I. Purpose

The Wadi el-Far’a Project recognizes the importance of including a study of the material cultural heritage, particularly the archaeological sites in the wadi’s watershed.

In keeping with the worldwide recognition that “…it is public duty to have some policy with regards to conservation” (Renfrew and Bahn 521), the emerging Palestinian State has recognized the responsibility of its governing bodies to make a plan for the management of its material cultural heritage. Some efforts have been put forth by a number of bodies with the Palestinian National Authority to establish a plan of action for cultural resource management. Within this context, the Birzeit University – Calvin College partnership aims to contribute to this ongoing effort to inventory the material cultural heritage sites of Palestine and create an aid for those making decisions about the management of the material cultural heritage sites within the region of the Wadi el-Far’a.

The following is a summary of the aims of the Birzeit-Calvin project team for the study of the material cultural heritage of the region:

- Organize already existing information and new information about the archaeological sites in the project’s study area.
- Visit already recorded sites in order to 1) assess their current state; 2) add additional information about these based on surface observations; 3) make any needed corrections to the already existing information about these.
- Record new sites encountered in the process of visiting already documented sites.
- Create a database of the archaeological sites and use that to construct a separate archaeological site layer in the project’s GIS.
- Compile information that will aid planning decision makers in the development of the region.
- Make recommendations for further work in the region.

Figure 1: Ihab Dababsa on the ruins of al-Smait, a large site located in W. Far’a and having a long history of human occupation.
II. Methodology

In order to help define and then subsequently realize the aims of the project as outlined above, the work plan was divided into three sections: 1) Study of previous archaeological surveys; 2) fieldwork; 3) Organization of the data. The team used different survey efforts as models, several of which are outlined below.

Study of Previous Archaeological Surveys

In the early nineties, the Jordan Department of Antiquities and the American Center of Oriental Research (ACOR) initiated an inventory project entitled “The Jordan Antiquities Database and Information System (JADIS)” as a tool for cultural resource management within Jordan. The development of this inventory had several functions:

- to generate a computerized inventory of archaeological and historical sites;
- to monitor development and threats of construction in urban and rural environments;
- to be able to intervene with greater efficiency where sites already known but poorly protected could be endangered by construction;
- to provide scholars, students, researchers with updated information on the status of archaeological sites in the country, and with a tool for the study of settlement patterns and the evolution of human occupation;
- to provide easy access to archaeological and bibliographic references related to sites;
- to monitor and address the needs of national and international research in the Jordan (Preface)

The following JADIS procedures were adapted for our own survey strategy:

The research for JADIS was geared to inform the Jordan Department of Antiquities of important sites for which no reporting system had been set-up previously. JADIS’ primary aim was organizing already existing information and putting it on a map. The information gathered, though, had many secondary uses, which included: “…biographical searches, settlement pattern analyses, and regional history, and also educational and management-oriented applications, since the information collected and the software which handles the information allow easy retrieval of basic data concerning the archaeological sites in their geographical and cultural setting” (Preface to JADIS).

JADIS not only helped the team define goals, but also gave the team a framework for collecting data and organizing this data. The team used the JADIS Site Form sheet (1.10), the Code Summary sheet (1.11), the codes for defining periods and describing periods (1.17) and the discussion of the “Problems of Data Reliability” (1.12) in order to create a data collection sheet for the Wadi el-Far’a Survey.

Of all the Far’a surveys consulted, these three provided the most significant information: The Survey of Western Palestine by C. R. Condor and H. H Kitchener; The Manasseh Hill

1 See Appendix II and Appendix III

1. The British Exploration Fund’s Survey of Western Palestine (SWP), conducted by C. R. Condor and H. H. Kitchener from 1881 – 1884, includes information about the archaeology, geography, geology, and natural history of Palestine (Abu El-Haj 22). Condor and Kitchener produced maps on a scale of 1:63, 360 (or 1 inch: 1 Statute Mile).²

2. An Israeli team directed by Adam Zertal (Tel Aviv University) conducted an illegal survey, which was published in 1996 as The Manasseh Hill Country Survey: The Shechem Syncline (in Hebrew).³ One of the most comprehensive and most recent surveys conducted in the region, its publication contains a large amount of information about a number of sites in the study area. This survey is valuable for site names, site coordinates (both UTM and Palestine/Israel), and descriptions of soils, type of water, site dating, and other descriptions. It also includes pictures of sites, pottery drawings, maps (scale of 1:50,000), and other descriptive information.⁴

3. The cultural resource management project of the Palestinian National Authority’s Palestinian Economic Council for Development and Reconstruction (PECDAR) entitled Cultural Heritage in Palestine, but commonly referred to as the Palestine Survey (PS), was conducted in conjunction with the Palestinian Ministry of Culture, the Palestinian Ministry of Tourism and Archaeology (which includes the Department of Antiquities). The PS is the first Palestinian survey that concentrates on the inhabited areas and the archaeological sites close to these areas.

   A. Fieldwork Conducted

   To update and complement the previous efforts, Ihab Dababsa and Ahmed Rjoob conducted their own field survey.⁵ They visited already documented sites and also investigated the areas between them through planed tracks⁶.

   Because fieldwork was conducted during the al-Aqsa Itifada, the field strategy was largely governed by the restrictions imposed by the Israeli occupation forces. Limited mobility in the region due to closures and check-points was aggravated by many inquiries and interruptions to work due to suspicions of both the Israeli Army and Palestinians. Because the daily commute from Ramallah was nearly impossible, the team stayed at the Salah Khalef Center.

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³ Translated by Dr. Kamal Abdalfattah’s brother (NAME???) into Arabic.


⁵ Mr. Dababsa and Mr. Rjoob received permission from the Palestinian Department of Antiquities to perform this survey work with the understanding that no surface finds were to be collected.

⁶ A “planed track” is best described as the path that the two team members took to get from one documented site to the next.
(close to the Far’a Refugee Camp), from which checkpoint-free access to a large portion of the study area was possible. It also gave the team the opportunity to build helpful relationships in the local community.

These circumstances moved the team to divide the study area in to the following two sections:

1. A larger area, which began at Khirbet Qishda, north of the Far’a Refugee Camp and east of ‘Ain Shibli village, including the Wadi al-Badhan area, the valley and the slope of the mountains on both sides of the Wadi el-Far’a, took two weeks.

2. The area east of ‘Ain Shibli village to the end of the project’s study area (east of Frush Beit Dajan). It also included sites south of the cliff. Unfortunately, the team was unable to cover this segment because it fell within the Oslo Accord’s Area C in which movement has been obstructed by Israeli checkpoints and the settlers’ colonies.

To ensure unobtrusive mobility, the team carried minimal special equipment. Geographic coordinates were taken from previous surveys and for new sites, the team used manual triangulation to transfer sitings to their map. The team did not collect any samples from the field, took snapshots of the sites using a simple 35mm camera, so that field activity was mostly limited to the completion of site data forms.

Organization of the Data

This “Site Data Sheet” was designed to absorb the data from previous surveys into standardized language necessary for the electronic database. The resulting MS Access database became the foundation of the new archaeological GIS layer.

III. Results

The team visited and documented 110 archaeological sites. Of these sites, fifty-five had been recorded in previous surveys and fifty-five “new” sites were recorded by the Far’a project team, including thirty-seven mills. Many natural caves and shelters, and tombs are scattered on both slopes of the Wadi. Although these are part of the cultural heritage of the study region and have not yet been recorded, the team did not record most of these because a larger survey team is required to give these proper attention. However, the team chose several as case studies.

A. Site Types

The sites are classified according to the name of the sites: 7

<table>
<thead>
<tr>
<th>Site Type</th>
<th># of sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell</td>
<td>4</td>
</tr>
<tr>
<td>Khirba</td>
<td>42 (16 big, 7 medium, 19 small)</td>
</tr>
<tr>
<td>Shrine</td>
<td>2</td>
</tr>
</tbody>
</table>

See Appendix I for definition of terminology employed here
<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caves and Shelter</td>
<td>3</td>
</tr>
<tr>
<td>Tomb</td>
<td>3</td>
</tr>
<tr>
<td>Mill</td>
<td>37</td>
</tr>
<tr>
<td>Cemetery</td>
<td>6</td>
</tr>
<tr>
<td>Structure Traces</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
</tr>
</tbody>
</table>

B. Site concentrations

In general, the archaeological sites in segment one are concentrated around the area of the Wadi el-Far’a refugee camp and the southern slope of the Wadi at higher altitudes likely due to the number springs in this area. The northern slope contains fewer sites and most of them are cemeteries. There are a few archaeological sites in the valley of the Wadi with the exception of the mills, which are all located here. Most of archaeological sites in segment two are concentrated on the northern slopes.

C. Mills

Of the 110 sites documented by the project’s team, it is noteworthy that the survey team recorded the mills in the region. British Archaeologist Condor and Kitchener recorded some of the mills of the Wadi el-Far’a in the *Survey of Western Palestine*. However, of the ones that they documented, they only recorded the names of these mills and did not record these on the maps (Index II 207-208). Some of these mills date back to the Mamluk period and some mills were still being used into the 1960s.8

The survey team plotted these mills and documented their names, their owners, and any remaining parts of them. The team relied on interviews of local people for the names of these mills, their owners, the way the mills functioned, and other pieces of history about these. Some of the people interviewed remembered when these mills still functioned.

The inner works of all the mills had been removed, reportedly sold to antiquities dealers. The installations on the outside of these mills (building, well, arm, channel) were found in various states of preservation, depending on how long ago these were abandoned period, their reuse function, or their ownership. Some of the mills functioned as a storage, a residence, or as a moist area for starting potato growth.

The mills fall into two categories according to the number of grinding stones and wells. Of the thirty-seven documented mills, only two, Tahonet Ther’en-Nuseria and Tahonet al-Atmawia, are classified as *et Tom*, meaning these mills each had two grinding stones, each with its own well, which also required a larger main building. Other than this doubling of installations the equipment in these mills did no differ from those with only one grinding stone and well each.

In general, the mills were owned by elite families from the area especially from the city of Nablus. Some of mills functioned until the 1960s. For example, Tahonet L’isar in al-Badan, the last functional mill in the area, functioned until 1965.

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8 For further information on the mills of the Wadi el-Far’a, see AbdelHalim Tomeizeh’s *Water Rights and Uses in the Middle of the Palestinian Mountain*
D. Enclosure Sites

The team exposed two possible enclosure sites: Khirbet al-Qassir, and Khirbet Marah abu-Esh-shuk. An enclosure site has a circular boundary of different-sized stones. Both of these are located on the summit of a mountain. The stones of their circular perimeter walls have fallen to the outside and few intact walls remain. Inside these eroded walls there was little pottery, so the dating of such structures is not conclusive. Given the character of these sites and the similarity these sites have with others classified as enclosure sites in Palestine, Dr. Kamal Abdalfattah suggested that these were enclosure sites. Two examples of other enclosures sites in Palestine are located in the following areas: 1) west of es-Samu’ village in Hebron district; 2) west of Yassid village in Nablus district. Adam Zertal dated the pottery in the above two mentioned sites to the Middle Bronze and Iron Ages, but did not define the sites as enclosure sites. While the function of these enclosure sites is unknown, Dr. Abdalfattah suggests that these were used seasonal settlements or as places from which to observe the roads.

E. Dating

The teams interpretation of the surface artifacts and architecture observed at recorded sites led them to conclude that they were misdated in the previous surveys. The Islamic periods and those that followed were largely ignored by the previous surveyors, though, the surface artifacts and architecture testified to human occupation and activity during these periods. Therefore, the team documented the presence of these periods at many sites.

F. Site Names

The first data layer in the spreadsheet begins with the site name (or names) given by the locals or taken from previous surveys. The survey team interviewed several local people for names of the sites as many of these as been recorded differently in previous surveys. For

**Figure 2:** Ihab Dababsa and local informant at the top of Tahona al-Rabay’iah, an Ottoman mill located in the Wadi Far’a area
example, Khirbet Mara Abu esh-Shok was recorded by Adam Zertal as el-‘Unuq, and Khirbet Bab al-Nqab with Tell Shibli.

Different criteria were followed in previous surveys to determine the site names. When the researchers did not have the original name of the site, they took the names from local people often hearing letters wrong, or they named after a nearby site or land features (eg., Zertal named Tell Shibli after the nearby ‘Ain Shibli), or added characters to the names when more than one new site had been discovered in the same area (eg. Jelamet el-Ahmar). The Far’a project team corrected some site names after consulting with the local people, while nameless sites were kept as they had been recorded in previous surveys. The names of several sites were not known by the local people, particularly since many of the inhabitants of the Wadi el-Far'a are not the original residents, but newly arrived refugees or shepherds.

IV. Recommendations

An understanding of the history of site management and the state of archaeology and archaeological site provides a context for the team’s recommendations. In general, the area’s material cultural heritage has suffered due to lack of or poor site management. The team found that a large number of the sites in the Wadi el-Far’a have been plundered and partially damaged by illegal excavations and other means of human destruction.9 Given this context, the team’s recommendations are the following:

A. Dissemination of the Project’s Work

The overarching goal of the Birzeit-Calvin partnership is sustainable development of the Wadi al-Far’a. All the sectors of the Birzeit-Calvin partnership have a common goal of sharing the work completed. At the national level, the work completed would benefit the work of a number of different ministries within the Palestinian National Authority, namely the Ministry of Tourism and Archaeology (which includes the Department of Antiquities), the Ministry of Culture, the Ministry of Local Governorates, the Ministry of Planning and International Cooperation, and the Ministry of Education. In addition to those branches of the PNA, the academic community would also benefit. In the case of the archaeology sector this would include the Institute of Archaeology at Birzeit University. At the international level, the work could help the efforts of NGOs and IGOs working in the region as well as organizations like USAID and the UNDP.

The dissemination of the project’s work to the above named institutions and organizations could be done in a number of ways, including submission of the project’s report to these, an online site containing the report, knowledge that the work has been done, and through educational seminars.

B. Use of GIS and MS Access Database in Development Plans

The full potential of the information collected for use by planners and developers may be realized by further use of the MS Access database containing the information collected about the

9 For further discussion of the history of site management in the region and the state of archaeology as well as archaeological sites, see Appendix IV.
material cultural heritage in the region as well as the use of this information as a layer in the project’s GIS. One of goals of the project was to document the cultural heritage sites in order to provide planners with up-to-date information about these sites to be included with any plans to develop this region. The integration of the archaeological sites into the project’s GIS allows for planners to make informed decisions as to the development of this region.\textsuperscript{10}

C. Tourism\textsuperscript{11}

One of the specific types of development for the region that has been discussed is tourism. Additionally, tourism development is also a part of the vision for the Palestinian territories, including the region. The 2001 Executive Summary of the World Summit on the Sustainable Development Progress Assessment Report for the Arab Region\textsuperscript{12} reports the following with regards to tourism development:

Although it currently represents about 4\% of the world’s tourism market, tourism is among the fastest growing sectors in the region and strongly contributes to foreign exchange earning and employment. For this reason, the sector has social and economic ramifications link to job creation. However, it should be added that tourism is vulnerable to the regional situation, with extreme fluctuations in revenue occurring during periods of heightened political instability. While tourism is a smokeless industry, it can seriously affect natural ecosystem biodiversity as well as the social structure of the host countries. (5)

\textsuperscript{10} According to Renfrew and Bahn, a GIS system “…offer[s] a number of advantages over existing text-based database, particularly in that they allow the complete storage and subsequent querying of data about archaeological monument which have a large spatial extent. GIS also allows planners to store and manipulate archaeological data within the same computer system as other data about the landscape such as landuse, topography, or plan and animal habitats. For this reason, GIS are widely seen as an appropriate means of integrating archaeological planning within a large environmental planning framework” (549).

