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Effects of the Israeli Segregation Wall on biodiversity and environmental sustainable development in the West Bank, Palestine

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This study assesses the effects of the Israeli Segregation Wall on biodiversity and environmental sustainable development in the West Bank, Palestine. Land confiscation, damage to species and soil erosion, together with loss of water resources have all impacted on the Palestinians and deepened their poverty. The paper shows a grim prospect.

Keywords: Israel Segregation Wall; Biodiversity; Environment; Palestine

1. Introduction

Since ‘Al-Nakba’ (1948) the Palestinian land and people have experienced many dramatic changes and problems, which have affected all elements of life in Palestine. The initial flight from homes and land in 1948 was followed by Israel’s occupation (1967 to date) of the Gaza Strip and the West Bank. Political instability and two uprisings (intifada) have resulted.

These events have affected not only the people but also the environment, which has deteriorated. Land confiscation procedures by the Israeli occupation, the building of illegal settlements, building of bypass roads, and closure of roads and large areas of the West Bank for security reasons are the main reasons for this deterioration. Furthermore, in the Occupied Territories, the movement restrictions have prevented the Palestinians from accessing their agricultural lands and cultivating them. This has led to degradation of land and reduction in crop diversity. The years of conflict have presented huge challenges to the Palestinian efforts for sustaining and conserving their environment. Many projects have been impeded by political difficulties.

Palestine has rich biodiversity because of its geophysical characteristics and climate [1]. Its flora consist of over than 2780 flowering plant species, 116 species of mammals, 511 species of birds, and 110 species of reptiles and amphibians in addition to more than

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30000 species of invertebrates [1,2]. This rich biological diversity in the Palestinian ecosystems is being reduced and degraded due to many problems [3].

Koziell and McNiell [4] have amply explained the importance of biodiversity. They emphasize that biodiversity contributes to poverty reduction in five areas: Food security, health improvement, income generation, reduced vulnerability and ecosystem services.

In Palestine the natural ecosystems provide support for human activities in agriculture, animal husbandry, forestry, traditional and pharmaceutical health products and many others [5]. In addition, the “National Biodiversity Strategy and Action Plan for Palestine” (BSAPP) stresses that biodiversity is a prerequisite for sustainable social and economic development.

A new threat facing the Palestinians and their environment is the decision of Israel to build a Segregation Wall around and within the West Bank (Figure 1). According to the International Court of Justice [7], the Wall is illegal, therefore it must be demolished and the affected Palestinians must be compensated for the loss of their lands and properties. Ninety percent of the Wall takes the form of an electrified barbed fence surrounded by an on average of 60 metre wide exclusion area (Figure 2a). The remaining part is composed of an 8 metre tall concrete wall (Figure 2b) [10,11]. The Wall is expected to affect the lives of 411,000 Palestinians living in 81 communities [12].

The Wall zone cuts through the western part of the West Bank and runs north to south grabbing the most fertile agricultural land and natural reserves and isolating different Palestinian communities [10]. The total length of the Wall route will be 721 km (Figure 1). The length of the Wall on the Green Line (1967 borders between Israel and the West Bank) will be 140 km (20%) and the length of the Wall in the West Bank land will be 581 km (80%) [10].

The Wall will certainly have environmental as well as socio-economic consequences. Thus, our inquiry aimed at evaluating the impacts of the Israeli Segregation Wall on the Palestinian environment with emphasis on biodiversity and its importance for sustainable development in Palestine.

2. Methodology

This study was based on collection of information and data from interviews and a questionnaire.

