The Segregation Wall impacts on Palestinian Environment

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1. Background

The Palestinian environment has been a victim of Israel's occupation policies and practices. These practices of occupation and control has systematically impeded the development and conservation of Palestinian natural resources.

The fragmentation of the Palestinian landscape has had a significant environmental impact. Overall, 61% of total land area in the West Bank is controlled by Israel. The land is used for settlements' expansion, for military purposes, for checkpoints or road closures, and for the establishment of the western segregation zone and the West Bank Segregation Wall[1] (ARIJ-UM, 2011)[2]. The expropriation of Palestinian land has created geographical discontinuity and resulted in a major physical impediment towards achieving sound and sustainable development in Palestine.

In 2002, following the outbreak of the second intifada, Israeli Prime Minister Ehud Barak approved the first project to build a "security barrier" (referred to here as the Segregation Wall). Since then, the Israeli government started its policy of unilateral segregation by establishing a Segregation Zone along the western parts of the Occupied West Bank.

The Israeli Segregation Zone covers land areas rich with natural resources including groundwater resources, forests, grasslands, and productive agricultural lands. It further isolated Palestinian communities in enclaves, undermining the territorial contiguity between the Palestinian villages and cities, controlling the natural resources and encapsulating most of the Israeli settlements.

At this time, an explanation of the nature of the "Segregation Wall" should be made. The wall includes two types of structures used by the Israeli Army to complete their territorial separation of Palestinian land; it is either made of concrete partitions 8-12 m in height or is made of wired fence. In either case, the term Segregation is used herein. The choice of structure is determined by the nature of the area the wall separates. For example, in areas where the Segregation Wall cuts through vast agriculture lands, it is a fence. The fence is in fact more devastating as it takes an area of a 40-100 m in width to complete, as it consists of double layered fences reinforced with barbed wire, trenches, military roads and footprint detection tracks, as well as 4-5 m high electrified metal fences with security surveillance cameras. In the other case, in areas with sizeable population and/or in-close proximity with the 1949 Armistice Line (the Green Line), the Segregation Wall consists of 8-12 m high concrete partitions with military watchtowers lined-up 250 m apart.

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[1] 61% of total West Bank area is comprised of: 1. Area "C" forms 1346 km^2 (23.7% of West Bank area) - falls under Israeli Control between western West Bank segregation wall and eastern Segregation Zone. 2. Areas of western Segregation Zone and eastern Segregation Zone forms 2110 km^2 (37.3% of West Bank area).

[2] ARIJ (Applied Research Institute-Jerusalem) – Barrier Monitoring Unit (BMU) of UNRWA, 2011. The environmental impacts of the West Bank Barrier and its effects on Palestinian livelihoods.

The construction of the Wall started in June 2002 West of Jenin. The wall is still under construction, and when completed, its length will be approximately 773 km. Up to date, 58.5% (or 452 km) of the wall was constructed, 8% (or 62 km) is under construction and 33.5% (259 km) is in planning phase (ARIJ database, 2015). The Wall is composed of vehicle-barrier trenches, exclusion zones, electric fences and thick concrete slabs stretching 8 meters high (Photo 1).

Photo 1: The Segregation Wall

The wall cuts through nine of the West Bank's 11 governorates and isolates 12.7% of West Bank territory, including East Jerusalem. The wall isolates and fragments the farms, forests, grasslands and water resources. Construction of the Wall has created Seam Zones that lie between the segregation wall and east of the Green Line. The Segregation Wall has 68 gates under Israeli control and are used to restrict the movement of goods and people between the seam zone and the rest of the West Bank. Movement is controlled by the permits regime, where access and movement of Palestinians in and out of these zones is regulated and requires specific permission from the Israeli Military. While some gates open on daily basis, most are closed and open during certain periods of the year. The majority of these are gates only open during the olive harvest season and only for a limited number of hours per day.

173 Palestinian communities with a total affected population of 693 thousand are directly affected by the construction of the segregation wall and its associated gate and permit system. When completed, there will be 42 communities with a population of 313 thousand totally isolated between the wall and the green line (Map 1).

