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# Exploring the framings of water scarcity in Palestinian textbooks

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## ABSTRACT

Water scarcity in Palestine is a top national priority issue. Extensive research has analysed the causes of water scarcity in Palestine, focusing on negotiations, the occupation, climate change, environmental conditions, the role of international donors and funders, and mismanagement. Nevertheless, how these representations are reflected in Palestinian textbooks has not been investigated. However, textbooks are key because they reflect the governmental position and dominant discourses and forge future generations' understandings of water issues. This paper takes textbooks as a case study to analyse the dominant discourses of water scarcity in Palestine.



## KEYWORDS

Palestine; water scarcity; textbooks; discourse analysis; education

## Introduction

Extensive literature has examined water issues in Palestine focusing on negotiations, occupation, and hydrology among others (McCaffrey *et al.* 2017). The literature has also highlighted the intertwined relations between water issues, the occupation, and mismanagement (Zeitoun 2009). However, academia has overlooked how Palestinian textbooks have been communicating water scarcity. This is striking given that textbooks represent a powerful tool in framing younger and future generations' understanding of water issues. The education system and terminology used and taught to students are impactful; as Peteet (2005) highlights: education can 'structure and nuance the way we see, understand and imagine the world. As such, they are always more than simple reflections of reality, referencing a moral grammar that underwrites and reproduces power'. While education as a whole is influential, so are textbooks in framing the discussion and nuancing the way we 'see, understand and imagine the world'. The focus of this article rests with the latter: in analysing the way textbooks discuss water issues and, hence, how they impact the problem of water scarcity. In addition, textbooks are an insightful into the intentions and agenda of the Palestinian Authority (PA), given that they are issued by the PA.

As a generality, textbooks play a prominent role in the cultural formation of students and their awareness of various educational and cultural issues (Alayan 2012, Alayan *et al.* 2012). Schissler (1990) underlines that textbooks and educational material have a strong influence on students inside and outside the classroom as they convey actual knowledge, images of history, political and social representation, and values that society wants to pass on to new generations. In addition, textbooks are often the books that students encounter the most often, and thus influence their

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perceptions of the world and their cultural understanding (Ide *et al.* 2018, Ide 2020). Educational textbooks, according to Podeh (2000), have the power to transmit historical narratives or 'alter – or rewrite – the past in order to suit contemporary needs'. Mehlinger (1985) notes that textbooks are powerful as they 'are responsible for conveying to youth what adults believe they should know'. For example, the 1989 Taif peace agreement, which ended fifteen years of sectarian conflict in Lebanon, urged the revision of curricula 'in a manner that strengthens national belonging, fusion, spiritual and cultural openness, and that unifies textbooks on the subjects of history and national education' (art. III.F.5; cf. Kriener 2012). Textbooks are also powerful 'in their capacity to convey a uniform, approved, even official version of what youth should believe', something which is not completely unbiased (Mehlinger 1985). For instance, a study on Iraqi schooling under Ba'thist rule and after the regime's fall shows how the discussion of religion changed after the 2003 US invasion of Iraq, as well as the influence of international agencies in strengthening rather than erasing signs of sectarianism from the textbooks, which were changed again to include more references to the Shi'a tradition after 2004 (Rohde 2003).

Most research on textbooks in Palestine has focused on themes related to history, nation building, the Palestinian-Israeli conflict, and questions of democracy and peacebuilding (Brown 2001, Abu Zahira 2004). Such studies have overlooked the discursive role of textbooks and their role in constructing young people's awareness towards environmental issues, including water scarcity (Ide 2018). This paper thus makes an original contribution to critical education studies by exploring water scarcity framings in Palestinian textbooks – which have been overlooked by studies on water politics in Palestine – answering the question: *How is the issue of water scarcity represented in Palestinian textbooks?*

This article first provides a general background on the Palestinian education system and on the discourses of water scarcity in the literature. Second, it presents the methodology adopted for this research. Third, it analyses the data collected and the initial results. Fourth, it provides a discussion of the data and concluding remarks.