2.1. Interviews

The first part of this study was based on five different independent interviews. The interviews were conducted with five distinguished experts in the fields of the environment and biodiversity. These experts work with different local environmental NGOs and governmental institutions. They represented the Applied Research Institute – Jerusalem (ARIJ), the Palestinian Agricultural Relief Committees (PARC) in Ramallah, the Environment Quality Authority (EQA) a Governmental Body in Ramallah, and the Wildlife Society in Beit Sahour. The interviews aimed at getting full professional information from the experts in this field on the real impacts of the Segregation Wall on biodiversity and the future solutions to contain this problem as well as the importance of the biodiversity to human life and sustainable development in the Palestinian Territories. The interviews were conducted at each organization’s workplace. A set of fourteen questions were designed in three

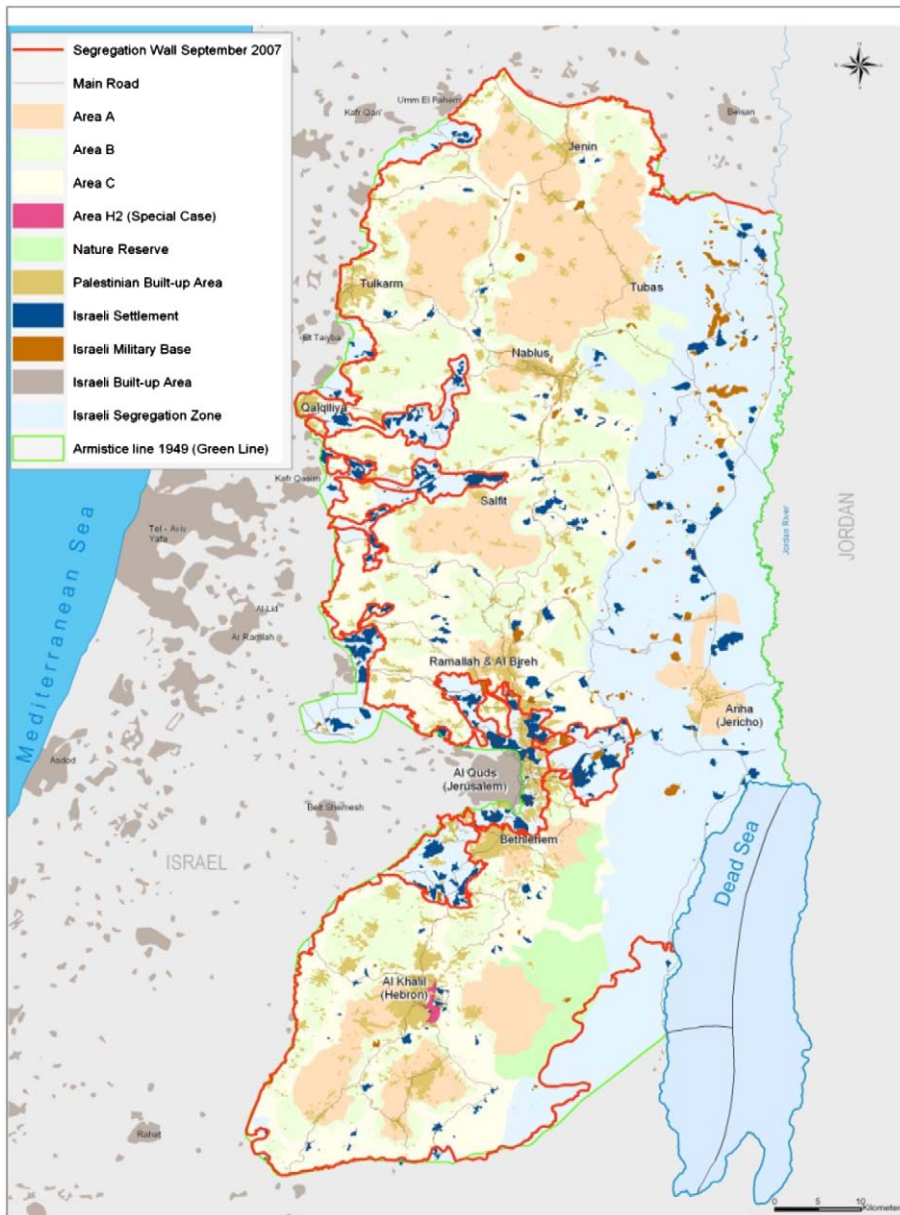


Figure 1. The western part of the Israeli Segregation Wall in the West Bank [6].

categories. Category one covers the importance of biodiversity to human life and promoting sustainable development. Category two covers biodiversity in Palestine, its richness, importance and challenges facing it. Category three covers the impact of the Segregation Wall on biodiversity in Palestine and thus, on the people themselves. Following the interviews, the obtained information and data were analysed using SPSS and summarized in tables.