2. The Impacts on Water Resources

Since the beginning of the occupation, Israeli authorities have imposed several physical restrictions on Palestinian movement and access to their water resources including the construction of the Segregation Wall, checkpoints, and roadblocks and closed military areas as well as the illegal settlements. These restrictions imposed on the access to water resources and structures have introduced real obstacles and challenges for the management and development of Palestinian water resources, biological diversity, and agricultural landscapes.

It is safe to assume that one of the objectives that framed the design of the segregation wall location was to increase Israel's control of Palestinian water resources and hydrological recharge areas (CoHRE, 2008)[3]. According to ARIJ database, by the time the wall is completed, 28 Palestinian ground water wells and 27 water springs will be isolated in the Western Segregation Zone. The total extraction rate from these isolated wells reached 22 million m^3/year in 2011 (Map 2) which constituted more than 34% of Palestinians' share in the Western Aquifer as stated within the Oslo interim agreement (PWA, 2014)[4]. This will result in preventing the Palestinian from utilizing and developing their water resources which will further aggravate an already dire water situation in the West Bank. Palestinian per capita water use was 79 liters per day in 2013 which is 80% of the minimum amount recommended by the World Health Organizations. Losing additional water resources due to the segregation wall will further reduce water availability with potential adverse effects on the health and wellbeing of the Palestinian population.

The Segregation Wall construction has isolated wells, springs and cisterns, and damaged or destroyed water infrastructure, especially irrigation networks (Photo 2). Of the 173 directly affected communities[5], 60 per cent reported that the Wall construction has impacted their domestic and/or agricultural water resources.

The construction of the Segregation Wall has damaged, destroyed or rendered inaccessible vital sources of water, such as wells, springs and cisterns. Once damaged or destroyed, these water sources were not repaired or replaced due to Israeli restrictions. The affected Communities reported that they were not able to restore or rehabilitate wells, water tanks and irrigation networks located behind the Segregation Wall. An approval from the Israeli Civil Administration (ICA) is needed in order to carry out any maintenance activity and/or bring construction materials, including for example new pipes to the lands behind the Segregation Wall. As a result, large water quantities are lost due to leakages in water tanks and pipes which are left unrepaired. This is reducing water use efficiency and thus availability for irrigation while simultaneously increasing the water cost for irrigation since