## General context

### *The Palestinian education system*

Historically, Palestinians have had little or no official control over their education system, which was dominated first by the Ottomans (with some schools run by Western missionary organisations with their own agenda), and then by the British under a League of Nations Mandate (cf. Tibawi 1956, Elboim-Dror 2000, Jabareen 2004, Brownson 2014). With the exception of a small number of Palestinian-run private schools, such as Khalil Sakakini's *Dusturiyya*, one of the few options available to Palestinians was to boycott aspects of the British curriculum which foregrounded British or Zionist priorities. After the establishment of the state of Israel in 1948, the West Bank adopted a Jordanian education curriculum, while Gazan schools adhered to the Egyptian system, leaving Palestinians with little control over educational materials in either space. This split education system continued until after the 1967 war, when both the West Bank and Gaza came under Israeli occupation. Palestinian schools in Gaza continued to be managed by the Egyptian side and in the West Bank by the Jordanian in addition to oversight by the United Nations Works and Relief Agency (UNWRA), which has been providing education facilities in Palestinian refugee camps. From 1967 until the 1993 Oslo Accords, the Israeli military took overall control over Palestinian education in the West Bank, Gaza, and Jerusalem, but maintained the Egyptian and Jordanian curriculum in Palestinian schools (Firer and Adwan 2004).

In 1990, prior to the establishment of the PA, the Palestine Liberation Organization (PLO) requested the assistance of the United Nations Education, Scientific and Cultural Organization (UNESCO) to develop education strategies to formulate a national Palestinian curriculum. Upon the establishment of the PA in 1993, they partnered with UNESCO to establish the Palestinian Curriculum Development Center (PCDC) in 1994. In 1995, the Palestinian Ministry of Education adopted the curriculum developed by the PCDC and UNESCO (Pingel 2003).

Following the 1993 Oslo Accords, a Palestinian Ministry of Education was established to address the need for education development in Palestine, including the development of educational materials for Palestinian students. The Palestinian Ministry of Education has released since 1999 two complete sets of textbooks per year. An entire national curriculum (grades 1–12) was available by 2006. The implementation of textbooks was phased over seven years to study the impact new textbooks had on students and teachers.

Susan Nicolai, in a study on education in Palestine, points out that:

The Palestinian education system has emerged through its formative years against a backdrop of on-going crisis, repeated emergency and intensifying restrictions on movement. When the Palestinian Ministry of Education and Higher Education (MoEHE) was established as a result of the Oslo Accords, Palestinians were in charge of their own education system for the first time in history. Since 1994, when the Palestinian Authority (PA) was formed, enrolment in all schools has risen from 650,000 children to over a million, an increase of more than 50% in a decade. During this time, the MoEHE has struggled to establish mechanisms for planning, budgeting and coordination while coping with student growth and the chronic crisis of occupation. (2006, p. 24)

The number of Palestinian students in primary education today is nearly 1.4 million (<https://english.wafa.ps/Pages/Details/130640>). The Palestinian educational system faces multiple difficulties and challenges in light of the historical context in which it was developed and in relation to the social and political realities faced by Palestinian students and educators (Suleiman and Abadi 2020). Nonetheless, education continues to be a symbol of resistance to injustice, resilience, and, most significantly, hope for Palestinian youngsters (Akersson 2015). The majority of youngsters believe that education is the ‘main means to improve their situation, both presently and in the future’ (Arafat 2003, p. 6). Furthermore, education has a vital value for Palestinians and it has assisted them in surviving despite the many challenges they face (Suleiman and Abadi 2020). Education and educational institutions profoundly influence many issues including identity and cultural cleavage (Hovsepian 2008, p. 18).

For several years following the development of the new Palestinian curriculum and its implementation in five phases from 2000 to 2006, it has been extensively researched. Much of the attention has centred on political issues discussed in the textbooks, particularly the curriculum’s coverage of Palestinian history, contemporary Palestine and the Israeli occupation (Brown 2001, Moughrabi 2001, Nordbruch 2003). Other topics include religion and gender (Al-Assali 2006, Assali 2013). Most literature focused on studying the textbooks on Civic Education (Assali 2013, Nordbuch, 2003), Palestinian Geography, and Religious Education (Reiss and Ihtiyar 2003). Water scarcity and other environmental issues were not covered in the studies that the authors of this paper surveyed. Therefore, this research paper aims to address this gap by analysing discourses of water scarcity in current Palestinian school textbooks.