\textsuperscript{11} See the September 1999 study entitled the Tourism Development Strategy of the Palestinian Economic Council for Development & Reconstruction (PECDAR). This study and report were primarily the contracted work of Chemonics International Inc. <http://www.pecdar.org/pecdarorg/default2.asp?tree=2363>

\textsuperscript{12} Here the “Arab Region” refers to the members of the League of Arab States of which Palestine is a part.
Given the above, the project proposes that further study should be completed for possible tourism development of the following sites:

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Area</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell al Far'a</td>
<td>Wadi Far’a Village</td>
<td>High potential to be promoted</td>
</tr>
<tr>
<td>Burij al-Far’a</td>
<td>Wadi Far’a Village</td>
<td>High potential to be promoted</td>
</tr>
<tr>
<td>Salah Khalaf Center</td>
<td>Wadi Far’a Village</td>
<td>A museum will be promoted in the center, which contain a hostel 13</td>
</tr>
<tr>
<td>Tohonet el – Matheoloniah</td>
<td>Wadi Far’a Village</td>
<td>Well preserved Mill, it could be used as Mill Museum</td>
</tr>
<tr>
<td>Khirbet Al – Farwa</td>
<td>Al-Badhan</td>
<td>High potential to be promoted</td>
</tr>
<tr>
<td>Khirbet el- Khiraba</td>
<td>Al-Badhan</td>
<td>High potential to be promoted</td>
</tr>
<tr>
<td>Tohonet L’assar &amp; Tohonet al –Burij</td>
<td>Al-Badhan</td>
<td>It was promoted as garden pond</td>
</tr>
<tr>
<td>Nassaria area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tell Miska</td>
<td>Al-Nassaria</td>
<td>High potential to be promoted</td>
</tr>
<tr>
<td>Bab al-Naqab</td>
<td>'Ain Shibli</td>
<td>High potential to be promoted</td>
</tr>
<tr>
<td>Marah al-Inab</td>
<td>Frush Bait Dajan</td>
<td>High potential to be promoted</td>
</tr>
</tbody>
</table>

Furthermore, a museum at one of the mill sites would not only be of interest to tourists, but also ties into the next recommendation.

13 A memory museum could be established here. Prior to its current function as a recreational center, this site was used by the Israelis to imprison Palestinians.

Figure 3: Ihab Dababsa on Tahoma al-‘Assar, an Ottoman mill used in the Tawahin Recreational Area in the al-Badhan area.
D. Education

According to Dr. Hamden Taha, the Director-General of the Palestinian Department of Antiquities in the Ministry of Tourism and Archaeology, one of the major problems his department faces since its formation in 1994 is the lack of involvement of local Palestinians in archaeology. He states that “Archaeological activity was limited mainly to foreign archaeological expeditions which studies sites in Palestine without attention to the Palestinian citizen participation in excavations or archaeological discoveries and without publishing findings in Arabic. This situation is inherited and still constitutes one of the main challenges faced by the Department of Antiquities…this department has established the beginnings of interaction between the Palestinian citizen and his archaeological heritage” (Palestine Report).

E. Further Archaeological Work

The project team recommends both further survey work in the Wadi el-Far’a region as well as excavations under the direction of the Palestinian Department of Antiquities. Given the wealth of cultural heritage sites in the Wadi el-Far’a, a more comprehensive survey should be completed by a larger staff with various areas of specialization. While Adam Zertal’s survey of the region is comprehensive, it is biased, meaning that the surveyors of Dr. Zertal’s team were not without an agenda, and completed illegally. The survey work completed under his direction, no doubt, sought to strengthen the Israeli (and thus Jewish) historical consciousness and claims to the territory. Zertal’s survey distorts the dating of the sites in this region in favor of a preponderance of “Israelite” occupation. Additionally, further work is needed to better assess the condition of archaeological sites in the region, in order to make more comprehensive recommendations for cultural heritage management and planning in the region.

In addition to further survey work, excavations in the region are also necessary. According to Dr. Hamdan Taha there are over six thousand archaeological sites in the Palestinian territories. Of these, approximately one percent has been excavated in the last century (Palestine Report). Further survey work would help determine which sites should be excavated in the Wadi el-Far’a region.

Appendix A: Terminology and Abbreviations

**Terminology**

Below is the archaeology terminology sheet with the corresponding number that was used on the field data sheets when collecting information in the field. It was adapted from the one employed by JADIS.

<table>
<thead>
<tr>
<th>Habitation &amp; Military</th>
<th>032. Wine press</th>
<th>065. Mudbrick</th>
</tr>
</thead>
<tbody>
<tr>
<td>001. House</td>
<td>033. Threshing floor</td>
<td>066. Inscription</td>
</tr>
<tr>
<td>002. Khirba</td>
<td>034. Other agricultural Structure</td>
<td>067. Mosaic Floor</td>
</tr>
<tr>
<td>003. Tell</td>
<td>035. Aqueduct</td>
<td>068. Rock art</td>
</tr>
<tr>
<td>004. Seasonal site</td>
<td>036. Water channel</td>
<td>069. Frescoes</td>
</tr>
<tr>
<td>005. Palace</td>
<td>037. Cistern</td>
<td>070. Statue</td>
</tr>
<tr>
<td>006. Cave/Maghara</td>
<td>038. Water reservoir</td>
<td>070. Cemetery</td>
</tr>
<tr>
<td>007. Shelter</td>
<td>039. Dam</td>
<td>071. Rock-Cut Shaft tomb</td>
</tr>
<tr>
<td>008. Rujm</td>
<td>040. Baths</td>
<td>071. Rock-Cut Shaft tomb</td>
</tr>
<tr>
<td>009. Nomadic camp</td>
<td>041. Bridge</td>
<td>072. Rock-Cut tomb Simple entrance or dromos</td>
</tr>
<tr>
<td>010. Hermitage</td>
<td>042. Road</td>
<td>073. Burial in Natural cave</td>
</tr>
<tr>
<td>012. Other Installation</td>
<td>044. Hut circle</td>
<td>075. Hypogaeum</td>
</tr>
<tr>
<td>013. Fortified</td>
<td>045. Storage</td>
<td>076. Grave</td>
</tr>
<tr>
<td>014. Unfortified</td>
<td>046. Cairn</td>
<td>078. Burial Cairn/Tumulus</td>
</tr>
<tr>
<td>015. Possibly Fortified</td>
<td>047. Mintar</td>
<td>079. Dolmen</td>
</tr>
<tr>
<td>016. Fortress</td>
<td><strong>Industrial</strong></td>
<td>080. Pit Burial</td>
</tr>
<tr>
<td>017. Castle</td>
<td>050. Quarry</td>
<td>081. Sarcophagus</td>
</tr>
<tr>
<td>018. Castrum</td>
<td>051. Mine</td>
<td>082. Caravanserai</td>
</tr>
<tr>
<td>019. Tower</td>
<td>052. Smelting Site/Slag heap</td>
<td>083. Sabeel</td>
</tr>
<tr>
<td><strong>Cultic Structure</strong></td>
<td>053. Furnace</td>
<td>084. Cardo</td>
</tr>
<tr>
<td>020. Temple</td>
<td>054. Pottery kiln</td>
<td>085. Forum</td>
</tr>
<tr>
<td>021. Church</td>
<td>055. Limestone kiln</td>
<td>086. Theater</td>
</tr>
<tr>
<td>022. Mosque</td>
<td>056. Flint knapping site</td>
<td>087. Arch</td>
</tr>
<tr>
<td>023. Monastery</td>
<td><strong>Scatter Artifacts</strong></td>
<td>089. Hippodrome</td>
</tr>
<tr>
<td>024. Sanctuary</td>
<td>057. Sherd of pottery</td>
<td>090. Tunnel</td>
</tr>
<tr>
<td>025. Shrine/Wali</td>
<td>058. Sherds of flint</td>
<td>091. Isolated structure/House</td>
</tr>
<tr>
<td>026. Synagogue</td>
<td>059. Staircase</td>
<td><strong>Traditional Building</strong></td>
</tr>
<tr>
<td>027. Hermitage</td>
<td>060. Worked stones</td>
<td>092. Complex (more than one house)</td>
</tr>
<tr>
<td><strong>Agriculture &amp;</strong></td>
<td>061. Mosaic patterns</td>
<td>093. Field wall</td>
</tr>
<tr>
<td>029. Mill</td>
<td>062. Structure Walls</td>
<td><strong>Other Terms</strong></td>
</tr>
<tr>
<td>030. Agriculture terrace</td>
<td>063. Column</td>
<td>094. Terrace wall /retaining wall</td>
</tr>
</tbody>
</table>
Site Condition

The site condition indicated by the survey team reflects the condition of the site on the date of visitation by the project team. The following is the standard used:

<table>
<thead>
<tr>
<th>Good</th>
<th>Partially destroyed</th>
<th>Destroyed</th>
<th>Completely destroyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naturally destroyed, features are generally kept</td>
<td>Human destruction, some damage to site features</td>
<td>Human destruction, most site features damaged</td>
<td>Human destruction, damage to all site features</td>
</tr>
</tbody>
</table>

Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>Palestinian Economic Council For Development and Reconstruction (PECDAR). <em>The Palestine Survey.</em></td>
</tr>
<tr>
<td>SWP</td>
<td>Condor, C. R., and H. H. Kitchener. <em>Memoirs of the Topography, Orography, Hydrography, and Archaeology</em></td>
</tr>
</tbody>
</table>

Pottery Abbreviations

<table>
<thead>
<tr>
<th>Pla</th>
<th>Paleolithic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neo</td>
<td>Neolithic</td>
</tr>
<tr>
<td>Cha</td>
<td>Chalcolithic</td>
</tr>
<tr>
<td>EB</td>
<td>Early Bronze I</td>
</tr>
<tr>
<td>MB</td>
<td>Middle Bronze</td>
</tr>
<tr>
<td>LB</td>
<td>Late Bronze</td>
</tr>
<tr>
<td>IR</td>
<td>Iron</td>
</tr>
<tr>
<td>Per</td>
<td>Persian</td>
</tr>
<tr>
<td>Hell</td>
<td>Hellenistic</td>
</tr>
</tbody>
</table>

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<tr>
<th>R</th>
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<tr>
<td>ER</td>
<td>Early Roman</td>
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<td>LR</td>
<td>Late Roman</td>
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<td>B</td>
<td>Byzantine</td>
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<tr>
<td>EISL</td>
<td>Early Islam</td>
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<td>MISL</td>
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<td>Cr</td>
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<td>Bri</td>
<td>British</td>
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<tr>
<td>Mod</td>
<td>Modern</td>
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Miscellaneous Definitions

Arm Remains: One of the mill installations; it is a channel, which connects the well and the main water channel having an angle shaped like an arm. In Arabic, *thira’*.

Rujm: An Arabic term that means stone heaps

Well: Used to express the Arabic beer. It is rounded built pit with worked stone walls, which is used in the mill.
Appendix B: Site Data Sheet

Wadi Al-Far’ia Archaeological Survey Data Sheet

Form #___________

A. General Information

Site No_______________. Date: / /2001
Site Name(s)_____________,_____________( Ar) ___________,____________(En)
District ____________,City( ) Village( ) ____________, In side and/ or Urban core ( ) Out Side( )
1. Site present use: Cultivation( ) Residential( ) Industry ( ) Seasonal Site( ) other_________________
2. Discovered site ( ) New discovered site ( )

LocationDescription_______________________________________________________________________
_______________________________________________________________________________________

B. Geographical Information

Palestine Grid(E) X_______________________,(N) Y________________________
Elevation(Z)_________________, Area(Square Km)____________________
Map No_______________, Arial Photo No_________________

C. Site Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Period</th>
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</table>

C. Environment features

Site Topography: Highland( ) Plateau( ) Valley( ) Plain( ) Rift( ) Mountain Top( ) Cliff( ) Other_________
Surrounding Environment: Open Land ( ) Cultivated land( ) Abundant cultivated land( ) industrial area( )
Residential area( ) field walls, channels( ) other_____________________________________ 

D. Surface collection

Collecting from the site ( ), Isn’t collecting from the site ( )
Type: Pottery sherds ( ) Flint sherds ( ) Stone tools ( ) Coins ( ) other_______________________
Bag Nos.________________ Place of collection__________________________________________
Date_________________
Notes:

E. Photos

Photo #___________ Scroll #___________.
Orientation_________________________ Description:
Orientation_________________________
_____ Description:

Photo #__________ Scroll # ____________,
Orientation_________________________
_____ Description:
Photographer_____________________.

---

F. Cultural Resource management

1. Site management: Managed site ( ) Not Managed Site ( )
   - Site condition: Good ( ) Fair ( ) Destroyed ( )
   - Site current use: Cultivation ( ) Industrial area ( ) Seasonal Site ( ) Other___________________________
   - Site’s Ownership: Governmental ( ) Islamic Waqf ( ) Church Waqf ( ) Private ( ) other_____
   - Legal site responsibility:______________________________________________
   - Site interventions: Excavations ( ) Conservation works( ) Other______________________
   - Open to Visitation ( ), Not open to visitation( ). Site presentation: available ( ), Not available ( )
   - Information and promotional material: Brochures( ) Catalogues( ) Maps ( ) Other_____
   - Site accessibility: Main street( ) Paved Road( ) Unpaved Road( ) Other_____
   - Site promotion plans, Short-Medium term ( ) Long Term ( ) None ( )
   - Threats to site: Highways( ) Vandalism( ) Deterioration( ) Developers( ) other_____________________

2. Relation between Site & Socio- economical in the territory
   - Type of local residential area close to the site: City ( ) Village ( ) Camp ( ) other_____
   - The site is included in the Territory promotional planning framework ( ), isn’t included ( )
   - Territorial infrastructure, served the site now ( ), close to the site only ( )
   - Facilities: accommodation structure available: Reception/ hotels ( ) restaurants ( ) None ( )
     other_____________________
   - Recreation facilities: Garden pond ( ) Cultural, educational facilities ( ) other_________________
   - Handicraft Activities__________________

Recommendations for the site promotion & protection

---

G. Remarks----------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------------

Archaeology, 90
Surveyed by__________________________________
Appendix C: Mill Data Sheet

Wadi Al-Far‘ia Archaeological Survey Data Sheet- Mills

Form #__________

A. General Information

Site No______________. Date: / /2001
Site Name(s) _____________, _____________ (Ar) _____________, _____________(En)
Reference: __________________________________________________________
District ______________, City ( ) Village( ) ______________, Inside and/or Urban core ( ) Out Side ( )
5. Site present use: Cultivation ( ) Residential ( ) Industry ( ) Seasonal Site( ) other: _________________
6. Previously Recorded Site ( ) Newly Recorded Site ( )
Location Description:
________________________________________________________________________________________
_____________________________________________________________________________________

B. Geographical Information

Palestine Grid (E) X_______________________, (N) Y________________________
Elevation (Z)_________________, Area (square m)____________________
Map No_______________ Reference: ______________________________________
Photo No_________ Reference: _____________________________________

C. Site Features

<table>
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<tr>
<th>Feature</th>
<th>Period</th>
<th>Feature</th>
<th>Period</th>
<th>Feature</th>
<th>Period</th>
<th>Feature</th>
<th>Period</th>
</tr>
</thead>
</table>

D. Environment features

Site Topography: Highland ( ) Plateau ( ) Valley ( ) Plain ( ) Rift ( ) Mountain Top ( ) Cliff( ) Other:

Surrounding Environment: Open land ( ) Cultivated land ( ) Abundant cultivated land ( ) Industrial area ( ) Residential area ( ) field walls, channels ( ) other:________________________

E. Photos

<table>
<thead>
<tr>
<th>Photo #________ Scroll # _<em><strong><strong><strong>, Orientation</strong></strong></strong></em> Description:</th>
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<th>Photo #________ Scroll # _<em><strong><strong><strong>, Orientation</strong></strong></strong></em> Description:</th>
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<th>Photo #________ Scroll # _<em><strong><strong><strong>, Orientation</strong></strong></strong></em> Description:</th>
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Appendix D. Site Management and the state of archaeology in the Wadi el-Far’a

Prior to the Palestinian Department of Antiquities take-over of archaeological sites, these sites had been under the control of the Israeli civil administration in the region since 1967. Unfortunately, hundreds of archaeological sites were fully or partially demolished during this period. The illegal excavations carried-out by the Israelis were often for ideological reasons—for political and settlement means.\textsuperscript{15} There was also serious negligent of “existing sites” such as Tel Balata and Tel al-Far’a (Palestine Report).