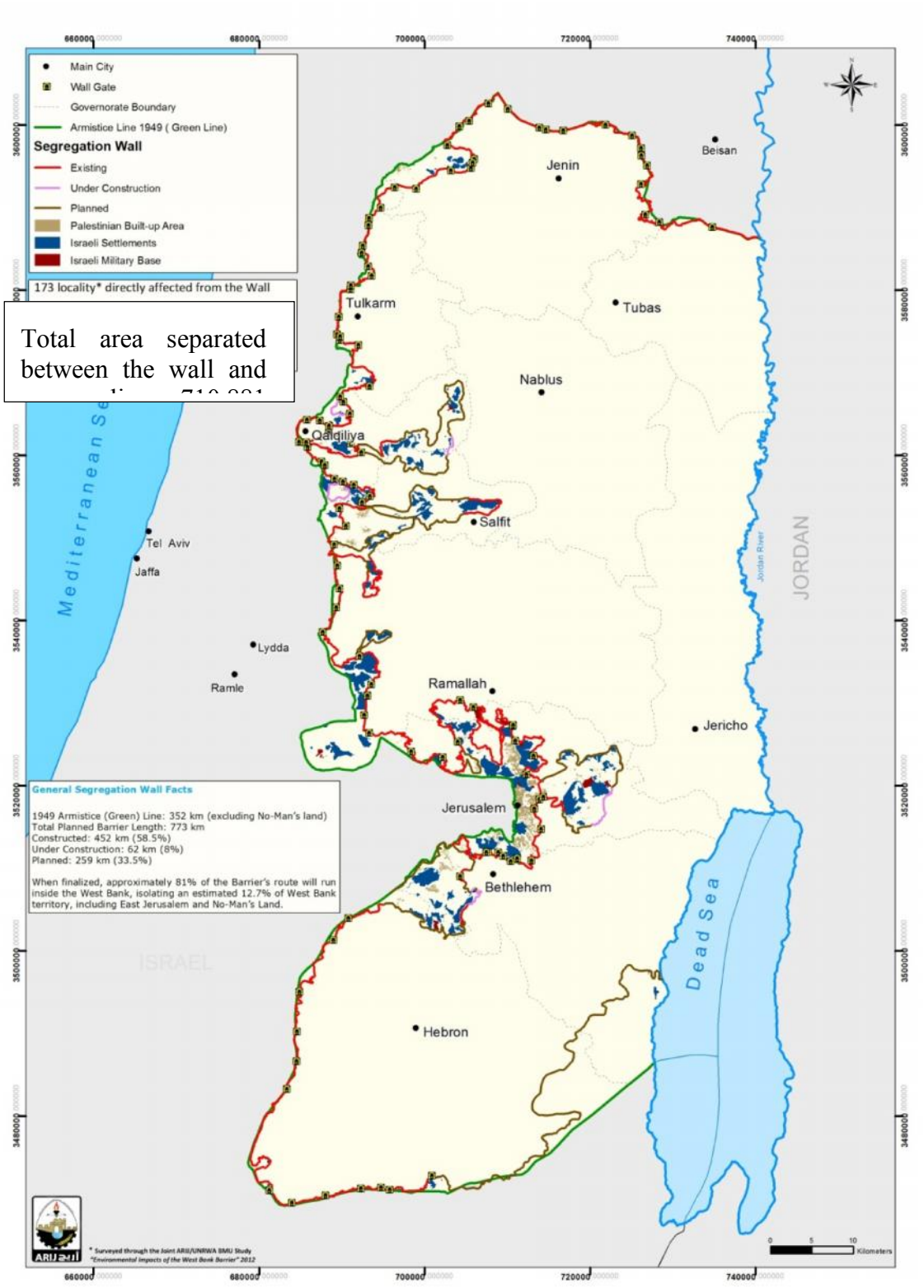
3 Centre on Housing Rights and Evictions (CoHRE), 2008. Policies of denial: Lack of access to water in the West Bank. Geneva, Switzerland