### *Discourses of water scarcity in the literature*

The water politics literature on Palestine is extensive and covers many different aspects. An incomplete list of the main authors and works on the topic include: Lowi, who analysed the role of power in water allocation in the Israeli-Palestinian case (Lowi 1993); Zeitoun, who investigated the role of power, testing and developing understandings around hydro-hegemony and on how Israel achieved and maintains a position of hegemony on water issues (Zeitoun 2009); and Feitelson, who examined the implications of shifts in narratives and discourses in Israel, and the impacts and implications such a shift would have on transboundary water governance (Feitelson 2002). Alattout investigated the discursive constructions of water abundance, scarcity, and power (Alattout 2006). Abitbol examined the role of peace-building within water politics, analysing how peacebuilding could transform the current conflict on different scales (Abitbol 2014). Trottier has studied the Israeli-Palestinian water conflict, investigating the challenges within the PA, and the possibility for a sustainable water sharing agreement between Israelis and Palestinians (Trottier 2000). Selby has unfolded the role

of the complicit relations of the PA in maintaining the Israeli water occupation (Selby 2003, 2013). Messerschmid showed what the role of new discourses of scarcity and climate change is in maintaining the status quo (Messerschmid 2012), and Fischhendler and Katz analysed the impact of uncertainties in cooperation over transboundary water in the Israeli-Palestinian negotiations (Fischhendler and Katz 2013).

Research on water scarcity discourses across the world identifies two main types of discourses framing the issue: the first emphasises mismanagement and misgovernance; and the second emphasises natural issues such as low precipitation and climate change, naturalising in this way water scarcity. This emerges for instance in the work on Australia (Edwards 2013), India (Mehta 2005), and Jordan (Hussein 2018a). As pointed out by Fröhlich (2012), the case of Palestine adds to these two discourses also the dominant and hegemonic discourse of the Israeli occupation, bringing in this way a third (and dominant) discourse of a political nature to frame water scarcity in the case of Palestine. For the scope of this paper, we review the analysis of Fröhlich (2012) on the dominant discourses of water scarcity in Palestine, adding it to the general two discourses view mentioned above. Three discourses associated with water scarcity in Palestine emerged through our analysis of academic articles, governmental reports, and donors and international organisation reports on water issues in Palestine.

The first discourse – which is dominant and hegemonic – identifies in the Israeli occupation an important reason for Palestine's water scarcity (Fröhlich 2012). It underlines that Palestine's water scarcity is mainly a social and political construct that is man-made especially through Israel's domination of water resources, resulting in severe water inequality for Palestinians. When Israel occupied the West Bank, Gaza and Golan Heights in 1967, most of Palestine's water resources, including the Jordan River and groundwater aquifers, came under Israeli control, as discussed in Section 'Discourses of water scarcity in the literature' (Zahra and Ahmad 2001). Moreover, the PA relies almost exclusively on international donors for funds to deal with challenges in the water sector. The main donors in the water and sanitation sector in Palestine include the US, the EU, EU governments, and UN agencies. This dependency on international donors for funds means that donors' choices and priorities dominate, with very little effort, if any, exerted to address the main problem identified by this discourse: the Israeli occupation and its control over Palestinian land and resources (Amnesty International 2009). International donors have mostly borne the costs of emergency water projects, including repairing water infrastructure damaged or destroyed in Israeli military attacks, or providing emergency water and sanitation services to Palestinians who have been affected by such attacks and have no access to adequate water supplies (Amnesty International 2009).

The second discourse identified in the literature is that the PA has been affected by internal divisions compounded by weak and fragmented management structures, lack of expertise, and mismanagement including poor sanitation services and infrastructure especially for Palestinians living in rural areas, area C, and the overcrowded refugee camps. This mis-governance was in fact the reason behind the water reform process which was started in 2010 and enacted in 2014 (Global Water Partnership 2015). A water sector audit that was conducted in 2008 observed that 'policy and strategy formulation have been exceptionally poorly represented in the work of the PWA during the past decade' and 'it is little exaggeration to state that total chaos reigns in the water sector' (Amnesty International 2009). The audit report continued by stating that 'political/personal infighting has created a plethora of water service providers and utilities at many levels none of which is fully effective' (Amnesty International 2009). As noted by the Global Water Partnership, the key governance problems of the PWA, similarly to the issues faced by other water ministries in the region, are budgetary, regulatory, and stakeholder oriented (Global Water Partnership 2015). Concerning the budgetary situation, increasing operational efficiency would help to tackle the 'deteriorating or non-existent infrastructure, limited technical capacity and existing socio-economic context' (Global Water Partnership 2015). As for the regulatory framework, this needs to make governance structures clearer, avoiding overlaps of responsibilities; and reduce bureaucracy while

providing a clear legislative framework (Global Water Partnership 2015). Concerning stakeholder engagement, the PWA needs to promote dialogue with all stakeholders, as this would increase trust in the governmental institutions and private sector investment to develop water infrastructures in the country. Moreover, as noted by Trottier, the PWA should work on restoring springs (Trottier 2019):