The Gaza – Jericho agreement and the Oslo Accords state that Palestinians have jurisdiction over areas A and B in the occupied territories, and over area C upon the completion of the Israeli transfer of jurisdiction of this area to the Palestinian National Authority eighteen months after the election of the Palestinian Legislative Council (PLC). However, Israel did not commit to this part of the agreement and the jurisdiction of area C has not been transferred to the PNA. Meanwhile, the Israelis have been conducting illegal excavations in area C for political purposes (e.g. Tel Rumeida) (Palestine Report).

The team found that most of the archaeological sites in the Wadi al-Far’a have been plundered and partially damaged by illegal excavations. This ongoing activity will make it difficult to conduct a more thorough investigation of these sites, which would contribute to an understanding these sites. The current laws concerning the destruction of antiquities also pose a threat to the archaeological sites in the region. The laws were inherited from the British Mandate, the Jordanian legislature, and the Israelis. This law does not impose a severe punishment on those who destroy antiquities. In addition to this, the Israeli government has a law that allows for the commerce and export of antiquities. Both of the above laws contribute to the on-going destruction as well as the theft of antiquities sites within Palestine. In 1995, the Palestinian Department of Antiquities proposed legislation that would cover a number of things, including the protection of antiquities within the territories. It is now awaiting approval of the PLC.

The team consulted the planning documents of the Palestinian National Authority and other organizations working in the region to determine whether current plans were in place for the management of cultural heritage sites in the region. In 1999, the Palestinian Ministry of Planning and International Cooperation (MOPIC), the Palestinian Ministry of Tourism and Antiquities, and RIWAQ released a study entitled \textit{Endangered Cultural Heritage Sites in the West Bank Governorates: Emergency Natural Resources Protection Plan}. This study surveyed and assessed selected cultural heritage sites within the West Bank governorates in order to begin the process of implementing a protection plan for the governorates. The efforts of this study are just the beginning of an attempt at developing a comprehensive plan to deal with the cultural heritage sites of the Palestine. The introduction to this study notes, “In principle, all cultural

heritage sites in Palestine, not just a selection of some sites of major importance, need codification and precise description for further planning purposes” (MOPIC 17).

The Palestinian Tourism Development strategy prepared by PECDAR mentions the Wadi al-Badhan (36) as an attractive site in need of further development. Additionally, the United Nations Development Program (UNDP) has an unpublished proposal for peripheral tourism development in Palestine. The Wadi al-Badhan is included in this project as part of the promotion of tourism in the Nablus district. This plan notes that the valley is a unique natural area in the West Bank without any mention of the material cultural heritage in the region. Thus far, then, minimal plans have been concerning the management of material cultural heritage of the region as plans have concentrated on the natural environment of the Wadi al-Badhan.
**Appendix E: Sample Site Form**

The following is one of 110 (one for each of the sites surveyed) compiled using the Far’a Project’s MS Access Database.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
<td>Tell al-Far’a</td>
</tr>
<tr>
<td>Palestine Survey</td>
<td>Fari’ah, al-Tall</td>
</tr>
<tr>
<td>SWP</td>
<td>Tell el Farah</td>
</tr>
<tr>
<td>Zertal 1996</td>
<td>Tel el-Far’a/Tell el Farah</td>
</tr>
<tr>
<td>Site Name Reference</td>
<td>Kochavi, PS, Zertal 1996</td>
</tr>
<tr>
<td>x</td>
<td>182049</td>
</tr>
<tr>
<td>y</td>
<td>188194</td>
</tr>
<tr>
<td>Coordinate Reference</td>
<td>PS, Zertal 1996</td>
</tr>
<tr>
<td>Elevation (m)</td>
<td>198</td>
</tr>
<tr>
<td>Area (sq. km)</td>
<td>80</td>
</tr>
<tr>
<td>District</td>
<td>Tubas</td>
</tr>
<tr>
<td>City/Town</td>
<td>Tubas</td>
</tr>
<tr>
<td>Village</td>
<td>Far’a Camp</td>
</tr>
<tr>
<td>Site Inside Urban Area</td>
<td>y</td>
</tr>
<tr>
<td>Present Site Use</td>
<td>Cultivation</td>
</tr>
<tr>
<td>Site Type</td>
<td>Tell</td>
</tr>
<tr>
<td>Location Description</td>
<td>S of Far’a camp, between ‘Ain Far’a in the N and ‘Ain Dulaibe in the S</td>
</tr>
<tr>
<td>Site Features</td>
<td>Fortified settlement, pottery sherds, mud brick, structure walls</td>
</tr>
<tr>
<td>Pottery Reading</td>
<td>Neo, Cha, EB1-4, MB1-2, LB1-3, IR1-3, PER</td>
</tr>
<tr>
<td>Pottery Reference</td>
<td>Zertal 1996</td>
</tr>
<tr>
<td>Site Topography</td>
<td>Highland</td>
</tr>
<tr>
<td>Surrounding Environment</td>
<td>Cultivated Land, Residential Area</td>
</tr>
<tr>
<td>Remarks</td>
<td>No site maintenance program since excavations</td>
</tr>
</tbody>
</table>

**CULTURAL RESOURCE MANAGEMENT**

| Managed Site | n |
| Site Condition | Good |
| Site Ownership | Governmental/Private |
| Site Legal Responsibility | PDA |
| Site Interventions | Excavations |
| Open to Visitation | y |
| Site Presentation | None |
| Promotional Material | Included in general catalogues and maps |
| Site Accessibility | Main Street |
| Site Promotion Plans | n |
| Threats to site | Vandalism, deterioration, cultivation, urban extension |
| Type of local community | Village, Camp |
| Site included in planning documents | UD |
| Territorial Infrastructure | Close |
| Facilities Nearby | Hostel |
| Recreational Activities | n |
| Handicraft Activities | n |
| Site's Need(s) | Protection, Maintenance, Conservation |
| Recommendation(s) | High potential to promote |

**Date Surveyed** | 20-Aug-01
Appendix F: Bibliography

In addition to the printed materials listed below, the following individuals, along with many unnamed, provided the project with valuable information: from Wadi al-Far’a village, Rateeba Mustapha Salih, Lutfi ‘Uwasah, Suhail Al-Atrash, Ma‘amon Al-Atrash; from al-Badhan: Mohammed Yussef, Abdullah Qasim Salahat; from Talusa, Borhan Ahmed Joma‘, Muhsin Dababsa; from Nablus, Ahmed Judah; from Salem, Mohammed ‘Arif Abu Kaid.


United Nation Development Program (UNDP). *Project for Peripheral Tourism Development in Palestine*.


I. Summary:

This report includes a comprehensive study of the built-up areas within the Wadi Al-Far’a. It concentrates on each area’s features, some of the problems faced by the inhabitants and provides some possible recommendations that ensure sustainable development in the future.

This sector is vital within the context of the whole project as it can be used in the future planning of this region. In addition, it includes a section on the Bedouin communities of this wadi. This is one of the only studies concerning Wadi Al-Far’a that focuses on these communities.

II. Purpose:

The Wadi Al-Far’a region is considered to be one of the most important regions in Palestine. However, it is a region that faces a lot of suffering. Not only is it a region without an electricity network and a sewage system, but there are also not enough schools and clinics to provide the inhabitants with their essential needs.

One of the main causes of these problems is that most of this region is under Israeli control. In addition, the region lacks the planning schemes at both the regional and local levels that are necessary for development. Moreover, most villages do not have a solid infrastructure because of the obstacles imposed by the Israeli control.

These problems were the motivation behind this study.

III. Methodology:

This sector was unique in the fact that only one person, Farah Ghalib performed all the tasks for this sector. A list of terms were developed by Farah and other team members to achieve a well-known standard for terms. At the same time, the report was limited to several aspects of Built-up areas, such as: population, number of buildings, households, coordinates, area, general occupational careers, existence of health clinics, sewage systems, water networks, public electricity, and number of mosques, as well as any unique characteristics to the locality.

A detailed study of each locality could not be made due to the problems with Israeli checkpoints in the region. Jennifer Moorehead, with Save the Children Organization, has begun studying each locality in greater detail than this study. As she is only beginning, at the time of our communications with her, only one locality had been fully studied, of which the details can be seen in Appendix C.

The data was primarily collected through personal fieldwork, consisting of face-to-face interviews, photography, video-recording, note taking, as well as retrieving data from the Palestinian Central Bureau of Statistics (PCBS). Farah would spend many visits to the Wadi el-Far’a, including many overnight trips with the other Palestinian team members who camped in the area. For most of the time, notes were the main form of documentation of local people, culture and infrastructure. A video camera was used in the beginning to help reveal pertinent areas of interest and the local setting to the non-Palestinian team members, who could not view the Wadi el-Far’a with their own eyes. Maps were also essential in determining the location of many of these built-up areas. Existing maps were used to find the general area of each built-up
area, and detailed confirmation and correction of these maps produced the built-up areas now known.

Data was collected on an Excel spreadsheet, (Appendix A, Table 1) and from there was transferred into map format for better analysis. For the first time in this area, the Bedouins were studied objectively; Farah used a similar spreadsheet (Appendix A Table 2) but this data was primarily taken as written observations and comments.

IV. Results of Study Localities:

A **Built-up Areas**

Refer to Appendix 1.1 with a summary of the information--population, area, schools, water, etc.--related to the Built-up areas within the Wadi el-Far’a.

Compared with other formal statistics in Palestinian regions of the West Bank, the Wadi el-Far’a’s population is relatively scarce. The locations studied will be discussed in the same order they can be found on the table.

1. **Ras al-Far’a**:

   This locality is considered a rural location, with 82 buildings and 572 people, who work primarily in agriculture, though some have businesses in recreation. Both occupations are totally dependant on the springs of wadi.

   **Schools:**
   
   There are no schools at Ras al-Far’a; the students study at Toubas and the surrounding area. Only 37.3 % of the children in this locality attend school.

   **Health centers:**
   
   No clinics exist at Ras al-Far’a; the people must go to Nablus city or a surrounding village.

   **Sewage:**
   
   At Ras al-Far’a there is no public sewage system, but they use the absorption holes, where contaminants leak from these earthen holes into the groundwater, contributing to the pollution in the streams.

   **Water and Electricity:**
   
   Ras al Far’a has no connection to a public water network. People depend mainly on private wells, where most of them have a well at home which is filled in the winter rainy months. Some people also depend on trucked-in water to fill their home-tanks. Public electricity is not available, so these people use private generators for lighting, which cause an economic strain on an already low-income based society. Sustainable development is difficult to attain due to all these problems in Ras al-Far’a.

2. **Al –Far’a camp**:

   4688 people live in the 668 buildings within the Al-Far’a refugee camp. Work in the camp includes agriculture, retail, mechanical work, or work inside the Israeli controlled territory.

   **Schools:**
   
   Three schools at Far’a camp are directed by UNRWA (United Nations Relief and Works Agency). There is a primary school for boys, with 913 students and 26 teachers, and two primary school for girls, with 830 students and 25 teachers. The enrollment rate in the camp is 34.1 %.
Health Centers:
There is only one clinic at al-Far’a camp that is run by the UNRWA, which is said to not have adequate health coverage.

Sewage:
No public sewage system exists in the camp. Some solid waste is disposed of through absorption holes, where most is disposed of by municipal trucks, which take the material to be burned 1.5 km outside of the camp. The effluent is drained into the wadi 15 km away.

Water and electricity:
A public water network has been installed, which only 840 people have been connected to so far. The others depend on wells (from rain or groundwater) and tank water.

3. Wadi al-Far’a:
This is a rural locality, where most everyone works in agriculture, with a few people working in recreational businesses. The population is 1909 persons in 341 buildings.

Schools:
There are no schools at Wadi al-Far’a. The 34.6% of children that do go to school go to al-Aqrabania and Tubas.

Health Centers:
There are no clinics at Wadi al-Far’a; the sick or injured go to Nablus city and al-Aqrabania to get treatment and medicine.

Sewage:
No public sewage system has been established yet, so the people use absorption holes for the solid and the effluent is pumped into the wadi 3 km away. Many people’s drinking and irrigation water has been contaminated because the once fresh spring water in this area has been so heavily polluted.

Water and electricity:
Wadi al Far’a has no connection a public water network. They take water from the springs because there are so many springs here. Private generators are used individually and collectively to supply electricity to most of the population, as no public electricity has been set up either.

4. Al–Badhan:
Another rural locality, there are 2004 people living in 269 buildings within Al-Badhan. They work in agriculture, trading and recreational businesses.

Schools:
215 students are taught by seven teachers at the only school, which is a co-ed school run by the government. The enrollment rate is 39.7%.

Health Centers:
At al-Badhan, no medical clinic has yet been created. This means the people must go to Nablus city or surrounding regions for medical attention.

**Sewage:**

After sewage is disposed of through absorption holes, it is pumped to the Wadi al-Badhan; this is because there has been no sewage system established. Solid waste is also collected by municipal tractors and burned at a special area. All these disposal methods have led to pollution in the local soil, water, food and air.

**Water and Electricity:**

There is a public water network, to which people can make a connection. The five springs in this area are the source for this water network, and the water is used for drinking, irrigation, and recreational uses. There is also a public electricity network set up for most everyone in the region.

5. **An-Nassariya:**

168 buildings house the 1120 residents in An-Nassariya, who work in agriculture, animal herding and trading.

**Schools:**

There are two schools here, one government-run school, and the other is a UNRWA-run school. The enrollment rate 32.1%.

**Health Centers:**

At An-Nassariya, one private and one government-run clinic service the general population. These clinics will often serve people who come from the surrounding areas.

**Sewage:**

Air pollution and insect infestation are common here due to uncovered absorption holes, as there is no sewage system in this locality. Most of the solid waste is burned by the local people (often in their own backyards).

**Water and electricity:**

An-Nassariya has a water network to which people can connect, but only a few people have a connection, so many still buy water from trucks. Private wells also help to serve the rest of the population that is not connected to this water network, where the owners will often sell water for drinking and irrigation purposes. An Israeli company set up an electrical network and sells electricity in the region.