Figure 2. The Israeli Segregation Wall. A) The electrified barbed fence [8]. B) The 8 meter tall concrete wall [9].

2.2. The questionnaire

The second part of the study depends on a questionnaire that was given to people who were affected by the Israeli Segregation Wall. For the sake of this study, Abu Dis and Al-Walajeh villages were selected as case studies to be compared with the results obtained in the interviews. Twenty questionnaires were distributed randomly in each one of the two villages. The people sampled were from different families, genders and ages whose lives were affected by the Segregation Wall. We explained the purpose of the study with a quick explanation of the types of questions before these people answered the questions. The questions of the questionnaire are in three categories. Category one contains questions about the physical properties of the questioned people and the effect of the Segregation Wall on them. Category two includes questions about the biodiversity in the area and its status in the wake of the construction of the Segregation Wall. Category three questions are related to the impact of the Segregation Wall on the socio-economic situation of the people affected by it. The results of the questionnaires were analysed using SPSS and summarized in tables.

2.3. The study area

Abu Dis village is located 3 km south of the Old City of Jerusalem. Most of the land of Abu Dis was confiscated by the Israeli Authorities to build the Ma'aleh Adomim settlement to the east of Jerusalem [13]. The original area of Abu Dis was 28,232 dunums¹ and the population of the village in 2005 was 11,932 [13]. Abu Dis is known for the wide ranges and areas of pastures and agricultural lands. It is famous for its olives, figs and fruit trees. Lastly, the socio-economic situation deteriorated too. The village's economy

depended on close cooperation with East Jerusalem. East Jerusalemites use to shop in Abu Dis (since it was cheaper than their market) while the ability of the people of Abu Dis to work in East Jerusalem gave them more chances to earn higher income [13]. The construction of the Wall (Figure 3) hindered these activities. Shops were closed leading to high unemployment rates [14].

The Al-Walajeh village is located 5.4 km north west of Bethlehem city and 8.5 km south west of Jerusalem at an altitude of 750 m above sea level [15]. Its population size reaches 2000 inhabitants [16]. The village is an agricultural area, known for its vineyards, olive trees, wheat, barley and fruit trees [16]. The original total area of Al-Walajeh was 17,793 dunums. In 1967, Israel expanded its Jerusalem municipal boundary by confiscating agricultural lands of Al-Walajeh [17]. Most of these confiscated lands were used to build the Gilo settlement [17]. Due to this confiscation, the village's total area was reduced to only 4,403 dunums. The land confiscation process continues with the Israeli Segregation Wall. The revised route of the Segregation Wall, approved by the Israeli Cabinet on 30 April 2006, shows that the whole village will be enclaved by the Wall (Figure 4). The Wall will isolate 1980 dunums of the village's lands. 45% of the village's total area will be off limits to the Palestinians [15].



Figure 3. A general view of the Segregation Wall in Abu Dis Village.