Restoring springs is still possible. If achieved rapidly, it would not only restore damaged ecosystems, it will also restore some social stability. The common property regimes that used to manage springs that have been drying up in the last years are still well ingrained among the population that developed and used them. However, waiting for another 20 years would definitely mean that these sustainable forms of management will have been lost. (Trottier 2019)

For Al-Khatib *et al.*, this situation ‘applies to the ownership rights regarding natural springs which are not dealt with in the new Palestinian water law’, resulting in mismanagement of springs (Al-Khatib *et al.* 2017). ‘The coherence regarding the actors and the legal instruments is low, since there is an evident overlap of the roles and responsibilities of different actors as well as the provisions of different laws and regulations’ (Al-Khatib *et al.* 2017). As summarised by the Palestinian Water Sector Regulatory Council (WSRC), the challenges of mismanagement and mis-governance faced by the water sector include ‘insufficient water availability and consumer orientation, lack of transparency and accountability, underinvestment in maintenance and expansion of the infrastructure, and limited cooperation between key stakeholders’ (Water Sector Regulatory Council, Palestine 2018). These reasons inspired the 2009 and 2014 institutional reforms of the water sector, and their full implementation is key to overcome these challenges. However, as noted by Halasah, ‘there is varying and limited community capacity to build and fix new centralized water or wastewater infrastructure’ and therefore reforms to empower community capacity are needed (Halasah 2019).

The third discourse identified in many international reports, donor agency statements and some academic literature is that Palestine’s lack of water resources is a phenomenon caused by anthropogenic climate change and a result of the region’s climatic conditions. The latter include increased droughts and increased occurrence of extreme weather (Mason *et al.* 2012). Such impacts have extensive effects for Palestinians, for example because Palestinian agriculture is largely rainfed (Feitelson *et al.* 2012). These reports discuss the low rate of precipitation, emphasising that Palestine is located in what is characterised as semi-arid Mediterranean region with hot, dry summers and rainy winters (Tippmann and Baroni 2017). The combination of two challenges – occupation and climate change – yields an uncertain future for Palestinians (Mason *et al.* 2014). Palestine is both bio-physically and economically vulnerable to climate change, combined with a limited capacity to respond to the effects of climate change (Feitelson *et al.* 2012).

## Methodology

This section presents the methods deployed to collect the data needed to answer the research question. The data collection came mainly from document collection of the national curricula and textbooks for primary and secondary schools from grade one until grade twelve. All data was gathered in Arabic and translated into English by the authors. The analysis was determined by selecting the sections in the textbooks that mentioned the word ‘water’. Although all textbooks were examined, the textbooks in Table 1 are those that discuss water issues. Once all sections were identified, the authors analysed them and identified the following recurring themes: water as a natural resource; water scarcity and use; water pollution; agriculture and irrigation; drinking water and domestic use; and water and conflict. Each mention of water was therefore grouped with others discussing the same theme.

The textbooks listed were published between the years 2000 and 2019 and are those that mention the word ‘water’. The analysis of the textbooks also aimed at identifying what was mentioned and not mentioned about water issues in Palestine, how the issues were framed, and in what context. All images and illustrations used in the textbooks were analysed as they constitute

**Table 1.** Textbooks mentioning water issues.

Subject	Grade	Edition
National and Life Education	One to four	Ministry of Education 2016–2017
Social Studies	Five to eight	Ministry of Education 2017–2018
Palestine's Geography and modern history	Ten	Ministry of Education 2016–2017
Geography	Eleven and twelve	Ministry of Education 2016–2017
History	Eleven	Ministry of Education 2016–2017
Arabic language and Literature	One, four, six, and eight to eleven	Ministry of Education 2016–2017
Religious Education/ Islam	One, five, seven, and eight	Ministry of Education 2016–2017
Religious Education/ Christianity	One	Ministry of Education 2016–2017
Science and Life	Three, four, five, seven (and minor mentions in grade eight and nine)	Ministry of Education 2017–2018
English Language	One and ten (minor mention in grade six and eight)	Ministry of Education 2016–2017
Technology	Seven	Ministry of Education 2016–2017

part of the educational material and – especially for the early years of education – visual illustrations play a key role in students' education and learning. Nevertheless, all images with water in them were found to be on the same pages/sections in which the word 'water' is mentioned.