4 Palestinian Water Authority, 2014. Water Information System. Ramallah -Palestine.

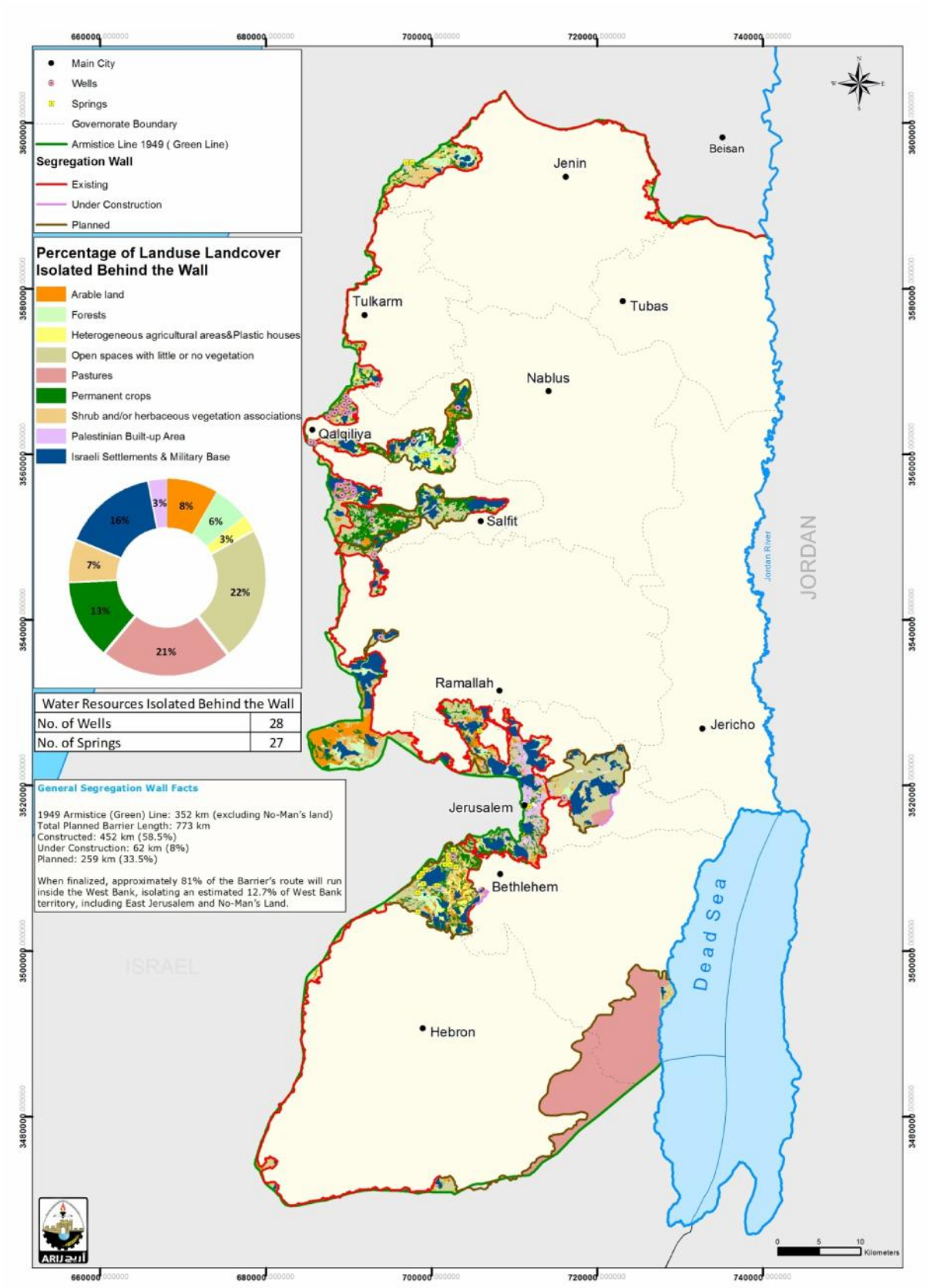
5 According to criteria applied by UNRWA's BMU and other organizations. The directly impacted communities list includes communities whose lands have been isolated by the Wall and communities located between the Wall and the Green Line, excluding most communities within the Israeli unilaterally-declared extended Jerusalem Municipal Area.

cost to farmers factors in the time required to abstract the water and the quantity of water extracted from source irrespective of how inefficient the water abstraction process is and irrespective of how much water was lost in the network (i.e. farmers pay for water lost in networks due to leakages). For example, old wells that run on diesel generators are 40-50 per cent more expensive than modern pumps that run on electricity. Getting approval from the ICA for installing electricity behind the Segregation Wall is a cumbersome and costly process which many communities are unable to afford. The high costs for water combined with the prevailing access restrictions place a high burden on farmers to continue cultivating their lands behind the Segregation Wall.

Photo 2: Demolished water well



Map 1: Affected Localities by the Segregation Wall



Map 2: Isolated Wells and Springs and Land Use/ Land Cover behind the Segregation Wall

Cisterns were either destroyed during Segregation Wall construction or due to their close proximity to the Wall. Other wells became inaccessible to livestock. About 30% of the affected communities reported that the Segregation Wall construction has impacted cisterns previously used for watering livestock and/or for irrigation of crops and trees. Only 18 of the 173 directly-affected communities have been granted livestock access through the Segregation Wall gates. Farmers who only have seasonal access to their lands isolated within the segregation zone are no longer able to make use of the water resources during the rest of the year. Some communities reported purchases of more tankered water due to the isolation of water sources they previously used, like the community of Ar Ramadin (pop. 4198) in Hebron Governorate. Tankered water is prohibitively expensive. The price of 1 m^3 can exceed 25 NIS.

Out of the 102 communities reporting impacts on their water sources, 10 say that irrigation networks were affected, cut or destroyed by the Segregation Wall construction. While some farmers were able to repair the network, others were forced to create a new network or give up on irrigating their lands altogether.