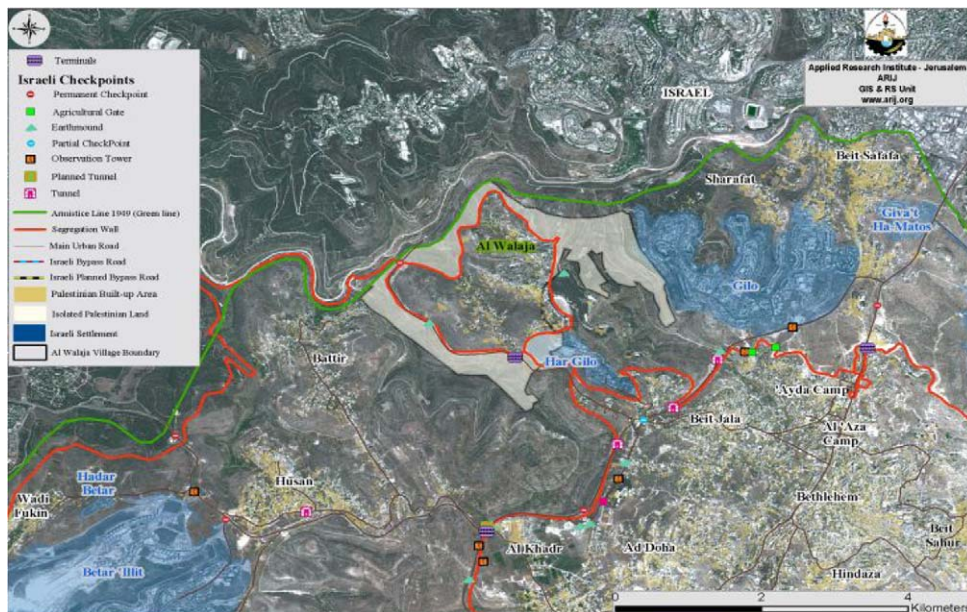


Figure 4. The enclave of Al-Walajah Village [18].

3. Results

3.1. The questionnaire results

Table 1 summarizes the place of living, gender and age of the sample questioned. The study sample was composed of 30 adult males and females who were affected by the construction of the Segregation Wall.

Table 2 summarizes the characteristics of lands confiscated for the construction of the Segregation Wall around Abu-Dis and Walajeh. Results show that the majority (about 67%) of the questioned lost between 1-30 dunums for the construction of the Wall. When asked about reasons behind confiscation, the questioned clarified that their lands were confiscated because they ended up behind the Segregation Wall (Figure 5), were right next to the Wall, were eroded to build the Wall or were the place where the Wall is built on. Results showed

Table 1. Information regarding the questioned people from both villages who were affected by the Segregation Wall.

Question	Answer	Frequency	Percentage
Place of living	Walajeh	15	50
	Abu-Dis	15	50
Gender	Males	17	56.7
	Females	12	40.0
	Not given	1	3.3
Age (years)	Less than 42	15	50
	More than 42	13	43.3
	Not given	2	6.7

Table 2. Characteristics of the land confiscated for the construction of the Israeli Segregation Wall (land area in dunums = 0.1 hectare).

Question	Answer	Frequency	Percentage
Area of confiscated land	1-30	20	66.7
	30-70	4	13.3
	More than 70	1	3.3
	70	5	16.7
	Not given		
Access to confiscated land	Yes	1	3.3
	No	27	90
	Not given	2	6.7
Water resources in land	Yes	19	63.3
	No	10	33.3
	Not given	1	3.3
Number of water resources	1	11	36.7
	2	4	13.3
	3	3	10
	Not given	12	40
Plant kinds in land	1-2	13	43.4
	3-4	5	16.6
	> 4	3	10
	Not given	9	30
Wild/medicinal plants	Yes	25	83.3
	No	4	13.3
	Not given	1	3.3



Figure 5. The Wall around Bethlehem; separating people from their agricultural lands and from holy places in Jerusalem [12].

Table 3. Effects of the Israeli Segregation Wall on residents and wildlife.