6. **Al-Aqrabania:**

Al-Aqrabania contains 115 building, which house the 741 residents in the area, who mainly work in agriculture, but there are a few people who still graze animals and some who have recreational businesses. (This area has been threatened by Israeli tanks on numerous occasions, causing fear and commotion among the local population.)

**Schools:**
The UNRWA directs the two primary schools in the area, while the government has set up a secondary school. The number of students is 900, with 53 teachers. The number is so high because most of the students come from other regions, such as Frush Beit Dajan. The enrollment rate in the local region is 34.4%.

**Health Centers:**

The Palestinian Medicine Clinic Relief (PMCR) runs the only clinic in the area, but it is said not to have provided adequate health coverage for the local population, so many people still go to Nablus city to get most medical services.

**Sewage:**

Since no public sewage system exists here, absorption holes are extensively used, where most effluent is pumped into the wadi nearby. The solid waste is burned individually as no municipal collection occurs.

**Water and electricity:**

Al-Aqrabania has no connection with a water network, making the local population depend on collecting and pumping wells, springs and buying water. The Israeli company has also established an electricity network here, allowing most people access.

7. **Beit Hasan:**

986 people live in the 125 buildings at this locality, working primarily in agriculture and grazing.

**Schools:**

There are two schools at Beit Hasan, one run by the government and the other by the UNRWA.

**Health Centers:**

The one clinic at Beit Hasan is directed by PMCR.

**Sewage:**

No public sewage system exists, so, absorption holes and burning of the solid waste by the local people is their means of disposal.

**Water and electricity:**

A water network has been created, but not for the whole population, so many people must still depend on the springs and their wells. They have an electric connection that was established by the Israeli company.

8. **Khirbet Tell el-Ghar:**

In Arabic, "Khirbet Tell el-Ghar" is considered a "khirbeh", which is the smallest type of village. This village only has 12 people living here, who work in grazing and agriculture. There are four buildings at this locality, but no schools or clinics. The children study at Al-Aqrabania schools, and people travel to other localities for medical attention. Because no public water or electric network has been set up, the people depend on buying water and owning private
generators for electricity. They use absorption holes for sewage and burn the solid waste individually.

9. **Ein Shibli:**
   Ein Shibli is a rural village, where 164 people live in the 38 buildings. The people mainly work at grazing and agriculture.

   **Schools:**
   The enrollment rate in Ein Shibli is only 25.2%, probably because the students have to travel to Al Aqrabania in order to study, as there are no schools built in this region.

   **Health Centers:**
   This locality has no clinic, making the people have to travel to Nablus or a nearby locality.

   **Sewage:**
   There is no connection to a public sewage system, so absorption holes are most commonly used.

**Water and electricity:**
There is a public water network at this locality, but only 26 people are connected to this network. The source of this water is the Shibli spring. It’s the main source of all water needs at this locality; many people will fill tanks of water from this spring. An electricity network has also been established in the region.

10. **Kashda:**
    This is another location that is considered a khirbeh, in which 26 persons reside, primarily engaged in animal herding. There are no public services--schools, clinics, water, electricity, sewage--for these people; they must travel to surrounding localities if they wish any of these services.

11. **Tamoun:**
    This locality is considered a rural area, even though 8513 people live here. Work varies from agriculture to trading, from grazing to working for Israelis. There are 1442 buildings at this locality.

   **Schools:**
   There are four schools at Tamoun, two schools for girls and two for boys. 2377 students are enrolled, making this one of the highest enrollment rates (40.4%) in the entire Wadi el-Far'a. 75 teachers work at these schools.

   **Health Centers:**
   Two clinics are located in Tamoun district, one run by the UNRWA and one run by the local government.

   **Sewage:**
They use absorption holes because there is no sewage system. Solid waste is placed in a special area, which is collected by a municipal garbage truck.

**Water and electricity:**
There is no public water in Tamoun, but the people get their water from collecting wells primarily. Tamoun also has no electrical network established, so people use private generators.

**Israeli settlements:**
There are two settlements in the Tamoun district. Argaman settlement has 833 donums, and was established in 1971; it is considered an agricultural settlement. Baqaot settlement is on 675 donums, and was established in 1972.

12. **Frush Beit Dajan:**
This location is considered a rural locality, where 959 people live in 157 buildings. They work in agriculture and grazing.

**Schools:**
At Frush Beit Dajan there is one primary government school. 163 students study at this school with 10 teachers. When student finish primary stage, they travel to Al- Aqrabania school to complete the secondary stage of their education. The enrollment rate is 33.6%.

**Health Centers:**
People have to go to Al-Jiftlik clinic, because there is no clinic at this locality.

**Sewage:**
There is no sewage system; absorption holes are used for the effluent, and the dry waste is burned individually.

**Water and electricity:**
Frush Beit Dajan has no connection to public water, making people depend on collecting wells and buying water. At the same time, there is no electrical network, and there are not enough private generators for the whole population. The Israeli company can supply this population, but has refused to give service for some reason, not yet known.

13. **Al-Jiftlik:**
3178 people live at Al-Jiftlik, a rural locality, where most of the population works at agriculture or grazing. 562 buildings are located in this area.

**Schools:**
At this locality, one co-ed school with 675 student and 19 teachers is run by the UNRWA. The enrollment rate here is 32.4%.

**Health Centers:**
There is one clinic directed by UNRWA, but can not satisfy the population needs.

**Sewage:**
No sewage system disposes of the effluent outside of the absorption holes, but solid waste is collected weekly to be burned on the outskirts of the region.
**Water and electricity:**

There is a water network, but no electricity network, so they use private generators.

**B. Bedouin Localities**

This is the first study that has included Bedouins and Bedouin culture in the Wadi el-Far'a region.

**Building (housing units):**

Only a few buildings exist throughout the Bedouin locations. Usually, Bedouins will primarily use only tents for homes and animal shelters; the buildings are used for several different families. Animal shelter tents are not far from the housing areas, and are commonly found right next to houses.

**Origins:**

The Bedouins of the Wadi el-Far'a come mainly from Hebron. Most were born in either Hebron, Al-Samoa, or Yatta, and arrived before the occupation of 1967. They came to find pasturelands for their animals to graze.

**Number of population:**

At all the different localities, the total number of people is about 450.

**Career:**

All of the Bedouins rely upon animal raising for their main source of income, but some also grow crops in the growing seasons.

**Grazing:**

Pasturelands have been unstable throughout the Wadi el-Far'a, especially in the last five years. As a result of varying rainfall each year, drought, and Israeli soldiers driving on the land, the land has become less fertile than it was when the Bedouins first arrived in the region. The income of the Bedouins has been severely decreased since the arrival of so many Israeli soldiers, as many grazers are penalized for being on particular land, causing the grazers or their sheep to be detained for varying periods. In 1998, they paid one thousand JDs (1000 Jordanian Dollars = 1500 USD) to the Israeli government. This is because the Israelis consider this area a military area, which means that pasturing is no longer allowed. This has caused another economic strain for the Bedouins because now they must buy their silage and barley.

**Water source:**

The main source is the Shibli spring. They depend on buying water in private tanks, brought to them by tractors, which is used as drinking water for themselves and their livestock.

**Marketing products:**

Cheese, milk, fat, butter, meat and wool are marketed in Nablus and Jericho city. Recently, there are problems in reaching the market because of the many Israeli check points that stop the people from traveling to places in and around the Wadi el-Far'a.
Education:
Students study at Frush Beit Dajan for primary school and An-Nassarya for secondary stage. Parents put much hope in their children to complete their studies, and possibly obtain a university degree in order to leave the Wadi and find jobs elsewhere that can better support them economically. Many people also return home to their villages in Hebron after or during their studies.

Health Centers:
They usually go to the two clinics at Al-Jiftlik.

Electricity:
The Bedouins rely solely on gas lamps for lighting and have no generators among them.

Relationships:
With regard to their origins, there is no strong relationships between these people and their original villages in the Hebron district; they visit their village usually less than once a year, even though they have houses in their original villages. Most of their sons who finish their education return back to their original villages.

With regard to their surrounding communities, these people have good relationships with most people who live around the Wadi el-Far'a; there is much trading that goes on between the Bedouins and their sedentary neighbors. Most products traded are cheese, milk, and crops. They also participate in different occasions in several of the localities throughout the Wadi el-Far'a.

V. Conclusions:
From all the data, several statements can be made regarding the status of the built-up areas within the Wadi el-Far'a. First, a list of statistics should be mentioned:
100 % of the localities studied were without a sewage treatment system.
Over 50 % of the areas had no health clinic.
Almost 40% of the areas studied were without a school.
Not one area had a school enrollment rate above 50%.
Over 50 % of the areas had no public electricity.
60 % of the localities were without a water network.

Understandably, statistics have many shortcomings, but some major information can be detailed here. One of the most serious problems is the high incidence of untreated illnesses caused by the combined effects of (1) the dearth of health clinics, (2) the lack of hygiene and pollution in local education curricula, and (3) very poor waste management.

Second, a major lack in publicly funded and controlled systems, from water and electricity to sewage treatment leave many people living without adequate services.

The environmental situation reveals many problems due to the poor sewage disposal system. Groundwater, surface water, and the air have all been polluted due to these inadequate sewage systems, but this will be discussed further in the pollution sector. As the population is so small the people are so dependant on water for agricultural needs, a plan to begin remediation of the environmental damage caused by these sewage systems.

It can also be noted that the origins of the people within the Wadi el-Far'a varies greatly, as could be seen from the Bedouin culture. Another observation that has been made is the low
enrollment rates in schools, but even though these rates are so low, many people said that education is very desired (almost above all).

VI. Recommendations:

Short Term

a. Work with Jennifer Moorehead and Save the Children on fulfilling a detailed study of every study locality inside the Wadi el-Far'a.

b. Determine a standard of living from which further study can be done on what percentages of the population is below this standard.

c. Develop a historical analysis similar to the present document in which to create a comparative study, in order to document the changes in living standards and migration patterns. This historical understanding is necessary to predict future development and explanation.

d. Locate spatially all Bedouin camps.

Long Term

a. Begin development of more schools and medical clinics, while at the same time expanding existing clinics.

b. Create a public water and electricity network for each locality.

c. Education programs for all local people on how to conserve resources and prevent pollution.

d. Develop a sewage treatment system for each locality or household.
Appendix A: Bibliography:


Appendix B:

Table 1: Statistical Data on Specific Built-up Areas in the Wadi el-Far’a Study Area

Here, data for each built-up area locality that was studied can be referenced. The second column, PCBS CODING (Palestinian Central Bureau of Statistics CODING), is the Palestinian national coding system, which was developed by the PCBS. For every locality in the West Bank, a special 6-digit of 5-digit code was given, where the first digit or two (depending on whether it is 5 or 6 digits) represents which governate the locality belongs to. The remaining four digits describe a serial number specific to each locality that was based on each localities specific geographical North-South, East-West location.

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<th>Y-COORD</th>
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<th>BUILT-UP TYPE</th>
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PRIV=private
PMCR=Palestinian Medicine Clinic Relief
UN=United Nations
UNRWA=United Nations Relief and Works Agency
GOV=government
Table 2: Statistical Data from Bedouin Study

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Appendix C: Jennifer Moorehead's locality study: the Al-Far’a Village.
[Received from Jennifer Moorehead, Save the Children US-Palestine]

Location:
Al Fara’a, Area A

Population:
1,712, 51.3% M, 48.7% F, 53.4% Children

Local Government Unit:
- Type: village council.
- Services provided: water tanks supply, garbage collection, electricity generators

Economic background:
- Village income (monthly): NIS 500-600/household (approximate figure)
- Level of education for males: B.A. and below for females: B.A. and below
- Source of income: agriculture
- Natural resources: none

Facilities and infrastructure:
- Water network: non-existent
- Sewage systems: individual latrines
- Streets: in need of repair
- Electricity: 1 generator serves the village
- Telephone lines: available
- No. of male schools: none, students attend school in Al-Far’a camp
- No. of female schools: none, students attend school in Al-Far’a camp
- No. of clinics: 1 mobile clinic/week
- No. of youth facilities: none

Community-Based organizations in the village:
Women’s Society

NGOs/PVOs active in the community:
Palestinian Economic Council for Development & Reconstruction (PECDAR) opened a street
Palestinian Hydrology Group (PHG) constructed water pumping station

USAID funding source, amount, and duration:
VSP, $8 million, 2000-2003
CRSP, $4.9 million, 1999-2002

USAID PVO & local NGO partners:
Educational Network
Women’s Studies Center
Union of Palestinian Medical Relief Committees (UPMRC)
Palestinian Agricultural Relief Committee (PARC)
Palestinian Farmers’ Union
Palestinian Youth Center
USAID-Funded interventions in the village:

**Education**
- Follow-up training of kindergarten teachers | Completed
- CRC campaign | Completed
- Implement teacher training program – Al-Far'a Early Childhood Center | Completed
- Provide materials and equipment to Al-Far'a Early Childhood Center | Completed
- Schools participating in community activities | Completed
- Train teachers on active learning methodology | Completed
- Train teachers & conduct follow-up training on active learning methodology
- Extracurricular activities for children on community involvement | Completed
- Extracurricular activities for community | Completed
- Community-based dialogue | Completed
- Workshops for parents council and school administrators | Ongoing
- Strengthening of parents' council through training | Ongoing
- Organize summer activities and camps | NEEDS APPROVAL
- Produce training materials | Did not start
- Train leaders on topics related to gender equity | Ongoing
- Coordinate with women's committee to mobilize their role | Ongoing
- Organize community meetings and workshops | Ongoing
- Organize extra-curricular activities | Ongoing
- Strengthening of parents' council through training | Ongoing
- Training group of voluntary animators | Ongoing
- TOT for local animators to organize extracurricular activities | NEEDS APPROVAL

**Health**
- Implement school HPE program | Ongoing
- Train health partner staff on women and childcare issues (IMCI); incl. MoH workers | Completed
- Train selected staff on IMCI | Ongoing
- Implement HPE at the community level | Ongoing
- Train selected community members on school HPE program | Completed
- Train selected community members on community HPE program | Completed
- Implement basic outreach health services | Ongoing
- Raise awareness of HW and community of Partner Defined Quality (PDQ) | Completed
- Organize workshops for staff and community on QI | Completed
- Train health workers on basic resource management skills | Completed
- Follow-up training on resource management
- Conduct health facility assessment (HFA) to measure impact | NEEDS APPROVAL
- Festival on school HPE | NEEDS APPROVAL
- Report on school and community HPE processes | NEEDS APPROVAL
- Sustainability of models and good practices through relevant ministries and/or partners
- Provide mobile health services

**Health/Water & Sanitation**
- Transfer and improve the wastewater collection system in Salah Khalaf Center
- Raise awareness on communal SDT through community-based activities

**Agriculture**
- Training farmers on effective & efficient irrigation techniques
- Training farmers on IPM
- Construction of agricultural cisterns
- Construction of agricultural cisterns
- Construction of agricultural roads
- Training farmers & women on waste recycling
- Pesticides residue testing campaign
- Demonstrations on composting
- Train women farmers on animal breeding
- Training on beekeeping
- Publish pamphlets on beekeeping & safe use of pesticides
- Training on solid waste recycling
- Training course on maintenance of agricultural machinery

