10% of Gaza's water supply meets potable standards (World Bank, 2009, page 28). Declining water quality has had discernible health impacts, Gaza experiencing a high incidence of diarrhoea, in particular. Health impacts are unevenly distributed, however; those with financial means drink bottled water, and hence it is the poorest who suffer most from Gaza's water crisis.

Several factors suggest that these problems may worsen in future. Even at current rates of abstraction, water and salinity levels in Cyprus, the Israeli Coastal Aquifer, and in particular the Gaza Strip will inexorably deteriorate. Moreover, high population growth—currently 1.8% in Israel and 2.7% in the WBG, though only 0.8% in the RoC—may place further pressure on water resources, especially in Gaza. There may be further increases in per capita abstraction. Moreover, climate change may further exacerbate water stresses. Contrary to some claims (CMS, 2011; Kifle and Bruins, 2009), there is little solid evidence that rainfall levels are already declining (Messerschmid, 2012). Nonetheless, climate change models suggest that, on average, precipitation in Cyprus and Israel–WBG will decrease by 10–19% for 2040–69 relative to 1961–90.⁽³⁾ In addition, Cyprus and Israel–WBG will almost certainly experience increased water loss from evapotranspiration, plus more regular extreme weather events. Sea-level rise may also affect local water resources, especially the shallow Coastal Aquifer which serves important storage functions for both Israel and Gaza (EQA and UNDP, 2010; IMEP, 2010). All that said, climate change is highly unlikely to be the crucial determinant of future water stresses and vulnerabilities. Conway's (2005) finding that the impacts of global climate change on Nile Basin flows will be relatively minor compared with changes wrought by population growth, transformation in land use, and development strategies is of more general relevance here. Israel's Second National Communication on Climate Change (IMEP, 2010, page 80) predicts reduced agricultural income resulting from climate change amounting to US \$100 million annually by 2020—but this is equivalent to only 0.0097% of Israel's GDP. For WBG Palestinians the granting of a more equitable share of regional water resources would have a much more significant bearing on Palestinian water vulnerabilities and insecurities than global climate change is ever likely to have, under any established climate change scenario (Messerschmid, 2012).

In addition, supply enhancement (especially wastewater recycling and desalination) and demand management measures may help mitigate, or even overcome, these pressures, as the evidence on the RoC and Israel above suggests. There are, however, significant economic, institutional, and political impediments to actualising these countertendencies. Economically, high-technology solutions not only require significant capital investment but are also expensive to maintain and operate, to the extent that many are currently beyond the means of the WBG, especially the Gaza Strip, even assuming continued support from

⁽³⁾ These figures are for the B1, A1B, and A2 climate change scenarios and are average figures across all sixteen global circulation models (GCMs). Note that these figures mask a high degree of uncertainty, since the individual GCMs generate very different precipitation projections, from no change to a 35% decline [scenarios generated from The Nature Conservancy (2011); World Bank (2011c)].

international donors. Institutionally, both the PA and even more so Northern Cyprus have weak administrative and regulatory capacities in the water sector. Politically powerful domestic interests (most notably the farming and tourism lobbies in Cyprus) and ideologies (such as Israel's Orientalist commitment to 'Western' levels of consumption)⁽⁴⁾ are obstacles to wise water management. The ongoing conflicts in Cyprus and Israel-WBG are on many levels impediments to water security (as discussed in the next section). Finally, it is also conceivable that future increases in the price of fossil fuels, or climate change mitigation efforts which place limits on fossil fuel consumption, may exacerbate water stresses by increasing the cost of, for instance, desalination or virtual water imports.

In summary, neither Cyprus nor Israel-WBG have plentiful natural water resources, even if neither are sites of 'absolute scarcity'. In both cases supply enhancement—made possible through investment, high economic development, 'developmental statism', and the global trade in agricultural staples—has mitigated water shortages and stresses for some populations. In both cases, moreover, water stresses are unevenly distributed. Beyond this, however, it is the differences between the two cases which stand out. In hydrological terms alone, water poses much greater challenges in Israel-WBG than in Cyprus. Moreover, the existing water problems in Israel-WBG—specifically, the ecological crisis in Gaza and continuous supply shortages in the West Bank—are far worse than in Cyprus. Significantly, however, these severe water problems are not primarily hydrological in origin. Indeed, whereas in Cyprus water stresses correlate broadly with hydrology, in the West Bank the reverse is true: here a resource-rich area is a site of extreme Palestinian water vulnerability. Evidently, the reason for this is not hydrological, but political.