The Governorates of Tulkarm and Qalqilya with their vast agricultural lands and numerous wells were the most affected by the Segregation Wall. Around 50 artesian wells with a total extraction potential of 6.5 million m^3/year were either isolated behind the Segregation Wall or located in the so-called "Segregation Wall buffer zone". Most affected are the areas directly adjacent to the Segregation Wall to which Palestinians have only limited or, in some areas, no access at all[6]. For example, in Deir Al Ghusun village with a total population of 9,497 in Tulkarm Governorate, seven cisterns were destroyed during Segregation Wall construction. Furthermore, an additional 30 cisterns and one agricultural well were isolated in the "Seam Zone", leaving farmers with limited access to water.

In Qalqiliya Governorate, 19 agricultural wells which make up 34 per cent of the total water quantity available for extraction in the Governorate were isolated by the Segregation Wall. In the past ten years, since the Segregation Wall was constructed, the irrigated area has declined from 12,000 to 7,000-8,000 dunums, adversely affecting incomes and food security in many rural communities[7].

Box 1

The community of Jalbun (pop. 2,899) in Jenin Governorate had ten cisterns isolated now by the Segregation Wall. Before the construction of the Segregation Wall, farmers used the rainwater collected in the cisterns to water their livestock and irrigate their trees. Access through the agricultural gate with livestock is not permitted and farmers therefore need to find other water sources for their animals.

[6] Interview with Palestinian Water Authority (PWA) representative, 2015

[7] Interview with Ministry of Agriculture Qalqilya Area Office representative, January 2013

The Segregation Wall obstructs the flow of surface water in many areas. Water trapped by the Wall often causes flooding and the degradation of adjacent agricultural lands. For instance, in Beit Hanina Al Balad, Jerusalem governorate, with total population of 1,230 flooding reached several meters high in 2012. Drainage pipes built under the Segregation Wall often become blocked by debris. However, Palestinians are not permitted to approach the Segregation Wall to clear the blockages which has led to severe flooding in some areas. The same situation occurred in Qalqiliya city which witnessed heavy flooding in 2005 and 2009 due to blocked drainage channels under the Segregation Wall (ARIJ-UM, 2011)[8].

3. Impacts on Agriculture and Land use

The intrusive route of the Segregation Wall through the West Bank governorates isolated and fragments the farms, forests, and grasslands. Around 710,881 dunums will be Isolated behind the Wall and almost 15% of the West Bank agricultural land will be lost once the construction of the segregation wall is complete. Land use and land cover analysis data showed that the isolated Palestinian lands are mainly arable. The area of isolated arable land is around 58,202 dunums. The isolated lands meant losses of 8% of arable land in the West Bank, 13% of permanent crops, 6% of forests, 22% of open space and 21% of pastures. In addition, the Palestinian Build up area trapped with the segregation zone is around 21,391 dunums which represent 3% of the total built-up area (Table 1).

Table 1: Land Use Land Cover behind the Wall, 2014

Land use Land cover Type	% Isolated from the Total Area
Arable land	8
Forests	6
Heterogeneous agricultural areas	3
Open spaces with little or no vegetation	22
Pastures	21
Permanent crops	13
Shrub and/or herbaceous vegetation associations	7
Israeli Settlements and Military Base	16
Palestinian Built-up Area	3

Source: ARIJ Database, 2015

The Segregation Wall's associated gate and permit regime restricts Palestinian access to land, which has resulted in a decline in agricultural production and changes in farming practices. To date, thousands of productive trees have been uprooted for the construction of

[8] ARIJ (Applied Research Institute-Jerusalem) – Barrier Monitoring Unit (BMU) of UNRWA, 2011. The environmental impacts of the West Bank Barrier and its effects on Palestinian livelihoods.

the Segregation Wall. In Qalqiliya city alone, about 12,000 olive, almond, and fruit trees were uprooted with detrimental impacts on farmers' incomes (ARIJ-UM, 2011)[9].