Question	Answer	Frequency	Percentage
The Wall causes changes in the variety of plants in the confiscated land.	Yes	25	83.3
	No	4	13.3
	Not given	1	3.3
The Wall hinders wild animal movement.	Yes	25	83.3
	No	2	6.7
	Not given	3	10
Daily access to jobs.	Easy	2	6.7
	Hard	3	10
	Very hard	12	40
	Almost impossible	11	36.6
	Not given	2	6.7
Willingness to change place of residence.	Yes	12	40
	No	17	56.7
	Not given	1	3.3

that 90% of questioned were banned from having access to their lands. In addition, about 63% of the sample pointed out that their lands contained 1 – 3 water resources (collection wells or springs). The water of these resources is used for irrigation, drinking, and other domestic uses. About 60% of the questioned reported that their lands were cultivated with 1-4 types of trees and about 83% pointed that their confiscated lands held medicinal plants. In addition, people reported that their confiscated lands were used to rear animals.

Table 3 summarizes the effects of the segregation wall on residents of the villages and on wild life in the region. The majority (83%) responded by saying that the Segregation Wall will cause changes in the variety of plants in the confiscated lands. A similar percentage believes that the Wall hinders the movement of wild animals in the region. About 87% of the sample described access to their daily jobs as being hard to almost impossible. Regarding the willingness to change the place of residence in response to the Segregation Wall construction, the majority (57%) of the questioned expressed their willingness to stay in their villages. But, a considerable percentage (40%) reported that they were considering changing their place of residence.

When asked about other effects of the Wall on their life, the sample pointed out that the Wall separated them from their land, made it hard to get to essential services such as health care and education, banned family members from getting to work places, made marketing of agricultural products hard, separated family members, forced some family members to change their place of residence and banned access to water resources. When asked about issues that stand in the way of getting proper health or education services, the sample reported the following issues: The Segregation Wall, Israeli check points, Israeli closure of roads and treatment costs.

3.2. Experts interview results

All experts interviewed stressed the importance of biodiversity. Then, they were asked to give reasons why they think biodiversity is important to human life in general and to Palestine specifically. Table 4 summarizes the reasons given.

Table 4. Importance of biodiversity to human life.

Question	Reason
Importance of biodiversity to human life	Source of genetic resources. Source of recreation for the people. Source of forestry products & food. Source of medicine. Part of people's culture. It is the integration between man and environment.
Importance of biodiversity in Palestine and its source of richness	The Palestinian landscape gave home to different species. Presence of four different ecological systems. Topography. Presence of Palestine between three continents. Economically rich species & genetic diversity. Because religions & culture gave it importance. Succession of civilizations.

When asked about the current challenges facing biodiversity in Palestine, the experts identified 9 challenges (Table 5). On top of these came the Israeli Occupation (Segregation Wall and Settlements). Thereafter, experts were asked to identify the effects of the Segregation Wall on the Palestinian Environment. Among others, most experts named banning animal movement, increasing overgrazing and fragmentation of ecological areas.

To the question about the integration of biodiversity into income generating projects (Table 6), all the interviewees replied that biodiversity can be integrated into income generating projects. Different reasons were advanced with examples. Most of the experts confirmed that by planting wild herbal or medicinal plants, planting certain economically valuable species, using forestry products and by planting various kinds of indigenous

Table 5. Challenges facing biodiversity in Palestine and the effect of the Israeli Segregation Wall on biodiversity.

Question	Challenges/effects
Current challenges facing biodiversity in Palestine.	Israeli occupation (Segregation Wall and Settlements) Urbanization. Desertification. Overgrazing. Waste water and solid waste (pollution). Lack of awareness Spreading of agricultural lands on the expense of natural lands. Bad rain distribution. Succession of civilization. Misuse of lands.
Effect of the Segregation Wall construction on biodiversity.	Bans animals' movement (seasonal migration, reach water resources ... etc.). Increased overgrazing due to shrinking of areas. Fragmentation of ecological areas and corridors. Affects plant survival and distribution, especially on both sides of the Wall. Disrupts the landscape. Noise pollution during construction. Hinders water drainage. Affects people's acceptance of the environment.