Water and conflict

In both Cyprus and Israel-WBG water issues have been and remain a source of political discourse and debate, albeit to very different degrees. In Cyprus muted accusations over groundwater depletion involve Greek Cypriot claims of Northern water mismanagement, countered by Turkish Cypriot references to the RoC's control over the island's key recharge areas (Ergil, 2000). By contrast, water is a regular subject of strident accusations and counteraccusations between Israel and the PA—Palestinian claims centring on Israel's monopoly of transboundary water and its discriminatory water practices, and Israel's principal arguments being that Palestinian water problems are a product of internal PA mismanagement and that the Palestinians are pursuing a 'sewage intifada' against Israel (GoI, 1998). Often, international organisations and NGOs are also participants to these disputes, usually siding with the Palestinians (Amnesty International, 2009; World Bank, 2009). All that said, in Cyprus and Israel-WBG alike, water issues are very far from being the leading causes or subjects of political controversy, as is indicated, for instance, by the limited importance attached to water issues within the two peace processes. Joint water management issues played only a minor role in the natural resource dimension of the 2004 Annan Plan, while they were intentionally relegated during the Oslo peace process to one of the 'other issues of common interest' to be resolved during permanent status negotiations, secondary to the far more difficult issues of "Jerusalem, refugees, settlements, security arrangement, borders, relations and cooperation with other neighbours" (GoI and PLO, 1993, article 5); during the actual permanent status talks conducted during 2000–01, water issues were barely even addressed (Selby, 2005, page 340).

With regard to violent conflict specifically, Cyprus and Israel-WBG present quite different pictures. At no point have water scarcities in Cyprus been a source of large-scale intercommunal violence: water was not a factor, for instance, in the Turkish invasion of 1974. Neither is there any evidence of localised water-related violence in Cyprus between

⁽⁴⁾ See, for example, Fishelson's comments quoted in Rouyer (2000).

or within communities in the RoC or Northern Cyprus. By contrast, there is evidence that water has been a source of political violence in Israel–WBG and between Israel and its Arab neighbours, albeit to a much lesser degree than is often claimed. During 1964–65 Israeli and Syrian forces engaged militarily over Arab League plans to divert Jordan River headwaters (Lowi, 1995). At a more localised level, there are regular violent skirmishes between and within West Bank Palestinian communities, over access to scarce and unevenly distributed water supplies (Selby, 2003b). Moreover, the location of some Israeli settlements in the West Bank has been influenced by Israel's interest in settling key recharge zones of the Mountain Aquifer. These examples are exceptions rather than the rule, however. Despite some claims to the contrary (Bulloch and Darwish, 1993, page 34; Naff and Matson, 1984, page 44), the 1967 Six Day War was not a 'water war', driven by conflict over regional water resources. Of the numerous other instances of large-scale violent conflict discussed above, none has had important water-related dimensions. As reflected in the importance assigned to it during the Oslo peace process, water has not been a significant driver of the Israeli–Palestinian conflict.

The counterthesis that water is associated more with international cooperation than with conflict also finds minimal support in Cyprus and Israel–WBG. In Cyprus the RoC's nonrecognition of the Turkish Cypriot administration in the North makes formal cooperation all but impossible, though there is informal technical cooperation over wastewater treatment (Brouma and Ezel, 2011). In Israel–WBG, while there is some formal policy coordination, this is over only West Bank aquifers—where 'joint management' functions as a means of Israeli veto and an instrument of hegemony or domination—and not at all over the Gaza Strip or the Jordan River, for which Israel prefers unilateral management (Selby, 2003a). There is also some localised Israeli–Palestinian 'cooperation', both between Palestinian communities and Israeli settlers (Selby, 2003b, pages 162–163) and across the Green Line. Contrary to liberal functionalist expectations (Dolatyar and Gray, 2000, page 84; Wolf, 1995, page 3), at no point in either Israel–WBG or Cyprus has water cooperation led or 'spilled over' into other more delicate areas of peacemaking.

Much more significant than the impact of water in causing or contributing to conflict have been the impacts of conflict, whether political or violent, in causing or exacerbating water problems. These impacts are evident in both Cyprus and Israel–WBG, and are both direct and indirect.