In Marda village in Salfit Governorate, at least 1,000 dunums of agricultural and other potentially arable lands are expected to be confiscated or separated behind the Wall. In addition, about 1,000 long-lived olive trees which are considered the primary source of subsistence of the resource-poor farmers in the region have been either destroyed or uprooted. An additional 800 olive trees will also be separated behind the Wall (Photo 3). The same situation occurred in Zububa village in Jenin governorate, where more than 1,700 dunums of agricultural lands were confiscated and/or separated behind the Wall and around 1,500 olive and almond trees were uprooted. In Tayba village in Jenin governorate, 4,000 olive trees and 1,000 almond trees were uprooted (ARIJ database, 2015).

Photo 3: Uprooting of Olive trees to build the Segregation Wall

Two-thirds of the 68 agricultural gates (Map 1) that control Palestinian access to land across the Segregation Wall are open for just one or two months per year during the annual olive harvest (Photo 4). Farmers are often not permitted to regularly access and maintain their

[9] ARIJ (Applied Research Institute-Jerusalem) – Barrier Monitoring Unit (BMU) of UNRWA, 2011. The environmental impacts of the West Bank Barrier and its effects on Palestinian livelihoods.

trees outside the harvest season. Impacted farmers report a 50 to 60 per cent decline in the yield of their annual harvest (ARIJ-UM, 2011)[10].

Photo 4: Agriculture Gate in Imnezil village in Hebron Governorate

The Segregation Wall's associated gate and permit regime prevents farmers from irrigating their lands during the most suitable times of the day – i.e. during the early morning hours or in evenings. The regime also limits the quantities of water that can be extracted from the wells. Farmers have had to adapt their agricultural practices accordingly.

Moreover, in many cases, farmers are not allowed to bring tractors, ploughs or fertiliser through the gates, and irrigation is limited and cumbersome. As a result, many farmers have resorted to replacing their citrus and other fruit trees with olive trees that require less maintenance but also generate less income. Farmers who previously cultivated crops have been compelled to leave their lands barren, losing a valuable source of income thus increasing their dependency on aid. Loss of access to land due to the Segregation Wall has further resulted in the overexploitation of remaining community lands.

[10] ARIJ (Applied Research Institute-Jerusalem) – Barrier Monitoring Unit (BMU) of UNRWA, 2011. The environmental impacts of the West Bank Barrier and its effects on Palestinian livelihoods.

Box 2

In Bir Onah neighborhood which is part of Beit Jala city where the wall is still under construction, the Israeli heavy equipment is leveling lands and uprooting old Roman Olive trees. The Wall will extend a length of 1.2 km on lands of Bir Onah neighborhood and will pass less than 100 meters from the Palestinians houses in the neighborhood. Additionally, the wall will isolate more than 3,100 dunums of agricultural lands owned by tens of Palestinian families in the city of Beit Jala; thus depriving them their right to access the Cremisan Monasteries, the school and the only open space left for Beit Jala city.

For the vast majority of communities, land for grazing within the "Seam Zone" has become inaccessible for shepherds and their animals. With limited pastures remaining, and unable to bear the high costs of commercial fodder, these communities reported a loss of up to 60 per cent of their livestock (ARIJ-UM, 2011)[11] (Photo 5). This placed a heavy burden on households where meat and dairy products were previously used for domestic consumption and generated vital sources of income.

Photo 5: Fragmentation of agro-ecosystems in Bethlehem city, isolating residential houses from their agricultural lands and preventing sheep from grazing in lands located behind the Segregation Wall

[11] ARIJ (Applied Research Institute-Jerusalem) – Barrier Monitoring Unit (BMU) of UNRWA, 2011. The environmental impacts of the West Bank Barrier and its effects on Palestinian livelihoods.

The Segregation Wall construction frequently results in land degradation, fragmentation of ecosystems, erosion and compaction of soil, arbitrary disposal of waste, and accumulation of dust on agricultural lands and trees. This impacts land productivity and severely diminishes the agricultural production and income of Palestinian farmers.

4. Impacts on Waste Management

The construction of the West Bank Segregation Wall and its physical structures negatively impacted the management of waste disposal for Palestinian communities located along its route. Over 20 per cent of the affected communities reported that the Wall either affected their solid waste or their wastewater disposal system[12]. Limited access to sanitary waste disposal services exposes the affected Palestinian population to health risks and places a greater financial burden on them.