Table 6. Integrating biodiversity with income generating projects and contribution of biodiversity to sustainable development.

Question	How
Integration of biodiversity into income generating projects	Can use herbal wild medicinal plants and spices Planting of certain economically valuable species Use of forestry products Planting native plant species that are diseases resistant
Contribution of biodiversity to the sustainable development	By good management of natural resources Nature has its economic value By having Geographical Identity (GI)

Table 7. Actions needed to combat environmental problems in Palestine.

Question	Action to be taken
Future actions that need to be taken within the current situation	Clear land use plans Greening projects and programs Public awareness Ecotourism projects Establishing bye-laws for the current legislations Presence and persuasion at international conferences Protected areas Rehabilitation of forests Waste water management Encouraging the interaction between the farmer and the land In-depth studies of affected species
Missing capacities	Expertise Public awareness Revising the Legislation Bye-laws Financing Cooperation with neighbouring countries Indigenous knowledge

species that are resistant to many plant diseases, poor and marginalized people can improve their income and biodiversity can be integrated into income-generating projects.

The five experts confirmed that biodiversity contributes to sustainable development. Most of the experts think that by good management of natural resources, countries can sustain their development (Table 6). Some experts mentioned that by transforming the value of some natural resources into economic value, countries can preserve and sustain their development. Finally, one interviewee referred to Geographical Identity "GI"² for some native species that can be of added value to society.

All experts agreed that much work needs to be done to combat the deteriorating environmental situation in Palestine (Table 7). Experts pointed to the lack of several capacities necessary for effective work on the current environmental situation in Palestine. Among these, expertise and public awareness came on top (Table 7).

4. Discussion

The results show that the Israeli Segregation Wall has confiscated considerable areas of Palestinian land; either by confiscation to build the Wall, or because the line of

construction now puts some land on the Israeli side, to which the legitimate Palestinian owners are denied access (Figure 5). The confiscated land is of good quality, 60% having water resources. The confiscated land was planted with various crops plants and many parcels were sites for wild medicinal plants.

Parcels of this land were the main source of income for many Palestinian families. In addition, cultivated lands left behind the Wall are subjected to desertification because Palestinian farmers are banned from reaching or cultivating their lands. The process of the construction led to the uprooting of many crop trees that were used by many families as a source of income. Besides, the uprooting of trees caused soil erosion and affected animals and birds that inhabit the region. The questionnaire results proved that not only were people disconnected from their land but also from their water resources they had in their confiscated lands. Whether they used this water for drinking, for animals and plant irrigation or for domestic use, the Segregation Wall badly affected them.

For those who raise cattle, the grazing areas (pastures) had shrunk and this led to the depletion of the plants due to overgrazing and concentrating grazing in smaller grazing areas. Consequently, this will lead to the desertification of grazing areas and perhaps extinction of some plant species. On the other hand, cattle population in the affected regions will be reduced and people will lose some of their income.

Many people used to culture or simply collect wild medicinal plants to be sold to other people, medicinal stores or pharmaceutical factories. After the construction of the barrier people were not able to reach the areas where these herbs are grown, in the wild or in their confiscated land.

Thus, the Israeli Segregation Wall has reduced biodiversity, limited grazing and cultivated areas and annexed to Israel valuable water resources. These conditions put more pressure on the remaining natural resources and increase poverty in the region. Table 3 shows these results. The bad effects of the Wall are clearly expressed especially when it comes to people's access to daily jobs and willingness to change place of residence.

The results of the interviews indicate a belief that biodiversity greatly contributes to human life and welfare. Over the years, people have connected certain events to the migration of certain animals, blooming of certain flowers and movement of clouds. This confirms the continuous close interaction between man and nature and that one can affect the other.

Palestine is a society based on agriculture. Furthermore, her indigenous wild and agricultural species are of high quality and high resistance to many fatal plant diseases that are not present in any other country. Conserving these species in order to ensure high crop productivity is one of the key elements necessary for developing the economy as well as for improving the living standards of the farmers.