Direct impacts of conflict are most apparent in Israel–WBG. Water infrastructures have sometimes been symbolic targets for attacks, most notably in the Palestinian resistance movement Fatah's first ever raid, in 1964, which was on a water pumping station. More commonly, however, infrastructures have been either indiscriminately or intentionally damaged during military operations. Israeli actions in the WBG from 2000 to 2004 resulted in extensive damage to Palestinian infrastructures and supplies—for instance, in Jenin in 2002, when as a result of Israeli actions over 15 000 people went without piped supplies for a month (Zeitoun, 2008, page 90). Ongoing Israeli restrictions on movement within the West Bank, and between the WBG and Israel, often have significant impacts, affecting for instance the import of infrastructure parts, water sector personnel, and water tankers. This is especially the case in Gaza, which since 2007 has been subject to an Israeli blockade, leading to widespread shortages of spare parts and diesel for generators, as well as electricity cuts, all of which have affected water and wastewater services (World Bank, 2009, page 29).

The indirect impacts of political and violent conflict are arguably more telling, however. First, many of the water problems discussed above are the direct results of conflict, this being especially true of Gaza's water crisis (caused in large part by pressures resulting from its large refugee population) and West Bank supply shortages (intentionally caused by the Israeli authorities). Second, conflict has had clear economic impacts, at least within Northern

Cyprus and the WBG, which in turn have constrained resources available for sustainable investment in and management of the water sector. Third, conflict has negatively affected good governance in the water sector: this is especially the case in the WBG, where violent conflict and a halting peace process have impeded sustainable institution building, and in Northern Cyprus, where the structural dependence on Turkey, combined with international isolation, has left civilian governance institutions extremely weak. Fourth, conflict has constrained opportunities for technical cooperation, with clear impacts on the management of transboundary resources in particular. This is especially evident in relation to Gaza's water crisis, over which Israeli–Palestinian cooperation is completely absent, but also applies to the transboundary Morphou/Guzelyurt Aquifer. Conflict and division have also presented obstacles to potential transboundary water transfers, preventing the conveyance of water from the RoC to the much drier Northern Cyprus, and limiting conveyance from Israel to Gaza. Across our two cases the water problems are most severe in the Gaza Strip, the West Bank, and Northern Cyprus. Conflict—and its specific structure and dynamics in different contexts—is the primary reason for this state of affairs.

Historical particularities aside, there are also more general reasons why water has not been a significant source of violent conflict in Cyprus or Israel–WBG, which contain implications for the future. First, although economic development and associated population growth typically increase pressure upon water resources, development also furnishes plentiful technological, economic, and institutional means for overcoming supply constraints. Second, despite its obvious biological and economical value, water is of declining relative economic and political importance within most societies. It is widely recognised that agriculturally dependent societies are the ones that are most vulnerable to water scarcities and associated environmental shocks (Reuveny, 2007, page 661). The logical corollary of this is rarely made explicit, however. Owing to economic development, agriculture is now providing ever-declining contributions to GDP, employment, and state revenues; and with this the political importance of farming lobbies, rural communities, and in turn water is tending in most countries to decrease (Selby, 2005, page 336). The consequence of this is that, despite resource pressures, violent water conflicts are becoming less rather than more likely, except perhaps at a very local level, in marginalised and impoverished rural and urban areas. It is this developmental dynamic, at the core, which explains why the only recorded outright water war occurred 4500 years ago between two Mesopotamian city-states, and why there have been no modern water wars (Wolf, 1998). Given the above, there is no good reason to assume that water conflicts are going to become more common or likely in future.

Water, conflict, and migration

There is little evidence in Cyprus or Israel–WBG to support Malthusian models of environment–conflict–migration interactions. The large-scale population displacements in Cyprus (in 1963 and 1974) and Israel–WBG (in 1948–49 and 1967) were not even partly caused by water stresses. It is possible that water shortages have been a contributory factor in internal migration, including rural–urban migration, in the two case areas, although as noted above such internal migration has been quite limited. At the most aggregate level, water resource pressures and migration in Cyprus and Israel, far from being positively correlated, are actually negatively correlated. For despite increasing pressure on water resources, Israel and both parts of Cyprus (but not the WBG, given Israeli restrictions) are areas of net immigration. Cyprus, which in the past was a lush island and a net exporter of migrants, is now the opposite in both regards.

There is likewise little evidence of water problems causing (either violent or political) conflict and this in turn leading indirectly to migration and further conflict (figure 1). As noted above, water has not been a source of intercommunal violence in Cyprus and has

only exceptionally been a reason for violence in Israel–WBG—thus rendering it extremely unlikely that water-related violence might have contributed to migration. Israeli restrictions on Palestinian water development in the West Bank have contributed to some local internal displacement (OCHA, 2011), but to our knowledge this is the only evidence across the two cases of political conflict over water contributing to migration.