## Results

### *Representations of water scarcity in the textbooks*

The analysis of all Palestinian textbooks showed that water issues are mentioned only in the textbooks listed in Table 1. Table 2 summarises the presence of the three discourses mentioned above in the Palestinian textbooks. Analysing the textbooks, looking for how the issue of water scarcity is framed, it emerged that the following two discourses – among those identified in Section 'Discourses of water scarcity in the literature' – are emphasised: the Israeli occupation; and anthropogenic climate change and environmental conditions. The discourse that identifies Palestinian mismanagement as contributing to water scarcity did not particularly appear in the textbooks. Moreover, there are two themes of water that strongly emerge in the textbooks: (1) water scarcity contextualised as part of the Israeli occupation; (2) the importance of individual behaviour and water awareness. The first theme deals with water scarcity as a man-made water crisis, mainly caused by political decisions and actions. The second theme refers to the lack of water resources because of the region's climatic conditions or the overall lack of water resources without specific reference to the political aspects involved, and emphasises the need for individual behaviour change and raising awareness. In Table 2, the two themes are classified as 'first theme' and 'second theme', for ease of categorisation.

### *Water scarcity contextualised as part of the Israeli occupation*

The discourse that identifies in the occupation an important reason for Palestine's water scarcity emerges in the textbooks at least twenty-eight times, where several themes are discussed including water scarcity in relation to environment protection, agriculture, and economic development, among others. In addition to this quantitative measure, the mentions of the second theme tend to be short sentences or paragraphs, while those about the first theme are big blocks and sections,



**Table 2.** Discourses mentioned in the textbooks. First theme: water scarcity as part of the Israeli occupation. Second theme: the importance of individual behaviour and water awareness.

Subject	Grade	Discourse(s) mentioned
National and Life Education	One to four	First to third grade: second theme of individual behaviour and water awareness (ex. p. 62/74/ second grade) Fourth grade: first theme of occupation (p. 45/ 78); second theme (p. 78)
Social Studies	Five to eight	Second theme (grade 5, p. 24/II. p. 13/ grade 7 p. 7) First theme (grade 6/II. p. 36–37/ grade 9 p. 19) Both themes (grade 8, p. 41)
Palestine's Geography and modern history	Ten	Second theme (p. 15) First theme (II. p. 34/ 36/ 126) Both themes (II. p. 100)
Geography	Eleven and twelve	Second theme (grade 11 II. p. 103–104) Both themes (grade 12 p. 100)
History	Eleven	First theme (p. 74)
Arabic language and Literature	One, four, six, and eight to eleven	One: second theme (p. 30/35) Four: second theme (p. 83) Six: second theme (p. 50) Eight: both themes (p. 58) Nine: second theme (p. 59) first theme (p. 93) Eleven: second theme (p. 54) both themes but mostly first (pp. 72–75)
Religious Education/ Islam	One, five, seven, and eight	One: second theme (p. 54) Five: second theme (p. 78) Seven: second theme (p. 87) Eight: second theme (p. 77)
Religious Education/ Christianity	One	Second theme (p. 29)
Science and Life	Three, four, five, seven (and minor mentions in grade eight and nine)	Three: second theme (pp. 69–73) Four: second theme (II. p. 56) Five: both themes but mainly first (II. p. 57) Seven: first theme (II. p. 25) Eight: first theme (II. p. 14)
English Language	One and ten (minor mention in grade six and eight)	One: second theme (p. 48) Eight: second theme (II. p. 32) Ten: second theme (II. p. 90)
Technology	Seven	Second theme (p. 67/81) First theme (p. 88)

grouping different paragraphs and long sentences as well as ‘discussion’ sessions where students were invited to discuss such aspects in class (for instance the Israeli control measures over water resources). This theme spells out the different dimensions that the occupation contributes to water scarcity in Palestine. For instance, in the sixth grade Social Studies textbook, in a lesson about siege in times of conflict, a text under the title ‘We learnt’ reads:

The Zionist occupation imposes a strong blockade on the Palestinian people, represented by the establishment of military checkpoints, control over crossings and borders, isolating Palestinian cities from each other and isolating Palestine from the outside world. Also, the occupation cuts off water and electricity, gas and fuel supplies and controls Palestinian tax revenues. (6th grade, II, pp. 36–37)

In a discussion about chemical solutions, an issue relating to the first theme is conveyed in a graphic with a caption that says ‘water + salt = Palestine’, students are encouraged to consider the use of a water and salt solution during a hunger strike as a security prisoner.