**Water & Sanitation**
- Establish a JSC
- Evaluation and redesign of solid waste system
- Provide the JSC with vehicles and containers
- Capacity building and ID for JSC members
- Professional training for staff of JSC
- Develop regulations & bylaws for JSC
- Sign subproject agreement (planning phase)
- Recruitment village workers
- Orientation village workers
- Salaries of village workers
- Needs assessment for solid waste behavior
- Training members of village committees
- Training teachers about child-to-child approach
- Forming neighborhood committees in 5 villages
- Transfer messages to committees
- Implementation of awareness campaigns on solid waste, water management systems, tariff system & hygiene education
- Campaign materials: posters, stickers, T-shirts
- Process review

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<tr>
<td>Implementation of awareness campaigns on solid waste, water management</td>
<td>Did not start</td>
</tr>
<tr>
<td>systems, tariff system &amp; hygiene education</td>
<td>Did not start</td>
</tr>
<tr>
<td>Campaign materials: posters, stickers, T-shirts</td>
<td>Did not start</td>
</tr>
<tr>
<td>Process review</td>
<td>Did not start</td>
</tr>
</tbody>
</table>
**Youth**

- Renovate part of the old building into a cultural in Salah Khalaf Center | Did not start
- Establish playgrounds in Salah Khalaf Center | Did not start
- Furnish youth club | Completed
- Provide equipment to youth club | Completed
- Train and provide technical assistance to the club/center network | Did not start
- Build the capacity of Salah Khalaf Center to support the club/center network | Did not start
- Organize cultural activities for youth | Ongoing
- Organize sports and recreational activities in cooperation with MoYS | Ongoing
- Network youth clubs with others in WB in cooperation with MoYS | Completed
- Train youth animators in youth to youth approach | Completed
- Train youth leaders and animators on gender concepts and opportunities, leadership & advocacy tools | Ongoing
- Train mid-level decision makers in youth centers/clubs on gender issues, communication & training | Ongoing
- Conduct community campaign to raise women's rights | Did not start
- Form youth club/center network to link between local youth clubs/centers and Salah Khalaf Center | Ongoing
- Train and provide technical assistance to the club/center network | Ongoing
- Build the capacity of Salah Khalaf Center to support the club/center network | Ongoing
- Train youth leaders on planning and management skills | Did not start
- Conduct open dialogue with the community | Ongoing
- Strengthen the role of school parents council to be involved in activities at Salah Khalaf Center | Ongoing
- Furnish & equip the cultural center of Salah Khalaf with computers and Internet connection | NEEDS APPROVAL
- Share youth achievements with parents, adults and community | NEEDS APPROVAL
- Produce materials supporting the campaign | NEEDS APPROVAL
- Form adult volunteers to support the youth groups their club centers by activation of the parents' councils or local committees | NEEDS APPROVAL
- Conduct vocational training for youth on different topics | NEEDS APPROVAL
- Provide equipment to youth club
Water Rights
Abdel Halim Tomazi and Sebastian Naslund

I. Abstract

Two main sources of water exist naturally in the Wadi El-Far’a, which are rainfall and springs. The main use of water is for domestic and agricultural purposes. In this sector, we have begun to locate spatially where each water system exists, determine type of water system--wells, irrigation channels, reservoir ponds, and greenhouses--and who controls these water systems. In this, we have desired to reveal all uses of the water, whether legal or illegitimate, which will give rise to an answer to the water shortage problem. Several different methodologies were used in order to obtain this data--interviews with local people, past well-drillers, government agencies, as well as regular internet and library searches. Once data was obtained, some conclusions could be made: first, the people in control of the water are usually only a handful of wealthier people, or Israeli citizens. The distribution of water is not being allocated appropriately. The water shortages are in part caused by the people presently in control of the water.

II. Purpose

Major water shortage issues exist throughout the Wadi el-Far’a. With such scarce quantities of water, and such major problems in the quality of water, the ones who control the water have a major influence in the area. In order to understand the reasons and the solutions to this shortage, it is imperative to understand who controls and utilizes each water source. But, who controls the water is a major subject of discussion and controversy in the West Bank. The Water Rights sector report is two-fold: first, it is to locate, map and determine ownership of each water system in their entirety within the Wadi el-Far’a as well as document overseeing agencies. Secondly, we discuss the complexity of issues related to water rights and water allocation in this area, while at the same time developing plans which ensure and protect the water for the local people of the Wadi. In order to create an environmentally sustainable plan for the Wadi el-Far’a that will allocate the water in the region fairly and equitably, we must fully understand who uses and controls the water.

III. Methodology

Data collection methods range from field observations, GPS (global positioning system) unit measurements and collection of preexisting data on the Wadi el-Far’a. The two main people devoted to this section were Abdel Halim Tomazi and Sebastian Naslund. Abdel Halim, who resides in Palestine, collected field data for any information previously unknown, or not available because of political reasons (water quantities is often a classified subject), such as locations of wells, pools, reservoirs, and greenhouses. In the field, Abdel Halim used a data collection table similar to table 1.

<table>
<thead>
<tr>
<th>Water Rights--Point samples</th>
<th>Sample Name</th>
<th>Sample Type</th>
<th>Property Ownership</th>
<th>Sample Description</th>
<th>Sample Other Info.</th>
<th>Other Info.</th>
<th>Other Info.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Name</td>
<td>Israeli Coordinates</td>
<td>Sample Name</td>
<td>Other Info.</td>
<td>Other Info.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Y</td>
<td>Z</td>
<td>Other Info.</td>
<td>Other Info.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Water Rights, 117
Table 1 - Data collection sheet for samples of the water rights in Wadi el-Far’a. The format and explanation of the data sheet is as follows:

<table>
<thead>
<tr>
<th>Sample Name:</th>
<th>If the sample has a name (e.g. Ein Far’a Spring is the name of one of the springs), this is the row that name will be placed. This is also the place where the owner’s name would be placed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Israeli Coordinates:</td>
<td>Israeli coordinates will be used as the standard locational medium for the entire project. X is the east-west coordinate; Y is the north-south coordinate, and Z is the elevation.</td>
</tr>
<tr>
<td>Sample Type:</td>
<td>The sample type is what type of water system the sample is. These will range from a well, spring, irrigation pools, recreation pools, unused water-mills, and greenhouses.</td>
</tr>
<tr>
<td>Property Ownership:</td>
<td>This will be the area which describes the person or persons who owns or controls the water resource or system. If a name was given, ownership would be private. If the water system is not private, then it is usually public ownership.</td>
</tr>
<tr>
<td>Sample Description:</td>
<td>Description of the use of the water (agriculture, recreation, etc.)</td>
</tr>
<tr>
<td>Other Info.:</td>
<td>This column is used for any other information given about the site; i.e. volume discharged from a well area of greenhouses, etc.</td>
</tr>
</tbody>
</table>

Beyond using just the collection table, Abdel Halim also spoke with many local people and farmers in the region to fully understand the historical context and ownership rights of particular water systems. He would often camp several nights in the area at a time because it was too dangerous and time-consuming to travel back and forth from his home. His longest stay was 12 nights. He confirmed the locations of most wells and all the springs in the area made by previous research in the area; he also made detailed observations of irrigation techniques, especially regarding citrus fruits last summer. He made more than 15 visits to the wadi, which was also stimulated by his work on his Masters Thesis. Abdel Halim began establishing a relationship with many local people; these connections he established definitely helped in obtaining the large quantity of data he and would no doubt be useful if future water-related projects began. He would also ask for advice and knowledge of the wadi from the locals, bringing a personal dimension to the project that is usually not present in these types of academic projects.

On the other hand, Sebastian Naslund researched and collected data conventionally—library loans, internet searches, meetings with scientists and professionals. This has proven to be an extremely large task, as water rights in the Middle East has become one of the largest water issues in the world. Sebastian has written several papers and spoken for several presentations related to the Water Rights sector, informing many people about the project. Information on discharge of wells and springs was located from the PWA (Palestinian Water Authority) and Marwan Ghanem’s work.

Abdel Halim and Sebastian have been in contact several times, and despite language barriers, a large amount of progress occurred. Email and use of the teams website has been the main form of keeping each other informed and transferring data to one another. Internet has proven to have its problems as well—connections, quantity of transferable data, and availability within Palestine is limited. A trip in the winter of 2001 was planned, but did not come to fruition as money was limited and tension in the region was high. During the 2002 summer field season, these team members finished collecting data, began analyzing and writing the final report for this sector.

After data collection was completed, data was stored in Microsoft Excel. The data was then loaded into the mapping program, Arc view GIS 3.2a, where final maps were created. One major obstacle that stands in the way of obtaining data and accomplishing what we would like to is the fact of the Israeli-Palestinian conflict. The difficulty of traveling, obtaining data from either Palestinian or Israeli governments, making simple phone calls, being able to go the site to
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collect data, and being able to work in the same location are all aspects that are hindered by of this conflict. All these aspects cause the retrieval of data to be a slow cumbersome process that is unknown in most peaceful situations. Given the situation, we have had to resort to the internet for our main source of information transferring.

IV. Data and Results

The results section is broken up into several major areas: First, background information, which includes a general discussion of the water rights and the issues pertaining to them, is presented. Secondly, each water source--rainfall and springs--is discussed to determine the uses and the rights of each source available to local inhabitants. Third, each water system is discussed individually to give an understanding of the uses, legal or not, and the ownership rights of each system.

A. Background Information to Water Rights study

Because water is so important in this region, the rights of access to the water are very complex, and differ presently from historical rights to the water, which once understood will shed some light on the present complications to the rights over water.

We have come to understand the importance of the Wadi el-Far’a as a water resource, especially for the Palestinians. The Wadi el-Far’a is not only the main drainage basin of the Eastern Aquifer in the West Bank, but also collects water from a second aquifer that discharges into the head of the wadi in the Far’a spring. The Wadi el-Far’a collects about one-fifth of the total freshwater discharged from springs in the West Bank and holds about one-tenth of all the wells in the West Bank. Palestinians control almost the entire area of the Wadi el-Far’a, giving them potentially the control over the water within this area. But, as more land is being converted to Israeli Colonies or Israeli Military areas, Palestinians are losing control of the land and hence the water. Whoever has the rights to this land also has rights to the water. Given these basic and broad facts, it can be seen that this water is of major importance to the Palestinians.

In the recent past, rights to the water have changed drastically within Palestinian lands. Several hundreds of years ago, Islamic Law stated that water was the community’s, not individual’s, and everyone had equal rights to the drinking water. This law governed until the Ottoman civil code, which had very similar principles to the Islamic law, with the addition of an administrative agency. When England took control of the land after WWI, English laws governed, and in 1948 when England handed rights of the Palestinian region over to Jordan, Jordanian laws took over. Jordanian and English laws were very similar, giving more rights to agriculture and industry as well as establishing monitoring programs. Jordanian laws only governed the land until Israel’s occupation of Palestine in 1967. At this point, Israel enacted its Israeli Military Code on August 15 of 1967, which gave full administrative, legislative and regulatory rights to Israeli military officials. Water rights within any Palestinian location have also traditionally declared that surface and groundwater rights are different. Any water transferred over land is the public’s (in other words, the local people’s) and not the government’s. Any water that is below the surface though is the government’s first and foremost, and only after it reaches the surface is it not the governments. So, permission for pumping must come from the government. This is still the way that rights to the water continues in most places within Palestine.

Several complications exist over the rights to the water, which have only been exacerbated by the rapid changes in laws over the past 100 years. The Israeli Military code
created 1500 laws to rule the land. One of these laws related to water was the permit system, by which people had to receive a permit in order to drill or continue using a well and refusals could not be appealed. Furthermore the rights to water could be taken away at any time without a reason. A complication associated with water rights is that local people of Wadi el-Far'a claim to have rights to the land that can date back tens of generations. Muslim people, on the other hand, claim that all water is for the public (the local people), as it is written in the Koran. And now, the Israeli government claims rights to the land of which it has taken control. This can cause complications and disputes that are never solved easily.

B. Water Sources

As the water sources have been discussed quantitatively, focus here will be placed on how each source is used. Since rainfall is much greater in the north-western section, or the upper areas of the wadi than in the south-eastern portion, most agriculture tends to be more up-valley, than down-valley. Rain has been commonly used in agricultural collecting ponds and reservoirs on roofs for domestic needs. Some areas of the Wadi el-Far'a are terraced in order to better use the rain water that flows over the ground.

Springs in the Wadi el-Far'a are very important for agricultural and domestic needs, and now even recreational uses. Usually, people collect the water from springs in tanks to be used domestically (see Figure 1 of an enclosed springhead). The springs are considered to be public ownership for domestic use. In Islam, this is known as, "Haak al sheffah"\(^{16}\): any spring on a piece of land is available to use for all people. No one person can forbid another person from accessing the water as long as they preserve the surrounding agriculture. Although this appears similar to the Islamic code of the past, it is still the system most commonly applied in this region.

Therefore, the population in Wadi el-Far'a have the right to use the water from the El-Far’a spring.

The upper springs (or the Far'a, Nablus and Badhan groups as they have been called)--Al Faria, Ein Miska, Ein Shibli, and Al-Tabban to name a few, supply the majority of natural water in Wadi el-Far’a for domestic and irrigation water. There is a secondary group of springs (the Miska group) in Wadi Far'a which discharge less water than the primary springs: they are located at the foothills in the south of the wadi. Refer to Figure 2 for a map of the springs. There are no documented measurements for the amount of discharge from these secondary springs. The water from these springs is only used for animals, as in the case of 'Ein Ad-Dabboor, Lijwar, Az-Zarra', and Moghor 'Eid. Despite the smaller discharges, it is still important for the animal husbandry to have water sources close to their grazing sites. Because of the recent trends in water shortage and springs drying up, a focus will be placed on the uses and rights of two springs, the 'Ein el-Far’a and 'Ein Miska.

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\(^{16}\) An Arabic term which means, *Prior right of the lips water*. This means that every human being has the right to drinking water.
'Ein El-Far’a

This spring is located in the south-side of Tell Far’a (a famous archeological site) near the main road that connects the Al-Badhan and Tubas villages. It is 160 meters above sea-level. The average discharge up until 1999 was 5.5 million cubic meters annually. In the West Bank, 'Ein El-Far’a is considered to be the second biggest spring after the Al Auja spring, which discharged 10 million cubic meters annually up until 1999. The irrigated area that is dependant upon on 'Ein El-Far’a and 'Ein Al-Duleib is 635 (dunums). Commonly, the supply of water has exceeded the amount of water needed by the farmers. The excess water flows into the wadi and is used by the farmers in An-Nassarya and Al-Aqrabania for irrigation purposes. Above all and traditionally, it is the human right to have enough water for domestic use in any of the surrounding villages. Using Islamic code, the prophet Mohammed said, "An Nas Shuraka' Fee Thalathah: Al Ma'o wa al Kala'o wa an Nar" which means, "All humans have the rights to share water, grazing areas, and firewood." This has commonly been used as a type of law in this region.

During the writing of this final draft, the 'Ein El-Far’a spring was dry because a farmer nearby dug a new well. There are two factors that have affected the relationship between this new well and the springs.

1) During the night, when there is no water being pumped from the wells, the discharge from the springs increases visibly.

2) According to an observation made by local farmers, when water is not pumped from the well, there is a drastic increase in the discharge of water from the El-Far’a spring.

It can be concluded that these new wells, which are deep wells have contributed to the decline in the quantity of water discharged from the Far’a spring. Many local people have felt that this is an infringement on their rights to the water.