Moreover, there is little reason to conclude that Cyprus or Israel–WBG have thus far been recipients of environmental migrants. International labour migration to Cyprus and Israel has been equally from water-scarce and water-abundant states. The largest refugee populations in the RoC are from Syria, Iran, and Turkey, which are mostly well endowed (the latter very well endowed) with water resources. Refugee flows to Israel from East Africa have been linked to drought and environmental degradation (IMEP, 2012), but there are no solid grounds for characterising such migration as essentially ‘environmental’.

The question of why there has been so little migration as a result of water stresses in Cyprus and Israel–WBG demands further attention and cannot be answered conclusively here. However, one important reason is that there are many other ways of adapting to environmental change and environmental shocks, besides migration. In all water-stretched regions states have responded to long-term pressures on water resources through supply-side investment and wastewater reuse, as well as by reducing allocations to agriculture, and turning to international markets to meet local food requirements. In both the RoC and Israel water managers have responded to periodic droughts with short-term reductions in allocations to agriculture, as well as by increasing groundwater abstraction during drought years (Zeitoun et al, 2009). Farmers in the Famagusta area of Northern Cyprus have responded to the extreme salination of the Magosa/Famagusta Aquifer by turning to dry-land farming. West Bank Palestinians manage in the face of intermittent domestic supplies through a range of household-level supply enhancement and demand management techniques—for instance, using underground and roof-top storage systems, increasing consumption of bottled water, and adapting domestic washing and cleaning practices (Selby, 2003b, chapter 8). An additional factor may be that chronic water problems, such as those in the WBG in particular, may be considered sufficiently normal and routine that they are integrated into everyday life and experiences, rather than experienced, like environmental shocks, as extreme events which provide reason to emigrate (Cahill-Ripley, 2011). For Palestinians, a further important reason why there is so little out-migration lies in the fear of losing the right to return to the WBG; and, at a more ideological level, in their commitment, which is also present within Zionist thinking, to the political importance of maintaining a physical presence within their homeland.

What, though, of the future? It has been argued above both that water problems in Cyprus and Israel–WBG will not necessarily become more severe and that the conflict potential of water is not necessarily increasing (and is in certain respects decreasing). As a corollary, it would be fallacious to think that increased water stress will inexorably generate environmental migration. Much more likely are continuing asymmetries in water vulnerabilities, without these leading to either political violence or migration.

While migration and conflict are unlikely consequences of environmental stress in Cyprus or Israel–WBG, the converse—that environmental stresses and vulnerabilities are very often caused by conflict and migration—clearly holds true. As noted above, conflict in these two divided territories has, *inter alia*, created population pressures upon water resources (especially in Gaza, as a result of forced displacement), impeded sustainable economic development of water resources, as well as strong water sector regulation (especially in Northern Cyprus and the WBG), limited opportunities for bilateral and regional cooperation (in both Cyprus and Israel–WBG), and involved the intentional limiting of access to water supplies (in the West Bank). Moreover, conflict in both cases has to a significant degree been either caused

or exacerbated by migration, especially settlement and forced displacement. All in all, these conflict and migration impacts are many times more significant than any impacts of water scarcity in causing or contributing to conflict and migration in Cyprus and Israel–WBG.

Furthermore, the most extreme ‘environmental migration’ problem found within our case studies does not lie in people being forced to move because of environmental stresses, but in people being unable to move. This is specifically the case within the Gaza Strip, where encirclement by Israel plus international policy on Palestinian refugees and Palestinians’ continuing commitment to remaining in their homeland impedes the ability of Gazans to leave their tiny territory, leaving them imprisoned with mostly undrinkable water supplies. In this sense—and others—Gazans constitute a ‘trapped population’ par excellence (Black et al, 2011b). Environmental migration is usually depicted within Western policy discourse as a problem and threat. But, as this example illustrates, migration is also a potential adaptation strategy—which when denied or prevented can cause far graver environmental vulnerability and human insecurity.

Conclusions

Cyprus and Israel–WBG provide negligible support for the Malthusian thesis that water scarcity can cause or contribute to conflict and migration. Moreover, there is little reason to suppose that a Malthusian future lies just over the horizon since, despite likely increasing resource pressures plus climate-change-related declines in precipitation, there exist plentiful means of adaptation (from importing virtual water to changing agricultural practices and livelihoods), and also because water is of declining economic and political value in most societies. That said, even within Cyprus and Israel–WBG, some states and populations evidently have far superior adaptive capacities than others—for a range of economic, political, and institutional reasons. In both cases we find striking asymmetries in water security and vulnerability, reflecting differential adaptive capacities plus also, crucially, long-established conflict structures and power relations. In both cases, moreover, we find that conflict is the central determinant of patterns of water crisis and insecurity. The very different forms taken by water insecurity in the two cases—especially its far greater severity in Israel–WBG—is closely correlated with the form and intensity of conflict in each case. And migration has historically been a central element of these conflicts. The cases of Cyprus and Israel–WBG, then, suggest the alternative model of environment–migration–conflict linkages shown in figure 2.