Observe and think: Water and salt keep the Palestinian prisoners alive while conducting the empty-guts battle [hunger strike]. (Science and Life, Vol. 2, Grade 7, 2017, p. 34)

This aspect also appears in the National and Life Education textbook (2016/2017, Vol. 1, Grade 2: 77 and 81):



Third lesson: 'my homeland's water'. Discussion of water resources, underground water, Mediterranean Sea, the Dead Sea. Think and discuss: 'Mohammed, from the city of Hebron, needs a permit to visit the Mediterranean Sea'.

The occupation appears again linked to water in the National and Life Education textbook (2016/2017, volume 1 of grade 4, p.45):

Activity 3 on Bedouin communities

Bedouin communities in Palestine suffer from many problems, most importantly the destruction of their homes by the occupation, forcing them to leave their places of residence to confiscate their lands and establish roads and settlements on them, and destruction of their schools to forbid them from education. They also suffer from lack of services like electricity and water and roads, which makes them in need of support and assistance in order to strengthen their resilience on their land.

Moreover, the National and Life Education textbook also emphasises a similar message (2017/2018, Grade 4, Vol. 2, p.78):

Activity 4: I learnt: to protect our Palestinian environment and our land from the Zionist occupation by developing it and planting on it, by saving water and electricity, by building roads and supporting farmers and by participating in national events in order to protect the land from confiscation and from the settlement construction which is considered a violation of International Law.

In the Social Sciences textbooks, the occupation appears as one of the causes of water scarcity in Palestine (Social Sciences, 2017/2018, grade 5, Vol. 1: 13). This is explained most clearly in grade 6 (Social Sciences, 2017/2018, grade 6, Vol. 2: 36–37):

The Zionist occupation imposes a strong blockade on the Palestinian people, represented by the establishment of military checkpoints, control over crossings and borders, isolating Palestinian cities from each other and isolating Palestine from the outside world. Also, the occupation cuts off water and electricity, gas and fuel supplies and controls Palestinian tax revenues.

In grade 8 of the Social Sciences textbooks, the issue of good agricultural practices and occupation emerge again (Social Sciences, 2017/2018, grade 8, Vol. 1: 41):

agriculture suffers from a decrease because of the Zionist occupation seizure of land, the establishment of colonies, and of the annexation wall, and the construction of bypass roads which has reduced the per capita water share of the Palestinian individual as well as the area of agricultural lands, as well as the dumping on Palestinian markets of Zionist products, which led to depriving Palestinian products from competition in the market. These problems can be overcome using modern scientific methods, and the use of lands suitable for agriculture, the promotion of industries that serve the agricultural sector, and by boycotting the goods of the occupation in Palestine, and through the encouragement of citizens to consume national products.

On page 52 of the same textbook, the transboundary issue in relation to the occupation emerges:

The Zionist occupation strove to control the waters of the Jordan River basin, exploit it and divert it to the Negev desert and the southern coastal regions. The occupation has also dried up the lake of Hula in 1951. The tragedy intensified after 1967 upon the occupation of the Golan, the West Bank and Gaza. Zionist control expanded over water sources especially the lower parts of Jordan River as they destroyed water pumps and caused extensive damage on the Jordan valley, along the Jordan River. The issue became more complicated after the Zionist invasion of Southern Lebanon in 1978 as they tried to control water resources in Lebanon and the nourishing sources of the Jordan River basin.

The occupation in relation to transboundary waters is also mentioned in grade 9 vol. 1 of the social sciences textbook, while the geography textbook (grade 10, vol. 2: 33–38) discusses water and the occupation from a historical and economic perspective, presenting the impacts of the settlements and of the occupation on the economy of the country, as well as the impacts of the occupation on the agriculture of Palestine, including confiscation of land. Textbooks of the Arabic and literature courses in grade 11 (vol. 2: 72–75) discuss the impacts of the occupation on the health of Palestinians due to limited access to water resources.