Ein Miska

The inhabitants of 'Ein Miska are originally from Deir Al-Hatab, located to the east of Nablus. This spring is located in the south side of the wadi surrounded by the Al-Aqrabania area. It is 38 meters below sea level. The average annual discharge from 1970-1994 was 1,317,000 cubic meters. The water flows from the spring, through a channel that is 2.5 kilometers long. This water is distributed systematically by the farmers in order to irrigate the land. 350 dunums of land depend on the water from this spring.

Within the last three years, this spring has dried up during the mid summer months. However, between 1970-1994, this spring continued to discharge year-round. The cause of this drought, according to the farmers, is because of two main reasons: First, the lack of rainfall in the past few years has decreased the discharge from the spring. Second, the increase in water being pumped from surrounding wells has also contributed to the spring's dryness. The farmers tried to intervene in this situation by writing complaint letters to the water authority in Nablus and to the Ministry of Agriculture. However, nothing was done in this situation, which gave rise to internal conflict between the local people. At times, the situation revealed signs of improvements between the farmers and well owners however, these improvements always regressed during the periods of drought. Because of the lack of water being discharged, the area of land irrigated by

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17 Every one thousand dunums equals 1 km²
18 Arabic transliteration from the Holy Sayings of Prophet Mohammed
Figure 2: Map revealing the location of each spring and their respective names within the Wadi el-Far'a (Project map).
Figure 3: Map of the different water systems within the Wadi el-Far’a, where the ownership of each system is detailed in this project (Project map).
the spring has decreased. The land that once depended on the springs for cultivation now depends on the rain for agricultural growth.

C. Water Systems of the Wadi el-Far’a

The map in Figure 3 details the spatial data collected by Abdel Halim and Sebastian Naslund, and its corresponding table is in Appendix A, which reveals the owner of each water system and the water systems usage.

Collecting Ponds

Individual cisterns, tanks or ponds collect rainwater, usually from the roof run-off. These collecting ponds can hold various quantities of water. Unfortunately, since almost every person in the Wadi el-Far’a has one of these collecting ponds, the total number and their locations has not yet been calculated. It is understood that these ponds are extensively used during the rainy season, but these ponds usually do not hold enough water to last very long into the dry season. As collecting ponds are so extensively used, their importance can not be forgotten.

Wells

Since a large quantity of groundwater exists in the aquifers, many wells have been drilled in this area. Springs only occur in a few locations around the region, so that wells are necessary to receive adequate quantities of water in many locations. People cannot solely rely on collecting ponds from the rainfall (since rainfall varies so widely), which necessitates the use of wells to ensure enough water for domestic and animal drinking, irrigation and recreation. More than sixty wells (out of an estimated seventy-two) have been identified by Abdel Halim in this area, which can be found in Appendix A or the map of all the wells (Figure 4). 95% of these wells were drilled in the 1960s. Other wells have been dug by the Israeli authorities to provide Israeli colonies with water for irrigation and domestic uses. Israeli wells often reach the deeper, whereas the Palestinian ones have been restricted by the Israeli authorities to not exceed a depth of 100 meters and a specified pumping rate. The Israeli wells not only reach deeper, fresher aquifers, but they also take much more water per capita than the Palestinians of the region. Despite the illegal nature of these Israeli colonies, they still claim rights to the water below the ground on which they have built their settlements. Because Wadi el-Far’a has a limited amount of rainfall, in dry years, there may not be enough recharge to satisfy the water withdrawal needs of its inhabitants, often causing the water shortages in the dry months that has been discussed in the hydrological sector. This shortage has negative repercussions on the farmers who own wells and are attempting to irrigate their lands.

In the last few years it has been difficult to determine the actual pumping rate at each well. The problem is that some of the well owners have pumped more water than they are permitted to pump, without letting this information be known to the PWA (Palestinian Water Authority). In addition, the Israeli Authorities have given farmers the permission, through the PWA, to reconstruct wells or drill new ones next to old wells on the condition that they must plug the old well. However, some of the farmers do not abide by this law but continue to pump water from both the old and new well, which causes the people who rely on non-pumped water to be left with dry springs or a dry wadi. Because Israelis have ignored the water problems in this area, internal problems between the Palestinians have festered. Many farmers have relied not on wells, but on springs as their source of water for thousands of years. Although these farmers have documentation for their water rights to this surface water for drinking and irrigating the land, people in influential positions drill wells that ultimately have a negative affect on the
Figure 4: Map of the wells located in and near the Wadi el-Far’a study boundary (Project Map).
discharge of the springs. This is considered by the many local farmers, who continue to rely on the spring, as a violation of their right to have an adequate amount of water for drinking and irrigation.

The water from wells has several uses: drinking, irrigation, and recreation. Now, that it is impossible for people to receive drinking water from the springs (since they are dry), the local residents have begun to rely on the water from wells for drinking. This is a new development, and will most likely result in greater problems, as their will soon be less water for irrigation purposes. Any water not used for drinking is then used for irrigation. The land used to be naturally irrigated when this excess water flowed from the springhead through the channel network onto the land. Now, well water is the primary method of irrigation during the dry months. The problems related to present irrigation practices will be discussed later with irrigation channels. Wells do not usually supply water to recreational areas, but again, in the dry months, wells now supply this water.

**Water Mills**

In the past, water was used in operating the mills to grind the grains. These mills are still standing today as archeological sites. There are 37 mills in the region of Wadi El-Far’a and Al-Badhan. These mills date back to the Mamluk period and some mills were even being used during the 1960s. (For more information, look at Tumazi's *Water Rights and Uses in the Middle of the Palestinian Mountain*). Water Mills have been previously mapped, and can be seen in the archeological section.

**Irrigation Channels**

Channels are used to distribute water to the fields. This water comes directly from the spring, like the Miska channel or from the wadi, like An-Nassarya channels and Al-Aqrabania channels. Wadi el-Far’a has a complex system of main and secondary channels. The main channels flow from the water source at the springhead *(Figure 5)*. The secondary channels branch out from these main channels. Throughout the secondary channels constructed gaps are placed for water to exit the channels and run on each farmers land or further irrigation channels; the secondary canals and gaps can be seen in *Figure 6*. Whereas the primary channels are owned by the entire community, secondary channels and the gap systems are owned by the farmer who uses the secondary channel.

The farmers have documents issued from the Land Registration Office that explain the area of land allocated to each owner. The Department of Land implements a tax for each farmer who owns a piece of land. Some of the influential farmers use generator-driven pumps to withdraw water from the wadi to irrigate the upper land that was previously rainfed. This action is an infringement of the rights given to the farmers who own irrigated land. This is the biggest
problem faced by the farmers who live near the main spring. However, water is now limited as the spring dries up in the summer and thus, this problem with the farmers has stopped. As of now, it is impossible to tell whether or not this problem will begin again in the future.

Because the main channels are owned by all the farmers, everyone must make a collective effort to clean them once or twice a year. In the past, these channels were made from soil and rocks and the channels stretched across a very long distance. Some of them were as long as 3 kilometers like the Al-Aqrabania channel. The main problem with this system is that the channels began to fill up with soil due to erosion, and plants began to grow along the side. These problems were difficult to repair. When there were hard rainfalls and floods covered the areas, channels were partially destroyed, causing the water in the channel to be lost through the gaps. In addition, the irrigated areas are prone to flash floods because of the steep slopes of the wadi. Despite these problems, the farmers tried to reconstruct and clean out these channels. For example, in the 1970s, the family of Al-Hamood built their own water channels using cement instead of the soil. In 1998, the Palestinian Hydrology Group (PHG) began to replace the soil channels and constructed cement channels in the Far'a spring and Duleib spring. The PHG replaced 8,830 meters. 635 dunums are now irrigated by these channels. Another project began in 2000 to change the Al-Badhan channel. In 2002, a new project began for the An-Nassarya channel. These changes are more efficient uses of the water, because water is no longer lost through the old soil channels. These changes also made the work time of farmers more efficient as they did not have to fix channels on such a regular basis. These channel changes have not occurred in all places in the Wadi el-Far'a.

Agricultural Pools

In the past, one could irrigate his or her land through the channels by using pumps. These channels were very labor-intensive and lost much water through deep seepage. Because of these problems, farmers began to dig pools in order to store water for irrigating their crops (Figure 7). Thus, each farmer had complete control of when they watered their crops as they each stored their own supply of water. Both, pools and channels, are used simultaneously in several places.
areas throughout the Wadi el-Far’a. The pool system has benefits because it encourages farmers to use modern irrigation methods, thus increasing the yield from their agricultural land. The number of these pools is increasing. Most of these ponds are at the An-Nassarya and Al-Aqrabania villages.

There are two types of agricultural pools. One type is a circular pool constructed from soil and the other is a cement pool that is square-shaped. The pools are built on terraces so that there is a slope for the water to run down naturally. The water comes from the channels to the pools and then exits the ponds through drains. However, by using a pump, one can eliminate using drains (Figure 8). New techniques of irrigation for example, sprinklers and drip irrigation, rely upon a set amount of water that is pumped from these pools. These pools still have problems because of the water lost through evaporation and deep seepage. Another way to store water is to use tanks. These tanks are made from cement and are covered to prevent evaporation that is common in this wadi. However, these cement tanks are expensive to build and as a result, very few people have them.

Recreational Pools

Recently, water has been used for recreational purposes, which has been provoked for several reasons. The first reason is economic: people are searching for ways to profit from using small quantities of water. It is not always feasible to use the water for irrigating their crops, as many of the crops, such as citrus, require huge amounts of water. Many farmers are losing their profits because their crop yields require so much water. Therefore, they are looking for new ways to increase their income; notice the different recreational uses in Figure 9.

Another cause for using water in recreation is the growth of population. According to the Islamic law, when a man dies, his land is divided among his

Figure 8: Photo of an irrigation pumping well up close (Project photo).
descendants. The problem with this is that it is not economically feasible when so many people use such small pieces of land to farm.

Figure 10: Map of the location of recreational and agricultural pools in the Wadi el-Far’a (Project map).
and therefore, people are now thinking of new methods to use the same land and generate income. Because of this, more people are using water in recreation. Recreation improves the problem because it does not interfere with the division of land. A map of the location of all recreational pools as wells as irrigation pools can be seen in Figure 10.

A last reason for using water in recreational areas is because of the present water shortages. Even though the springs dried up in the last few years, local people have been expecting these water shortages for several years. Since recreational areas do not require as much water as irrigation, they have been a great solution to the problem of water shortage, while still maintaining an income.

Although there is the initial high cost of the recreational equipment, in the long run, using water for recreation is profitable for these people who have done it. On top of this, when the recreational area is finished using the water, it can then be used in irrigation. There are twelve recreational areas in Wadi El-Far’a and el-Badhan. Some of these areas are for small cafes and clubs, such as the cafes in Wadi El-Far’a, At-Tawaheen, and Al-Forat. Other recreational areas include large swimming pools and restaurants, like the Palestine Recreational Center and Al-Jazeera Recreational Center. The largest recreational areas are 'Ein Shibli and Al-Waha Recreational Center. Not only do the people feel good about these recreational centers but people from all over the West Bank can enjoy these centers as they can come visit during the weekends. Furthermore, it is a place that the Palestinians can spend their leisure time as they can no longer visit Palestinian beaches because the Israeli government banned the travel.

Greenhouses

Greenhouses have been in use in Wadi Far'a since the 1980s. At that time, there were only greenhouses at Far'a and Frush Beit Dajan. Since then, this technique has spread to the Al-Badhan, Al-Aqrabania, and An-Nassariya areas. There are 50 greenhouses to the east of 'Ein Shibli (see Figure 11). The aim of using this system is to increase the production of crops year round. Greenhouses allow farmers to grow crops earlier in the year than in their regular season. By producing crops earlier, the farmers have a longer period of time in which to increase their profit margins. They have the advantage over other farmers because their crops are harvested sooner. In addition, the land can be harvested more than once a year. Also, production in greenhouses exceeds the production in open land. Furthermore, during the winter months, the rain is collected on plastic on the roof of these greenhouses and is then transferred and stored in the water ponds. Once in the ponds, this water can be used for irrigation. Greenhouses on the land are very expensive and when a farmer's rental period ends, new farmers on the land often remove the greenhouses as they are too expensive to maintain. Hence, there are a fluctuating number of greenhouses in the wadi (see map of greenhouse localities in Figure 11). Another problem is that farmers cannot always sell their products in Palestinian cities due to the Israeli occupation.

V. Interpretation

Several concluding statements can be made about the water rights in the Wadi el-Far'a. First, it is noticed that even though the entire land is Palestinian land, Israeli authorities continue to claim equal, if not greater, rights to the land, and hence the water. Not only do Israeli change the rules that have governed the land for the past thousand years, but people with some degree of power (or money) in the region can drill a well and discharge more water than that which should
Figure 11: Map of the greenhouses within the Wadi el-Far’a (Project map).
be allocated to them. This can be done because of the poor enforcement policies, and the lack of an enforcement agency, as the PWA, the Palestinian Police, and the Israeli forces do not prevent or stop illegal activities. So, presently, those with power have the ability to claim rights to the water without having any repercussions. Despite this, local Palestinians still strive to find ways to drink water, feed themselves and raise enough money to live. In doing this, the local people have developed agricultural pools to store their irrigation water, recreational pools to earn more money with little water, and greenhouses to use less water in order to get higher crop yields. All of these recent developments (last 30 years) are owned and run by the local land owners.

VI. Recommendations

Short Term

a. Carry out a study on the effectiveness of an equitable water distribution plan that would be regulated under clear guidelines concerning ownership and usage.

b. Construct a study on the size of land parcels and the quantity of water used per area.

c. Map out all water resources that have not been mapped--all collecting ponds, cisterns, abandoned wells, etc. At the same time, determine ownership, if any.

d. Determine sizes of agricultural and recreational pools in order to get a very accurate water budget plan.

e. Determine, quantitatively, water consumption amounts for the different water systems and the different people using the water.

f. Study the quantity of water used by the Israeli colonies, and compare that with the per capita use of the Palestinians within the Wadi el-Far'a.

Long Term

a. Construct a) a monitoring program for all water systems, b) ownership guidelines regarding installation and usage methods of these water systems, and c) a system of equitable allocation, which takes into account social, economic, and environmental needs and costs. Use a pre-existing agency (i.e. the PWA) as the regulator of these programs, guidelines and allocation plans.

b. Stop restricting the rights of Palestinians from using adequate supplies of surface water, drilling new wells in the deeper aquifer, and creating water projects that can bring about greater amounts of water for the local population.

c. Prevent the Israeli colonies from drilling new wells and stealing water from actual Palestinian territory.

d. Develop water rights laws that do not ignore old Islamic laws, but take into account the complexity of the situation regarding water rights.

e. Develop education programs which teach the people how to use the water equitably, and teach them about their rights to the land.

f. Plug and close any abandoned water systems; charge the owner of that water system, or get funding from outside organizations or agencies.
### Appendix A

#### Water Rights or Water Resources

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<th>Sample (other)</th>
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Appendix B: Annotated Bibliography


- This book gives an excellent summary of the last 3,500 years of history within geographic Palestine. Maps, statistics and facts regarding the entire environment of the West Bank are given; this helps to put the Wadi el-Far’a within the context of the entire West Bank. Special attention is given to the water crisis and who has control of that water, and how it can be best allocated.