Of course, neither this model nor our specific findings on the two cases are straightforwardly generalisable. The small size of Cyprus and Israel–WBG, plus the relative economic prosperity of Israel and the RoC, limits the utility of these cases for developing general conclusions

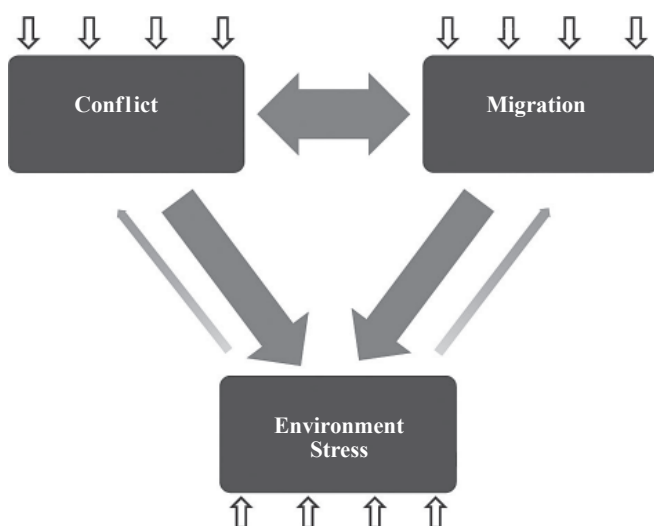


Figure 2. Environment–migration–conflict linkages in Cyprus and Israel–WBG.

about the nature, extent, and causes of environment-related migration. Moreover, in most parts of the world political and violent conflict are not as determining of water problems and vulnerabilities as they are in Cyprus and Israel–WBG. That said, given that Cyprus and especially Israel–WBG are regular focuses of Malthusian reasoning, the fact that these cases provide negligible support for such reasoning is of general significance—corroborating extant critiques (Leach and Mearns, 1996; Peluso and Watts, 2001). Equally, the analysis above suggests the need for further consideration of the constitutive impacts of conflict on environmental insecurities. For despite its self-evident importance, there exists no sustained general literature on this subject. If the cases of Cyprus and Israel–WBG are a good guide, analysts should devote far less attention than currently to hypothetical and weakly evidenced ‘environmental security’ and environmental migration threats, and rather more to the multiple effects of conflict in causing and structuring environmental stresses and vulnerabilities.

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References

- Allan T, 2000 *The Middle East Water Question: Hydropolitics and the Global Economy* (I B Tauris, London)
- Amnesty International, 2009 *Troubled Waters: Palestinians Denied Fair Access to Water* (AI Publications, London)
- Barnett J, Adger W N, 2007, “Climate change, human security and violent conflict” *Political Geography* **26** 639–655
- Black R, Adger W N, Arnell N W, Dercon S, Geddes A, Thomas D, 2011a, “The effect of environmental change on human migration” *Global Environmental Change* **21** S3–S11
- Black R, Bennett S R G, Thomas S M, Beddington J R, 2011b, “Climate change: migration as adaptation” *Nature* **478** 447–449
- Brauch H G, 2011, “Global climate change impacts for the Mediterranean in the 21st century: challenges for human and environmental security”, in *Coping with Global Environmental Change, Disasters and Security: Threats, Challenges, Vulnerabilities and Risks* Eds H G Brauch, C Mesjasz, J Grin, P Kameri-Mbote, B Chourou, P Dunay, J Birkmann (Springer, Heidelberg) pp 485–524
- Bray N, 2011, “Long division: Cyprus plays spoiler in the Mediterranean” *World Policy Journal* **28** 73–82
- Brouma A D, Ezel C, 2011, “Water policy networks: a new form of governance for Cyprus? The case of Nicosia”, in *Water Resources Allocation* Ed. P Koundouri (Springer, Dordrecht) pp 65–87
- B’Tselem, 2009 *Foul Play: Neglect of Wastewater Treatment in the West Bank* Jerusalem
- B’Tselem, 2011 *Dispossession and Exploitation: Israel’s Policy in the Jordan Valley and Northern Dead Sea* Jerusalem
- Bulloch J, Darwish A, 1993 *Water Wars: Coming Conflicts in the Middle East* (Victor Gollancz, London)
- Cahill-Ripley A, 2011 *The Human Right to Water and its Application in the Occupied Palestinian Territories* (Routledge, London)
- Christian Aid, 2007 *Human Tide: The Real Migration Crisis* London
- CMS, 2011, “Climate of Cyprus”, Cyprus Meteorological Service, http://www.moa.gov.cy/moa/ms/ms.nsf/DMLcyclimate_en/DMLcyclimate_en?opendocument
- CNA, 1997 *National Security and the Threat of Climate Change* CNA Corporation, Alexandria, VA
- Cohen A, Cohen I, 2011, “Israel”, in *Migration Legislation, Institutions and Policies in the Euro–Med Region* Ed. G F I Zusammenarbeit (GIZ, Eschborn) pp140–168
- Collier P, Hoeffler A, 2005, “Resource rents, governance, and conflict” *Journal of Conflict Resolution* **49** 625–633
- Conway D, 2005, “From headwater tributaries to international river: observing and adapting to climate variability and change in the Nile basin” *Global Environmental Change Part A* **15** 99–114