### *Individual behaviour and water awareness*

The second theme that emerges in the textbooks is the arid conditions of the region as well as in Palestine specifically, and the need to change people's behaviour to increase resilience and cope with water scarcity. There is therefore a focus on reducing water demand and use, as well as raising awareness about the water situation embedded in the discourse on the environmental conditions of water scarcity.

For instance, the Social Studies textbook – 8th grade, volume I on (p. 52) – underlines that water scarcity is also affecting other countries in the region, which is generally characterised by low precipitation, being an arid and semi-arid region, and that the main causes are: droughts due to increased temperatures, increased rates of evaporation, a decrease in rainfalls, increase in population resulting in an increased water demand and consumption, water pollution, and the fact that most surface water in the region originates outside of the Arab World.

The solutions suggested to water scarcity, for instance in the Arabic language/literature textbook – 6th grade volume I (p. 50) – focus on water demand management: raising awareness about reducing demand for all segments of society; directing farmers to use modern irrigation methods for crops; performing regular maintenance of water networks to detect and repair any water leaks; and avoid wasting too much water when washing the car. The Social Studies textbook – grade 8th volume I (p. 50) – also points to the necessity of considering desalination and the reuse of treated wastewater as possible sources. These textbooks highlight the important role that individuals have, as changing their behaviour may contribute to reducing water scarcity in Palestine. To change students' behaviour, there is a focus on the use of engaging religious texts to motivate students to adopt environmentally friendly behaviours. In fact, religion itself has a significant influence on defining beliefs, values and practices that guide individual and social behaviour (Raju and Manasi 2017). It is also claimed that religion has a great potential to affect human environmental behaviour because it engages the religious and moral dimensions of humanity through both religious teachings and ritual practice (Moseley and Feldman 2003). Thus, some religious teachings may motivate certain behaviours and create a culture that promotes environmentally benign attitudes, and religious environmental ethics can foster pro-environmental behaviour (Raju and Manasi 2017). In religious teachings, water is portrayed as a sacred element for human life and sustainability (Raju and Manasi 2017). In the case of these Palestinian textbooks, religious references from both the Qur'an and the Hadith are used in the textbooks with the aim of shaping students' attitudes to water consumption. These texts encourage students to rationalise water consumption and to become aware of its importance for human life. Since water is a crucial input for all living beings (humans, animals or plants), people should consume it carefully and economically. It is people's moral responsibility, therefore, to look after water resources and conserve them.

This appears in grade 1 textbook of National and Life Education. Students are invited to choose between right and wrong behaviour to save water when washing their hands at home (vol. 1: 44) and when gardening (p. 56). Students are invited to be pro-active, and to go home to make a difference in saving water (p. 88): 'with the help of my family, I will collect pictures that show care about saving water, I will design signs and hang them around the school'. In grade 4 (vol. 2, 2017/2018) students are reminded that 'my environment is my responsibility'. Hadith and religious anecdotes are often used to convince students to change their behaviour. In the social studies textbook of grade 8 (vol. 1: 53), students are told that 'The Almighty said: 'We made out of water every living thing' (Qur'an 21:30); The Prophet PBUH said: 'Do not waste water even if you were at a running stream' (Reported by Al-Imam Ahmad and Ibn Majah)'. The Arabic language and literature textbook in grade 2 (vol. 1: 141) also provide the students with a song about cleanliness with two pictures, one of a boy in the shower and the other with a boy and a girl brushing their teeth, explaining the importance of saving water. In grade 6 of the same course, students are told about the necessity of saving water when washing cars.

## Discussion and conclusion

Palestine's natural resources are critical for current and future generations. The sustainability of these resources requires – in addition to political solutions – effective capacity-building and collaborative approaches that include public participation (Al-Sa'ed *et al.* 2009). Effective public participation can be possible through education, the empowerment of civil society, and mobilisation of citizens around the importance of water and sanitation (cf. Hussein 2018b; Al-Ajarma *et al.* 2020; Piccoli *et al.* 2016). Education is a powerful mechanism for promoting this process, as well as a driving force for social mobilisation and creating a young generation that is well informed, active in demanding their rights, and has the ability to engage in protecting the environment and actively saving its natural resources (cf. Al-Ajarma 2019, Vojno *et al.* 2022). Further, environmental education and training are important elements in safeguarding natural resources and raising awareness of the value and need for sustainable management of water and wastewater to protect and improve the quality of Palestine's water resources (cf. Gutierrez-Martin and Dahab 1998).