Furthermore, building and administrative restrictions imposed by the Israeli authorities on the development and implementation of waste management infrastructure projects in Area C, impedes the establishment of new solid and sewage waste facilities that can help alleviate waste disposal crises.

Waste disposal sites behind or close to the Segregation Wall were rendered inaccessible. Affected communities must now either transport their waste to distant sites at extra cost, or burn the waste within or in proximity to their residential areas, releasing toxic emissions into the air and leachate into soil and groundwater (Photo 6). Moreover, due to increased transportation costs, most villages have little choice but to burn their garbage within the community. Other villages have incurred additional costs from buying or renting alternate land for waste disposal.

Photo 6: Accumulation of Solid waste in the affected communities

[12] Results are based on data from 144 Wall affected communities. 'Seam Zone' communities and Bedouin communities in the Jerusalem area were excluded as they are treated as separate categories.

The physical structure of the Segregation Wall and its associated access regime, impacted sewage waste disposal management. In the West Bank, only 38.4 per cent of the households are connected to public sewage networks (PCBS, 2015). Especially rural areas rely on cesspits or septic tanks for wastewater disposal thus requiring periodic services by vacuum tankers. Most wastewater collected by vacuum tankers is discharged directly into open areas without treatment. Numerous Segregation Wall affected communities reported that prior to Segregation Wall construction, sewage was discharged far away from the community in areas now located close to or behind the Segregation Wall, which are now inaccessible for wastewater disposal. Therefore, many affected communities discharge their sewage close to the built-up areas and onto lands surrounding village thus polluting trees and crops and posing a health risk to residents.

The Segregation Wall's construction also affected sewage and water drainage networks. Drainage channels built under the Segregation Wall can become blocked by debris or during winter times when heavy rains occur (Photo 7). However, Palestinians are not permitted to approach the Segregation Wall to clear blockages due to security restrictions imposed by Israel, leading to sewage waste overflow onto adjacent lands such as in Qalqiliya and Ar Ram and Dahiyat al Bareed localities, which cause soil contamination and increases health risks with water-borne diseases.

Photo 7: Blocked drainage causing water and wastewater flooding of residential areas and agricultural lands

In some areas, sewage networks are located behind the Wall, out of reach of Palestinian village councils and municipalities. 'Anata, Beit Hanina El Balad and Kafr 'Aqab are some of the communities where the destruction of sewage pipes resulted in sewage overflow onto lands near the Wall.