-
- CSIS/CNAS, 2007 *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* Center for Strategic and International Studies and Center for New American Security, Washington, DC
- Dinar S, 2008 *International Water Treaties: Negotiation and Cooperation Along Transboundary Rivers* (Routledge, London)
- Dolatyar M, Gray T S, 2000, "The politics of water scarcity in the Middle East" *Environmental Politics* **9** 65–88
- Dyer G, 2010 *Climate Wars: The Fight for Survival as the World Overheats* (Oneworld, Oxford)
- Elkiran G, Aysen T, 2008, "Water scarcity impacts on Northern Cyprus and alternative mitigation strategies", in *Environmental Problems of Central Asia and their Economic, Social and Security Impacts* Eds J Qi, K Evered (Springer, Heidelberg) pp 241–250
- Elkiran G, Ongul Z, 2009, "Implications of excessive water withdrawals to the environment of Northern Cyprus" *Water and Environment Journal* **23** 145–154
- EQA/UNDP, 2010 *Climate Change Adaptation Strategy and Programme of Action for the Palestinian Authority* Environmental Quality Agency, Palestinian Authority and United Nations Development Programme, Jerusalem
- Ergil M E, 2000, "The salination problem of the Guzelyurt aquifer, Cyprus" *Water Research* **34** 1201–1214
- Feitelson E, Rosenthal G, 2012, "Desalination, space and power: the ramifications of Israel's changing water geography" *Geoforum* **43** 272–284
- Fischhendler I, Dinar S, Katz D, 2011, "The politics of unilateral environmentalism: cooperation and conflict over water management along the Israeli–Palestinian border" *Global Environmental Politics* **11** 36–61
- FMEP, 2011, "Comprehensive settlement population 1972–2009", Foundation for Middle East Peace, Washington, DC
- Furst-Nichols R, Jacobsen K, 2011, "African migration to Israel: debt, employment and remittances", Feinstein International Center, Tufts University, Somerville, MA
- Gleditsch N P, 2012, "Whither the weather? Climate change and conflict" *Journal of Peace Research* **49**(1) 3–9
- Gleditsch N P, Nordås R, Salehyan I, 2007, "Climate change and conflict: the migration link", Coping with Crisis Series working paper series, International Peace Academy, New York
- Gleick P H, 1993, "Water and conflict: fresh water resources and international security" *International Security* **18** 79–112
- GoI, 1998 *Palestinian Obligations As Per Note for the Record of the Hebron. Protocol of 15 January 1997* Government of Israel, Jerusalem
- GoI, PLO, 1993, "Declaration of Principles on Interim Self-Government Arrangements", Government of Israel and Palestine Liberation Organization, Washington, DC
- Hardin G, 1968, "The tragedy of the commons" *Science* **162** 1243–1248
- Hartmann B, 2010, "Rethinking climate refugees and climate conflict: rhetoric, reality and the politics of policy discourse" *Journal of International Development* **22** 233–246
- Hatay M, 2007 *Is the Turkish Cypriot Population Shrinking? An Overview of the Ethno-demography of Cyprus in the Light of the Preliminary Results of the 2006 Turkish–Cypriot Census* Peace Research Institute Oslo, Nicosia
- Hoekstra A, Hung P, 2005, "Globalisation of water resources: international virtual water flows in relation to crop trade" *Global Environmental Change* **15** 45–56
- HSI, 2009 *Development of Utilization and Status of Water Resources in Israel until the Fall of 2008* Hydrological Service of Israel, Jerusalem (in Hebrew)
- Hurewitz J, 1968 *The Struggle for Palestine* (Greenwood, New York)
- Iacovides I, 2010, "Water use patterns in Cyprus and demand management: towards water resources sustainability", in *Water Resources Allocation: Policy and Socioeconomic Issues in Cyprus* Ed. P Koundouri (Springer, Heidelberg) pp 23–32
- ICBS, 2011, "Press Release, 8 May 2011", Israeli Central Bureau of Statistics, Jerusalem
- IDMC, 2010, "Country Report Cyprus Internal Displacement Monitoring Center", Internal Displacement Monitoring Center, Geneva