The interview results illustrate the belief that these indigenous species can be an economic asset. They could be labelled with patent rights; making use of their geographical identity, GI. This would include unique quality characteristics associated with a particular location. These characteristics belong to the history, tradition, and folklore of the region [19].

Table 4 shows that environmental specialists stress the importance of biodiversity to human life and that Palestine is rich in biodiversity due to several factors. This emphasizes the need to protect biodiversity and ensure sustainable development of natural resources. The experts interviewed believe that this rich biodiversity is threatened. The measures taken by Israel like the Segregation Wall, settlements, bypass roads used by settlers and military closed zones declared by the Israeli Army exhaust the natural ecosystems and

reserves of Palestine. The interviewee from ARIJ asserted that if a map for the declared natural reserves in Palestine and a map for the Israeli military bases are merged together, the two maps will match. This signals the challenges facing nature and biodiversity in Palestine. The Occupation threatens the environmental resources and their sustainability, just as it deprives Palestinians of their rights and freedoms.

The results show other threats that impact the preservation of biodiversity in the Palestine. These include urbanization, overgrazing, desertification, solid wastes and wastewater. There is, sadly, a lack of awareness of the importance of biodiversity and misuse of lands. These results could have been expected. The Palestinians have been living under oppression for six decades during which they have suffered from evictions, closures, land confiscation and lack of control on the natural resources. The need to survive has conditioned all Palestinian responses.

The construction of the Israeli Wall epitomises this oppression, strengthens the Occupation, and degrades the environment. As shown in the interview results, migrating wild animals were affected by the construction of the Wall. These animals were banned from seasonal migration or reaching their water resources. In some areas – where the Wall was completed – large amounts of animal species (e.g., wild pigs) were stuck on one side of the Wall, increasing their numbers in that area. This new environment was different from their original habitats; consequently, the residents were largely affected. The animals attacked the residents and destroyed their agricultural lands and crops. On the other hand, the electric wired parts of the barrier are considered a trap for wild animals trying to cross to the other side of the Wall. Experts call these crossing areas “the Killing Zone”.

The Wall has also impacted the vegetation cover. The results show the belief that all the areas where the Wall is being constructed will be affected while the most affected areas are those that are directly close on both sides of the barrier. The construction process requires the use of large bulldozers, which erode the land, producing noise and dust on both sides of the barrier. As explained by the interviewee from PARC, the dust accumulates on planted crops in the areas on both sides of the barrier, reducing growth and leading to the death of crops. Consequently, farmers cannot market these plants or their produce: a direct economic cost. The construction has led to the uprooting of natural as well as cultivated trees that are a source of income. Besides, the uprooting of the trees causes soil erosion, and destroys the habitats of animals and birds.

Thus, the interviews demonstrate the devastating effects of the Israeli Segregation Wall on the Palestinian environment and especially on biodiversity. This directly harms the people themselves, who are dependent on this diversity. Although, by good management, biodiversity can be integrated into income-generating projects and thus contribute to sustainable development (Table 6), management of the resources remains a problem as Palestinians do not have the authority to manage their own resources that are controlled by Israel. Nevertheless, some steps and actions still can be taken (Table 7) to alleviate the current situation of biodiversity and the environment in Palestine. In addition, measures can be taken to fill gaps in environmental issues (Table 7).

Finally, the Wall has another important negative impact on Palestinians. It separates the two holy twin cities, Jerusalem and Bethlehem, from each other and restricts the access of both Muslims and Christians to their holy places in Jerusalem.

Although some adverse effects may be very hard to reverse, it is possible to conserve resources to some extent and to mitigate adverse effects. The real problem is the injustice of Israel.

Notes

1. 1 dunum = 0.1 hectare.
2. GI is a sign used on goods that have a specific geographical origin and possess qualities or a reputation due to that place of origin.

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