- One chapter of this book is devoted to the Jordan river conflicts over water. The need for environmentalism over national security is discussed in order to create awareness on the problem of sustainability. This book helps put forth the idea that in order to live in this environment, we need to work together and help one another, instead of preventing the flow of information for security reasons. We have already dealt with this as water aspects within the West Bank are usually considered a confidential matter, so trying to get water characteristics on the wadi can be difficult.


- This book puts the Palestinian-Israeli problem of water among the whole problem of water in the Middle East, and the need for better management solutions. It describes the problems regarding the management and distribution of the water within the West Bank. It discusses the importance of places within the West Bank that act as major recharge basins for aquifers (such as Wadi el-Far’a). This book also describes the water resources in great detail of the West Bank, giving much needed information to me for the topic. It describes other water systems (facts, statistics, and graphs on wells and springs), giving excellent background information to the Wadi el-Far’a and revealing the importance of this wadi. This book also outlines several sources that will be very helpful to our project.


- This paper helps to determine means by which aquifers can be shared between countries, using Palestine-Israel as a specific example. This is helpful because the Wadi el-Far’a lies over the most important aquifer to the Palestinians, as well as part of another aquifer. The way these aquifers are managed will determine the environmental status of the Wadi el-Far’a. These paper specifies the problems that surround the water rights issues in
Palestine, as well as discuss the information that need to be taken into account before better management can occur.


- This study has effectively answered many answers regarding the geology, hydrogeology, water resources and management within the Wadi el-Far’a. This study is one of the most important work to our study, and touches on many different issues, that we will certainly take into account. His information not only stands as a base from which we can work from, but also as a comparative study for the results that we will get.


- This book focuses on most of the water systems throughout the entire Middle East. The author also discusses the Israeli-Arab conflict over waters. The author proposes that the supply of water is not the problem, it is rather the distribution and amount of water that is wasted that is the problem. And this can be seen clearly--washing cars everyday, irrigating lawns and other vegetation that just soaks up the water and does not offer anything greater than aesthetic beauty, etc, etc. The author also proposes several solutions to the problem of supply: shipping freshwater by boats and pipes, or desalination projects, amongst many others.


- This places the Wadi el-Far'a within the context of the water resources of Jordan, Israel and Palestine. This paper mainly helps for background information and comparative research, but this study also details the Far’a spring as a representative example of springs in the region. This study helped to make multi-nations work in cooperation with each other, which is what this project is also attempting to do.


- This book focuses heavily on the need for better management, citing several failed international programs within the Middle East, and Palestine-Israel especially. This book helps to understand the complexity of the problem and the difficulty in trying to find a political solution, which is what our project will try to do after all the facts and information have been collected. The author explains some problems that have caused solutions to fail and tries to give a realistic stance of solving the problem.


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*Water Rights, 137*
This book gives a detailed summary of the last 150 years of Palestinian history. Government bureaus, agency's, and departments are outlined and their role is described. Attention is also given to the special laws and agreements between countries and within countries; these agreements are important to my topic as I study who was given control of what water and when, and if any changes have occurred since then.


This publication gives exact locations of all the springs within the el-Far’a drainage basin, as well as chemical properties, discharges and other information for up to 25 years. This will help our study by acting as a comparative and being part of the series of information regarding the Wadi el-Far’a water resources.


Written by a conglomerate of authors, this book is similar to Rivers of Eden in layout and objective. It proposes solutions to the quantity of water. This book also tries to allow people to understand Islamic laws toward water, and laws of Arab tradition in general. This will be a helpful text in understanding why people are and have been acting the way they do in areas like the Wadi el-Far’a.


Similar to the book written by Mustafa and Gray, this book deals with the conflicts that arise over water in the ME. This book gives special attention to the Israeli-Palestinian problem. This book discusses the policies enacted from international agreements (Oslo). This book states that a resolution to the problem should not be based on natural aspects of the environment, but rather anthropogenic aspects of the environment--human discussions, agreements and/ or structures. This is helpful to think of because there is large dispute even among local people in the Wadi el-Far’a.


This book is written by a number of authors. It details international water laws, and gives specific examples of areas that need for laws to be created or enforced, and one of these areas is the Jordan river. Since all the water from Wadi el-Far’a drains into the Jordan river basin, it is important to acknowledge what is happening there and what can be done to prevent such problems in a smaller area like the Wadi el-Far’a.

This book gives an overview to a survey done in the mid-1940's. This helped me get some figures on population and settlement locations, population densities. This helped to understand what group of people was controlling the water before the state of Israel began and before Palestine became an occupied territory. This is good for a comparative analysis of the region.


This book described how land was allocated during this time and how ownership or control of the land was given to local people, which helps to understand what some people within the Wadi el-Far’a might be basing their claims to water rights on.
Environment and Pollution Sector Report
By: Raida Qarabesah, Benjamin Ruddell, and Lynne Abigail Tan

I. Introduction

The Wadi el-Far’a watershed is threatened by rapid population growth in the city of Nablus and several refugee camps, as well as by continued economic pressures from the Israeli occupation. The stream is fed by a number of perennial springs and provides water for a significant portion of Palestine’s agriculture. Water pollution and water shortages are becoming more acute as urban and refugee areas continue to grow and pumping from the groundwater for both legitimate and illegal purposes becomes more prevalent. Water sources that were once pristine are now contaminated. Under the Israeli occupation local government is unable to coordinate, regulate or enforce the just and equitable distribution of water supplies or the environmentally sound disposal of wastes. Together these factors have resulted in a crisis in public health and economics.

The pollution sector of the project is of importance given the current lack of information concerning the nature and extent of the contamination of the watershed. The springs, wells, and streams in the study of the catchment area represent the major source of water for agricultural and domestic purposes for the watershed’s inhabitants. With a survey of environmental pollution and water resources we hope to prioritize feasible, practical, and sustainable short and long term environmental solutions for the region. Towards this end an attempt was made to take a survey of current water quality and supply in the valley. This data was to be correlated with land use survey data and historical data. The details of this survey and its results are outlined below, along with recommendations for future study and work in the Wadi el-Far’a.

II. Objective

The purpose of the pollution survey is to establish the quantity and identity of municipal and agricultural pollutants in the Wadi Far’a surface waters, and to locate the sources of these pollutants. In addition it hopes to make recommendations for improving the condition of the watershed in terms of water quality and quantity.

III. Methodology

The Calvin College and Birzeit University teams met in Amman, Jordan to organize and coordinate plans for the project in July and August 2001. The parameters for testing were determined as well as the methods of collection and analysis. Raida would take water, soil and plant samples every ~2km along the Wadi el-Far’a and its tributaries. She was told take three samples at each springhead to accurately establish discharge quality from the aquifer (three samples are required given the unpredictable flow patterns at a spring head). The samples were to be submitted to the Palestinian Water Authority for laboratory analysis of the following parameters:
A preliminary report was written using background information gathered in the first stage of the project. Research was done on the water catchment and its context including socioeconomic, water resources, landuse, agricultural practices, and general studies on wastewater quality. Included in these studies was a hot spot unpublished report by the Ministry of Environmental Affairs (See Appendix B). Ministries and Institutions were visited throughout Jordan and Palestine, information was gathered and interviews conducted by the sector staff. Previous studies on water quality in the region were also collected at this point from the Palestinian Water Authority (PWA), the Palestinian Hydrology Group (PHG), and Birzeit University.

IV. Results/Data

A. Samples collected in the Field Season of Summer 2001 by Raida Qarabesah and analyzed by the Palestinian Water Authority (PWA).

These samples, twenty-two in total, were taken at various appoints along the springs and streams of the Wadi el-Far’a catchment area. (See Table 1 in Appendix A). The data collected from these samples were compared with Palestinian Water Quality Guidelines (See Table 2 in Appendix A). Biological factors were not tested for at this point in time, thus could not be used as a parameter for our investigation of the pollutants in the water sources. The samples were also spatially analyzed using Arc View 3.2, (See Figure 1). Nitrogen compounds used as a measure of pollutants, but lack of phosphate levels, BOD, DO, and coliform levels from the samples taken in 2001 prevent specific pinpointing of the pollutants in the samples. 19

B. Historical Data, Previous Publications, and Field Observations

In the course of our research the team gathered historical data and publications related to the El-Far’a Valley and its inhabitants in order to provide a contextual basis for our research and to investigate the currently available materials on our research area (Appendix C Annotated Bibliography). In addition, team members from Birzeit were able to gather observations from the field and through interviews with the local population.

Springs and Wells: Two studies were conducted in the West Bank by the Palestinian Hydrology Group in cooperation with Bethlehem and Newcastle Universities, one on springs in the West Bank and the other on wells. The research teams did an in-depth study on the chemical

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19 Raida has proposed a more systematic and chemically more comprehensive sampling process to be done in fulfillment of her M.A. in Geography at Birzeit University in the calendar year 2003.
Figure 1: Location of Springs and Water Sampling Sites
and biological quality of the water resources in the West Bank and evaluated their utilizability as a source of drinking water and/or irrigation. These studies revealed that the springs in the Nablus district, in which many of the springs in our study area are located, were safe for irrigation but already unsuitable as a source of drinking water in 1999. All chemical parameters, though significantly high, were below the maximum guideline levels for drinking water quality according to the World Health Organization. However, measurements for biological parameters revealed extensive pollution of the spring water, indicating contamination by sewage and solid wastes. The team also utilized the work of Marwan Ghanem, who wrote his thesis on the hydrogeology and hydrochemistry of the catchment area. His studies on the groundwater basins and its aquifers provided a contextual basis for our research.

In addition, studies on the practices and conditions of the built-up areas and land use in the region give insight into some of the causes of pollution in the area, as well as the consequences of the polluted water resources on the local population. Reports such as papers on two of the built-up areas within our study boundary- a report on the Far’a Village by Jennifer Moorehead and a Hot Spot report by the Ministry of the Environment on the Far’a Refugee Camp (See Appendix under Built-Up Areas)—reveal practices that are detrimental towards the sustainability of the environment and its natural resources. The implications of this data are discussed in the section below.

V. Discussion:
The water pollution in the area stem mostly from the agricultural and disposal practices in the area and the lack of an adequate infrastructure in regards to proper waste disposal. Our Built-Up areas report reveals a number of disturbing trends and realities.

The total population for our study area, including Nablus city, according to a 1997 Census by the Palestinian Bureau of Statistics\(^\text{22}\) is 231,245 with 38,839 households. The census reveals fairly depressing conditions. With the exception of Nablus city, most of the built-up areas and villages have no public water or sewage networks. Of the sixty-one built-up areas in the study area only twenty built-up areas had one or more housing units connected to a public water network, and only four locations had any sort of public sewage system (See Appendix C in Built-Up Areas Sector). The majority of households use cesspits as a means of waste disposal, of the total households in our area 44% used cesspits. The census also revealed that 72% of the households in our area have connection to a public water network, however of this

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percentage 63% of the households are located in the city of Nablus. Many of the built-up areas dump their sewage effluent directly into the streams and solid waste into unlined pits. A major source of pollution comes from the Nablus municipality with a population over 100,000 (PCBS 1997 Census). Nablus dumps untreated effluent from its sewage network directly into the Wadi el-Badhan, a tributary of the Wadi el-Far’a. The Al-Far’a refugee camp with 4688 inhabitants disposes of some of its solid waste in pits and the rest by trucking it to a site 1.5km from the camp to be burned (see Figure 2). The effluent is drained into the stream a few hundred meters away from the camp and wastewater from homes is often dumped directly into the streams or into open ditches. Though a public water distribution network has been installed, only 840 people have been connected to it. The remainder of the population depends on wells and tank water pumped from the Far’a Spring. Since the camp is situated up a slope only a few hundred meters away from Al Far’a Spring, cesspits and open ditches allow infiltration of contaminated water and possible contamination of groundwater resources, thus jeopardizing the major source of freshwater in this area. The open ditches also pose significant health concerns as a breeding ground for disease-carrying insects and the possibility for fecal to oral contamination for children that play in and around the ditches outside homes.

Agriculture is the backbone of the Palestinian economy, but the agricultural practices have also contributed to the water quality problems and public health issues. There has been a significant increase in the use of pesticides and fertilizers in the last few years (128 water resources, ARIJ). Furthermore, 18% of the pesticides used in the West Bank have been internationally banned because of their negative effects on environmental and public health. The chemicals pollute the soils, and the water-soluble pesticides could possibly contaminate surface water by run off or contaminate ground water resources by leaching. There are no regulations for proper dosage, use, and disposal of pesticides and fertilizers, and many farmers discard empty containers at farm borders or by burning them nearby (ARIJ 130).

Another source of water contamination is the livestock that use the streams and springs as a water source, and pollute the water with fecal matter. Moreover, local herders bring their sheep and goats to the streams to wash them and to shear the sheep, thereby polluting the surface waters (MEa report on Far’a camp).

Finally, an extremely significant pollution factor is the waste disposal and use of agricultural chemicals by the Israeli colonies. However, no information or data are currently available to the Wadi el-Far’a Project Team

Problems with the Survey

The pollution survey was not successful in its efforts to collect current data on water quality. As a result, the team is unable to correlate water pollution with surveyed environmental
problems. The original research plan for samples at the spring heads, at two kilometer sampling intervals along the Wadi el-Far'a and its tributaries, and soil samples could not be carried through due to the closures, military barriers, and other impediments resulting from the current political instability that prevented movement and work in the research area. Instead, samples were taken mostly at the spring heads and only a few samples collected at the streams themselves. A second sampling trip with on-site testing equipment as well at the appropriate site was planned later in the summer of 2001, but the study area became unsafe for investigative research, particularly with visible use of maps and equipment which are viewed as a potential security risk to the military personnel in the region. There were also some dry springs that could not be sampled until the winter season, however the winter round of sampling was also canceled because of political situation In addition, the Calvin College portion of the team were prevented from entering the study area site during the two summer sessions.

Besides the barriers posed by the unstable political situation in the region, there were also problems in the data collection methods themselves, which may account for the inconsistencies in data sets. Such inconsistencies in data resulted from: lack of quality control measures in sampling methodology as well as in the procedures used for assessment of the desired parameters at the various testing centers. Until this past year, no real measures were taken at the various agencies (e.g. The Palestinian Water Authority and the Palestinian Hydrology Group) to standardize their sampling and analysis methods, nor were there any quality control measures in place. Statistical and sampling error for the historical data is difficult to account for because of this lack of standardization in methods and lack of documentation of the methodology of sampling and analysis. Though standardized methods were planned for they do not appear to have been carried out, resulting in further problems with the data.

In addition, the PWA lab was unable to comply with our request to test our samples for the following parameters: phosphate levels and biological and chemical oxygen demand. The faecal coliform data listed also seems inconsistent with what we know about the watershed and the historical data collected from the PWA and Birzeit University. Upon speaking to a representative of PWA he suggested that the biological parameters tested for by Birzeit that indicate 0 levels of fecal coliform despite the high levels of total coliform, were samples which were not tested for fecal coliform, thus indicated as zero. The lack of this data, along with the lack of data on the water quality along the streams themselves, prevented proper interpretation of the nature and quantity of the pollutants contaminating the water source, whether they are primarily from human waste or from agricultural pollutants such as fertilizers and pesticides.

Despite the lack of hard, up-to-date data we can still draw general conclusions from previous water quality studies and built-up areas studies in order to make recommendations for future research and work.