-
- IMEP, Israeli Ministry of Environmental Protection, Jerusalem
2005, "The right of nature to water in Israel", <http://www.unep.org/GC/GC23/documents/Israel.pdf>
2010 *Israel's Second National Communication on Climate Change*
2012 *Climate Change Adaptation Report*
- IPCC, 2001 *Third Assessment Report. Climate Change 2001: Impacts, Adaptation and Vulnerability*
Intergovernmental Panel on Climate Change (Cambridge University Press, Cambridge)
- Jägerskog A, 2009, "Functional water cooperation in the Jordan River basin: spillover or spillback for political security?", in *Facing Global Environmental Change* Eds H G Brauch, Ú O Spring, J Grin, C Mesjasz, P Kameri-Mbote, N C Behera, B Chourou, H Krummenacher (Springer, Heidelberg) pp 633–640
- JMCC, 1994 *Water: The Red Line* Jerusalem Media and Communication Centre, Jerusalem
- Kafle H K, Bruins H J, 2009, "Climatic trends in Israel 1970–2002: warmer and increasing aridity inland" *Climatic Change* **96** 63–77
- Kahl C H, 2006 *States, Scarcity and Civil Strife in the Developing World* (Princeton University Press, Princeton, NJ)
- King R, Ladbury S, 1982, "The cultural reconstruction of political reality: Greek and Turkish Cyprus since 1974" *Anthropological Quarterly* **55** 1–16
- Koubi V, Bernauer T, Kalbhenn A, Spilker G, 2012, "Climate change, economic growth, and civil conflict" *Journal of Peace Research* **49** 113–127
- Leach M, Mearns R, 1996 *The Lie of the Land: Challenging Received Wisdom on the African Environment* (James Currey, Oxford)
- Lowi M, 1995 *Water and Power: The Politics of a Scarce Resource in the Jordan River Basin* (Cambridge University Press, Cambridge)
- Maguder N, 2010, "Cyprus facing up to life after 'peak water'" *CNN* 22 September, <http://edition.cnn.com/2010/WORLD/europe/09/20/cyprus.water/index.html>
- Manoli A, 2010, "Desalination in Cyprus", Republic of Cyprus Water Development Department, Nicosia, [http://www.cyprus.gov.cy/moa/wdd/Wdd.nsf/0/24B06DE543FBD990C22576EB002E2633/\\$file/Desalination.pdf](http://www.cyprus.gov.cy/moa/wdd/Wdd.nsf/0/24B06DE543FBD990C22576EB002E2633/$file/Desalination.pdf)
- Messerschmid C, 2012, "Nothing new in the Middle East: reality and discourses of climate change in the Israeli–Palestinian conflict", in *Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability* Eds J Scheffran, M Brzoska, H G Brauch, P M Link, J Schilling (Springer, Berlin) pp 423–459
- Metha L, 2010 *Limits to Scarcity* (Earthscan, London)
- Mitrany D A, 1975 *Functional Theory of Politics* (St Martin's Press, New York)
- Myers N, 1995 *Environmental Exodus: An Emergent Crisis in the Global Arena* Climate Institute, Washington, DC
- Naff T, Matson R C, 1984 *Water in the Middle East: Conflict or Cooperation?* (Westview Press, Boulder, CO)
- OCHA, 2011 *Displacement and Insecurity in Area C of the West Bank* UN Office for the Coordination of Humanitarian Affairs, Jerusalem
- Pashiardis S, Michaelides S C, 2009, "Regional drought assessment in Cyprus" *Geophysical Research Abstracts* **11** http://www.geophysical-research-abstracts.net/gra_volume_11.pdf
- PCBS, 2011, "Palestine in figures, 2010", Palestinian Central Bureau of Statistics, Ramallah
- Peluso N, Watts M, 2001 *Violent Environments* (Cornell University Press, Ithaca, NY)
- Phillips D, Daoudy M, Å-jendal J, Turton A, McCaffrey S, 2006 *Trans-boundary Water Cooperation as a Tool for Conflict Prevention and for Broader Benefit-sharing* Ministry for Foreign Affairs Stockholm, Sweden
- Rao M, 1994, "An imagined reality: Malthusianism, Neo-Malthusianism and population myth" *Economic and Political Weekly* 29 January, pages 40–52
- Rempel T, 2006, "Who are Palestinian refugees?" *Forced Migration Review* **26** 5–7
- Reuveny R, 2007, "Climate change-induced migration and violent conflict" *Political Geography* **26** 656–673
- Rodinson M, 1973 *Israel: A Colonial–Settler State?* (Monad, New York)