Research has highlighted the role young people can play and how they are contributing to water management in Palestine and the region (cf. Al-Ajarma 2019). Therefore, within the context of Palestine's current water challenges, young people with suitable education can make a difference by adopting innovative water solutions and raising awareness about climate change, water management, and nature-based solutions for water issues (Al-Ajarma *et al.* 2020). According to the Palestinian Ministry of Education, about 1,385,000 students are enrolled in the schools of the West Bank, the Gaza Strip, and East Jerusalem in 2022 (Wafa 2022). At the start of each academic year, every student is given a set of textbooks, one for each subject: Arabic, English, Science, Maths, History, Islamic Education, Citizenship Education, etc. (Al-Ramahi and Davies 2002). In this paper, the authors investigated how water scarcity is discussed in these textbooks and in what contexts.

By investigating water scarcity framings in Palestinian textbooks, this paper found that there is a call for raising awareness and change students and people's behaviour on water issues. Interestingly, Palestinian textbooks also use religious teachings to advocate for the moral responsibility students have in regard to water issues and, hence, the need to change their behaviour.

Nonetheless, the academic discourses on water scarcity focus on the Israeli occupation; mismanagement and mis-governance by the PA and PWA; and anthropogenic climate change and environmental conditions. The paper found, as shown in Section 4, that the textbooks represent and discuss water scarcity by focusing on two themes: water scarcity contextualised as part of the Israeli occupation, i.e., the first discourse; and the need for individual behaviour change and awareness raising, contextualised within the third discourse.

This finding shows that the Palestinian textbooks' representation of the causes of water scarcity is in line with the broader and dominant Palestinian discourse that sees the Israeli occupation as responsible – both directly and indirectly – for environmental and water problems. Building on Ide's argument, this study confirms that

while there is certainly truth to this narrative, it also masks intra-Palestinian causes for environmental degradation, such as a lack of coordinated water governance and inadequate waste disposal systems, and hence contributes to the legitimisation of Palestinian political and economic elites. (Ide 2018)

This is also confirmed by the overall lack of mention in textbooks of the cause of water scarcity that sees mismanagement and mis-governance within the PA and the PWA as one of the reasons for the country's water scarcity.

When examining how the issue of water scarcity is framed in Palestinian textbooks, it emerges that only the first and third discourses are mentioned, while the second – mismanagement and mis-governance of the PA and PWA – is overlooked. There is only one mention of the role of the PA and PWA in the water sector: in the textbook for Social Studies 8th grade on page 53, in a lesson on conserving water and achieving water security, there is one article from the PA law, which simply explains the role of the PWA:

Article (2) of the Palestinian Water Authority Law of 2014 states that it aims to develop Sources of water, its management, increasing its energy, improving its quality, preserving it, and protecting it from pollution and attrition.

In these textbooks, Israel is framed as the main factor responsible for water shortages and environmental degradation in Palestine. This is not surprising given that the occupation is constraining and limiting access to and the use of water for the Palestinians. While one should not deny Israel's role in creating extensive problems and challenges regarding water security for Palestinians, it is also necessary to consider how the water resources accessed and managed by the Palestinians are being used. A careful study of the current water situation in Palestine shows that the responsibility for water conditions – in addition to the occupation – is also related to poor management, funder control, and mis-governance. However, poor management is linked to funder control which, in turn, is linked to Israeli control. This leaves those trying to understand water governance in Palestine in a vicious circle which seems to be avoided in the textbooks. In a way, textbooks reproduce the power dynamics of the existing governance structures in the country. Moreover, in these textbooks, responsibility for solving water scarcity is externalised either to the political dimension – linked to the first discourse and first theme – or to individual Palestinians – linked to the second theme and third discourse. In studying the textbooks, the role and impact of religion (specifically Islam teachings) emerges in relation to the second theme of the discussion surrounding water issues. From a religious perspective, water is a sacred resource and, thus, people have a moral responsibility to preserve it. Hence, textbooks have utilised religious texts and teachings to argue in favour of altering students' behaviour to become more environmentally friendly and to emphasise the responsibility of individual Palestinians, rather than political institutions.

## Disclosure statement

The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the views or positions of any entities they represent or are affiliated with.

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