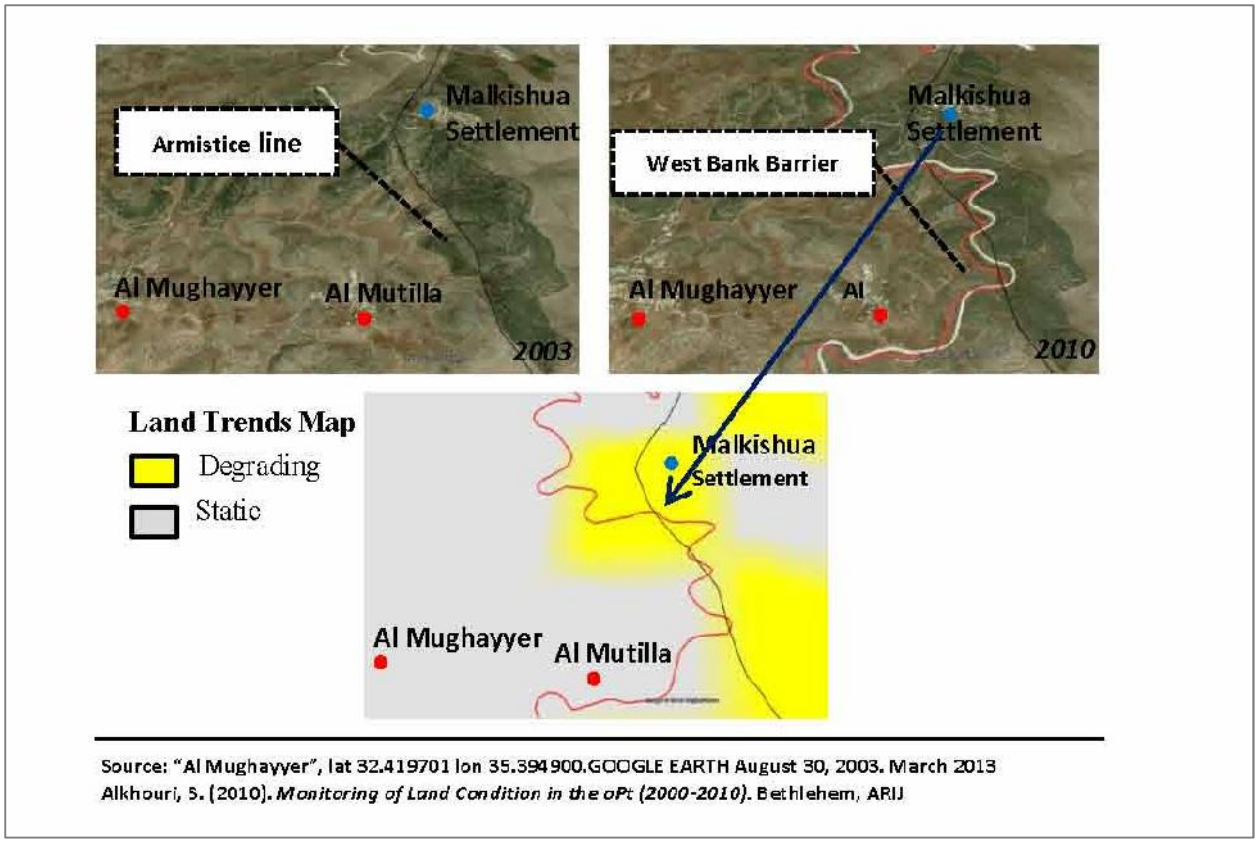
5. Natural heritage sites isolated behind the Wall

Habitat fragmentation as a result of the Wall acts as a physical barrier that may prevent many species of animals to travel to their sources of food and mate. This may endanger the survival of specific species. Such an action will increase the probability of Palestinian natural heritage loss by endangering a number of plant and animal species. More than 82 km^2 of protected areas and up to 39.7 km^2 of forested area are included in the Wall zone. Since conservation management of parks and forests are prohibited in the wall zone, unsustainable actions might have a detrimental impact on the ecosystem functions of natural reserves, in particular the conservation of animal and plant species and soil conservation.

Of particular note is Umm Al-Rihan Forest located in the northwest of Jenin Governorate in proximity to the Green Line within the semi-coastal region. It covers an area of approximately 3,600 dunums and is on the UNESCO's tentative list of natural heritage sites. It is a dense natural forest with oak and mastic trees. It is rich in biodiversity and hosts many endemic flora and fauna. It is also located within an important migratory route for threatened avian species crossing from the coastal region to the depression areas. With the Wall construction, the forest became completely isolated by the Wall, thus making it inaccessible for Palestinians. It is therefore not possible to carry out conservation, management, and sustainable development actions in Umm Al-Rihan forest thus depriving Palestinians of the environmental services of this unique natural landscape. This resulted in social, economic and environmental losses to the Palestinian population at large. In addition, the Wall imposed changes to the landscape and isolated the forest from it surrounding landscapes, thus creating an ecological barrier which restricts wildlife movements, such as wolves and red foxes[13].

Al-Mughayyir Forest is located in the northern West Bank within the eastern slopes region. The forest covers an area of approximately 3,400 dunums. The construction of the Wall fragmented the forest into two isolated landscapes. The land separated behind the Wall has a size of approximately 744 dunums; 22% of the total green area behind the Wall. The tree cover along the path of the wall has been reduced. It is estimated that 45% of the forest has been degraded. Such pressure on the forest's integrity and stability of natural processes leads to habitat loss and hence loss of an important component of the Palestinian natural heritage.

[13] MOTA. (2009). Inventory of Cultural and Natural Heritage Sites of Potential Outstanding Universal Value in Palestine. (H. Taha, Ed.) Ramallah, Palestine



Map 3: Al-Mughayyir Forest fragmentation and tree cover loss due to the construction of the segregation wall.

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