- Rouyer A R, 2000 *Turning Water into Politics: The Water Issue in the Palestinian–Israeli Conflict* (Palgrave Macmillan, Basingstoke, Hants)
- Selby J, 2003a, “Dressing up domination as ‘cooperation’: the case of Israeli–Palestinian water relations” *Review of International Studies* **29** 21–38
- Selby J, 2003b *Water, Power and Politics in the Middle East: The Other Israeli–Palestinian Conflict* (I B Tauris, London)
- Selby J, 2005, “The geopolitics of water in the Middle East: fantasies and realities” *Third World Quarterly* **26** 329–349
- Selby J, Hoffmann C, 2013 *Divided Environments: Rethinking Water Security, Climate Change and Conflict* (I B Tauris, London)
- Sert D S, 2010, “Cyprus: peace, return and property” *Journal of Refugee Studies* **23** 238–259
- Shafir G, 1989 *Land, Labor, and the Origins of the Israeli–Palestinian Conflict, 1882–1914* (Cambridge University Press, Cambridge)
- The Nature Conservancy, 2011, “ClimateWizard”, <http://www.climatewizard.org/>
- TRNC SPO, 2011, “Economic and Social Indicators 1977–2008”, Turkish Republic of North Cyprus State Planning Organization, Nicosia
- Trimikliniotis N, 2010, “Cyprus case study”, in *Migration, Employment and Labour Market Integration Policies in the European Union. Part 1: Migration and the Labour Markets in the European Union (2000–2009)* Eds A Platonova, G Urso (International Organization for Migration, Brussels) pp 47–53
- UNHCR, 2006 *State of the World’s Refugees 2006: Human Displacement in the New Millennium* United Nations High Commissioner for Refugees (Oxford University Press, Oxford)
- UNHCR, 2011, “UNHCR Statistical Yearbook 2009”, United Nations High Commissioner for Refugees, Geneva
- UNRWA, 2010, “In figures”, United Nations Relief and Works Agency, http://www.unrwa.org/userfiles/file/statistics/UNRWA_in_figuresJune_2010_English.pdf
- Vengosh A, Amer M, 2005, “Sources of salinity and boron in the Gaza Strip: natural contaminant flow in the southern Mediterranean coastal aquifer” *Water Resources Research* **41** 1–19
- WASH, 2005 *Water for Life, 2005* Water, Sanitation and Hygiene Monitoring Group, Ramallah
- WDD, Republic of Cyprus Water Development Department, Nicosia
- 2003a, “Development of water resources in Cyprus: a historical review”
- 2003b, “Water Development Department Annual Report 2009”
- 2010, “Report on the implementation of articles 11, 13 and 15 of the Water Framework Directive (2000/06/EC) in Cyprus”
- Wolf A T, 1995 *Hydropolitics along the Jordan River: Scarce Water and its Impact on the Arab–Israeli Conflict* (UN University Press, Tokyo)
- Wolf A T, 1998, “Conflict and cooperation along international waterways” *Water Policy* **1** 251–265
- World Bank, Washington, DC
- 2009 *Assessment of Restrictions on Palestinian Water Sector Development*
- 2011a, “Cyprus data”
- 2011b, “2011 World Development Indicators”
- 2011c, “The climate change knowledge portal”, <http://sdwebx.worldbank.org/climateportal/>
- 2012 *Stagnation or Revival? Palestinian Economic Prospects*
- Zeitoun M, 2008 *Power and Water in the Middle East: The Hidden Politics of the Palestinian–Israeli Water Conflict* (I B Tauris, London)
- Zeitoun M, Messerschmid C, Attili S, 2009, “Asymmetric abstraction and allocation: the Israeli–Palestinian water pumping record” *Ground Water* **47** 146–160