Summary of Environmental Problems in the Study Area

- Pollution of spring headwaters caused by proximity to poorly designed underground septic systems and inappropriate human and animal uses of the headwaters, including washing of animals and vehicles and leaking of mechanical fluids (point sources).
- Pollution of Wadi el-Far’a caused by agricultural pesticide and fertilizer runoff, animal feces, sediment runoff, and dumping of solid wastes along the banks (non-point sources).
- Pollution of Wadi el-Far’a caused by discharge of municipal sewage into the Wadi
- Summer shortages in irrigation water caused by wasteful irrigation/distribution systems, illegal pumping, and failure to store winter floodwaters and runoff.
- Reduced discharge from springs caused by wells lowering the water table, such as the two large municipal wells just installed to supply Nablus with drinking water.
- Pollution of groundwater caused by septic and agricultural seepage
- Poor crop yields caused by poor water quality
- Insufficient or contaminated drinking water in valley villages
- High incidence in Nablus Governate of waterborne infectious diseases, such as hepatitis, ascariasis, giardia, and other gastrointestinal disorders
- Contamination of produce by neurotoxins and carcinogens from use of harmful and illegal pesticides.
- Brucellosis spread by contaminated meat from infected livestock is a prevalent problem. Associated with this is the contamination of water resources by livestock that graze near the streams, spreading Brucellosis to other livestock and human consumers by fecal-oral route.
- Inadequate access to appropriate medical facilities and personnel outside the city of Nablus.

VI. Conclusions

Our study reveals that the area has numerous problems not only with the quantity and availability of water resources, but also in regards to water quality and pollution. The lack of clean drinking water poses numerous health risks for the local population. Our recommendations address three basic areas: Increasing the availability of potable water resources and water for irrigation, changing practices that perpetuate the problem of pollution of currently available resources, and cleaning up and addressing already contaminated sites and health and occupational concerns that have arisen as a result of the pollution. Education is an essential component of our recommendations. Our goal is to assist the Palestinian people in establishing autonomy and self-sufficiency. Longevity of the changes and improvements made in the area is dependent on active community support and involvement. The following is a list of recommendations and solutions to some of the problems surveyed in the watershed divided into Short and Long-term solutions according to the problem addressed. In the long term, just and effective government must coordinate sustainable and equitable distribution of water resources and enforce environmental health. In the short term, fundamental development techniques and aid should be applied to the residents of the Wadi el-Far’a according to their needs. An ongoing and more sophisticated independent professional survey of pollution will be needed to quantify and prioritize these needs, and to verify the effectiveness of aid.

VII. Recommendations:

**Short Term**
- Growing Shortage of overall water supply in the Wadi el-Far’a
  - Help farmers replace earthen and leaky concrete canals with pipes
  - Encourage the use of greenhouses to reduce evaporation and allow better control of irrigation applications.
Pollution, 147

147

c. Encourage the planting of water saving, more durable cash crops, and the elimination of water wasting crops such as bananas (which also tend to rot before they get to market, given the political situation).

d. Help farmers construct small dams and storage ponds to store winter floodwaters

e. Coordination of planned deep well exploitation of the Eastern Aquifer and the management of surface water sources in the Wadi el-Far’a

Pollution of Groundwater by Septic and Agricultural Seepage

a. Provide free redesign, repair and replacement of non-functional septic pits and cesspools, and provide free pumping services (to maintain the septic systems).

b. Cooperate with UN refugee administration to close all ineffective sewage / wastewater disposal systems and replace them with proper latrines and treatment systems, particularly in the refugee camps.

c. Construct an NGO or government-managed, engineered and maintained septic sanitary facility for sewage and wastewater in each village and town.

Insufficient Clean Drinking Water

a. An NGO should drill and maintain small deep wells in valley villages that are without clean drinking water, or find a way to reliably truck water in.

b. Small on-site water treatment facilities should be established in villages along with safe water storage vessels.
   • Have a unit such as a MIOX unit (LATA. Inc., Los Alamos, NM) for on-site water treatment and disinfection. From a 3% brine solution, the MIOX unit electrolytically produces disinfectant with hypochlorite, chlorine dioxide, ozone, peroxide and other oxidants. These units are used by organizations such as the CDC for water quality projects. A health care worker in the community would be put in charge of producing and distributing this disinfectant to families in the community in order to provide clean drinking water for the community. Education would be necessary for proper instructions of how to use the disinfectant.23

Other Health Related Problems.

a. Brucellosis- since contamination is spread between livestock through fecal-oral contamination, efforts should be made to protect water resources from fecal contamination from grazing livestock.

Long Term

Polluted Spring Headwaters (point sources)

a. Develop spring heads to protect headwaters from pollution by human uses- enforce non-access of humans, vehicles and animals to the headwaters. Construct a water pump station at each major spring head to sell or freely distribute water to trucks and herdsman according to the spring’s water user’s agreement.

b. Establish & enforce buffer zone around springs and wells where septic systems and all waste disposals are prohibited. 35m is a typical isolation distance.
c. Establish and enforce a buffer zones where deep well drilling is prohibited.
d. Regulate and enforce industrial pollution guidelines to control industrial pollution (example: the generators at the block factory)

Polluted Wadi (non-point sources)
a. Educate farmers on proper use of pesticides and fertilizers to reduce quantities applied. Enforce international bans on the production and use of dangerous pesticides.
b. Educate farmers on plowing and drainage techniques to minimize runoff of rainwater and the pollutants and sediments it carries downstream.
c. Establish and enforce a no-dumping/no-septic zone along the Wadi (35m is a typical isolation distance)
d. Establish animal watering stations on community land, outside buffer zone.
e. Construct an NGO or government-engineered and managed landfill to collect solid wastes for disposal. Clean up and enforce no-dumping zones along the wadi.
f. Physically block vehicle access to the Wadi and enforce appropriate human and animal usage.

Municipal Sewage Pollution of Wadi
a. Construct a properly designed and operated WWT plant at Nablus. The design of this plant should reflect regional experience in wastewater treatment successes and failures. For example, the Salt Valley WWT in Jordan has been very successful because of its excellent design and operation, and because the city of Salt controls the industrial sewage discharges into the WWT that render many other Jordanian WWT’s ineffective.
b. Construct smaller WWT plants to serve large communities and refugee camps
c. Transport or pipe sewage from small communities and refugee camps to the Nablus WWT.

Summer Shortages of Irrigation Water
a. Construct the proposed dam at Jiser al-Malaky to store winter floodwaters for summer use in downstream irrigation.
b. Use winter runoff to recharge groundwater, as discussed in the fourth section of the report.
c. Stop water theft. Water theft undermines the entire spirit of cooperative community water management efforts and must be eliminated.
d. Use treated wastewater directly for irrigation of high-value crops, using appropriate WHO or ASCE guidelines.
e. Educate and help farmers implement modern irrigation techniques: sprinklers and drip irrigation for certain crops, advanced surface irrigation for other crops (salt-intolerant crops, for example).

Reduced Spring Discharge
a. Regulate and enforce groundwater pumping based on a water budget approach to groundwater management
Pollution of Groundwater by Septic and Agricultural Seepage

- Establish central community septic systems in villages, properly designed and maintained by the government or an NGO.
- Educate farmers in the proper use of pesticides and fertilizers to reduce application and the corresponding seepage of chemicals and nutrients.

Poor Crop Yields from Bad Water

- Educate farmers in modern irrigation systems and practices to reduce the effects of pollutants on plants (flushing soils, crop rotation, irrigation timing).
- Educate farmers on pollution-resistant crops.
- Emphasize the relationship between individual and community pollution prevention and better agricultural results.

Insufficient Clean Drinking Water

- Implement comprehensive water resources management policies to restore the natural watershed flow patterns and high water quality.
- Establish community-managed water supply systems, utilizing treated spring waters or well water.

Health Problems

- Educate communities about sanitation, hygiene, solid waste disposal, and water quality.
- Educate communities about safe pesticide use and management (dosage, protective clothing, proper precautions).
- Management and monitoring of the health status of the communities with regards to waterborne and water quality related diseases.

Further Research

- Another round of sampling with proper maps and equipment.
- New locations for samples better representative of the watershed.
- Establish a research and educational center for monitoring soil and water pollution, the quality of the agricultural products, and to enhance the application of new agricultural techniques with keeping in mind, environmental awareness.

TECHNICAL DISCUSSION OF SELECTED SOLUTIONS

In a semi-arid region with intense solar radiation, high mean temperatures, and low humidity, evaporation accounts for the vast majority of precipitation. Surface reservoirs lose much of their water to evaporation losses commonly as high at 10 cm per day. With such severe evaporation losses prevalent, it makes sense to store water underground where it cannot
evaporate. In addition, the ground can be used as an effective secondary treatment system for polluted waters by functioning as a biological trickling filter. These solutions take advantage of the ability of the soil to store and treat water.

1. The small-scale treatment and use of runoff for groundwater recharge using diversion dams and infiltration beds at the outlet of sub-basins to protect the Far’a.

This system is intended for use on the streams and tributaries to the Wadi el-Far’a that carry winter storm runoff. This runoff is typically polluted with pesticides, fertilizers, animal wastes and heavy sedimentation that contributes to water quality problems in the Far’a. The system will collect and treat the first 20% of the runoff from a typical winter rainfall event, then recharge groundwater using this runoff. Three elements must be designed to fit the unique hydraulic profile of each tributary: a primary grit clarifier and screen, a diversion weir, and a sand trickle filter / infiltration bed. Care should be taken to make sure the system could handle (with impaired function) 10-year storm flows without flooding surrounding properties.

The primary grit clarifier and screen will consist first of a mechanical screen (2” iron grate) and then of a settling tank. The settling tank will be a trapezoidal open channel sized to reduce flow rates from a typical (one month) winter storm to 0.3 m/s to allow settling of grit. The slope of the walls is determined to decrease hydraulic resistance proportional to any increase in flow rate, thus maintaining the proper flow velocity across a range of flow rates. The length of the settling tank is somewhat arbitrary, but a typical length is 20m. The tank should be made of concrete.

The diversion weir should be removable and can be constructed of any suitable material that will allow one man to remove it (wood, iron). Its height will be two meters above the concrete floor of the sand infiltration filter. The next 80% of flow will spill over the weir and into the outlet structure before continuing down to the Wadi el-Far’a.

The sand infiltration bed filter will be a large sandbox lined with concrete. The bottom of the box will have four-inch pipes placed through the concrete on a one-meter grid to allow efficient drainage. The pipes should not terminate closer than 0.5 m above the highest seasonal level of the groundwater table. The box should be about 2.5 meters deep. The bottom 10 cm should be coarse gravel, the next 90 cm should be coarse sand, and the water level will reach 2 m above the floor of the sandbox. The surface area of the filter should be calculated so that for every 2 m$^3$ of the first 20% of runoff from a typical 1-month winter storm, one square meter of filter is needed.

The structure should be maintained at least once a year in the summer- cleaning is essential to the function of a filter system. Maintenance is simple and labor-intensive. The settling tank should be shoveled out and the screen cleaned. The weir should be checked for damage. The top 20-30 cm of sand should be scraped off the filter. All the gravel and sand in the filter should be replaced every third year or so.

2. The large-scale treatment and use of municipal sewage for groundwater recharge using shallow-well injection into the upper aquifer upstream of spring groups to help mitigate the drawdown effects of well pumping on spring discharge.

Nablus presently discharges the bulk of its municipal sewage into the Wadi el-Far’a several hundred meters above the Ein Badhan spring group. Plans exist for the construction of a water treatment facility to clean this sewage before discharge into the wadi. This plan is appropriate,
but this report proposes to use the treated municipal sewage for the recharge of the Eocene Western unconfined aquifer that feeds the major spring groups. The treated sewage should be injected to a depth no greater than one meter above the seasonal high water table.

Before the location of the injection is discussed, caution must be given about the importance of effective primary treatment of the injected wastewater. If the wastewater is not cleaned effectively prior to injection, disastrous damage to the upper aquifer will occur. Great care should be taken to eliminate contraband industrial and commercial chemical dumping into the Nablus city sewer grid. Chemicals and oils degrade the efficiency of wastewater treatment and are themselves often not removed by wastewater treatment facilities, and will in turn cause severe pollution of the aquifer.

The Far’a spring group has been particularly affected by new groundwater exploitation, so the proposed injection well will be located to help rejuvenate these springs. The well should be placed “upstream” of the springs so injected waters will flow underground to where they are needed. The soils of the upper Far’a are very permeable; Ghanem assigns a hydraulic conductivity of 11 m/day to the Eocene Western aquifer. The injection well should be located so that the injected waters flow for about 30 days before reaching a spring. This ensures that any pathogens that survive the treatment process should be removed and deactivated. Thus the injection well should be located at least 330 meters from the Far’a spring group, at the location shown in Figure 4.

The injection well should reach no deeper than one meter above the seasonal high of the groundwater table. The well should be designed in accordance with the ASCE Standard Guidelines for Artificial Recharge of Groundwater, with particular attention to local faulting and rock layers near the Far’a spring group.

Figure 4: Eocene Aquifer Elevation Profile and Well Location (elevations in meters, relative to sea level)
### Appendix A

#### Table 1: Sampling Data from 2001 Summer collection Season by Raida Qarabesah.
Analyzed by Palestinian Water Authority Laboratories on 8/30/2001

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WW= Wastewater
TMTC= too many to count
Table 2: Palestinian Water Quality Guidelines and Methods of Analysis

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<td>By Using Conductivity meter, 2510</td>
</tr>
<tr>
<td>Chloride (Cl⁻)</td>
<td>mg/l as Cl</td>
<td>250</td>
<td>Argentometric Method: By titration with AgNO₃</td>
</tr>
<tr>
<td>Bicarbonate</td>
<td>mg/l as CaCO₃</td>
<td></td>
<td>Titration Method: Titration with HCl, &quot;Potentiometric titration&quot;, 2320B</td>
</tr>
<tr>
<td>Ammonium</td>
<td>mg/l as NH₄</td>
<td>0.5</td>
<td>Using Special HACH own method</td>
</tr>
<tr>
<td>Nitrate (NO₃⁻)</td>
<td>mg/l as NO₃</td>
<td>50</td>
<td>Ultraviolet Spectrophotometric Screening</td>
</tr>
<tr>
<td>Sulfate (SO₄²⁻)</td>
<td>mg/l as SO₄</td>
<td>200</td>
<td>Turbidimetric method, Sulfate precipitation in Acetic Acid Medium with barium chloride and Potassium antimonyl tartarate react in Acid</td>
</tr>
<tr>
<td>Phosphate (PO₄³⁻)</td>
<td>mg/l as PO₄</td>
<td></td>
<td>Ascorbic Acid Method, Ammonium molybdate</td>
</tr>
<tr>
<td>Calcium (Ca)</td>
<td>mg/l as Ca</td>
<td>100</td>
<td>Flame Atomic Absorption Spectrometric</td>
</tr>
<tr>
<td>Magnesium (mg)</td>
<td>mg/l as Mg</td>
<td>50</td>
<td>Flame Atomic Absorption Spectrometric methods</td>
</tr>
<tr>
<td>Sodium (Na)</td>
<td>mg/l as Na</td>
<td>200</td>
<td>Flame Atomic Absorption Spectrometric</td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>mg/l as K</td>
<td>10</td>
<td>Flame Atomic Absorption Spectrometric</td>
</tr>
<tr>
<td>Total Coliforms</td>
<td>CFU/100 ml</td>
<td>0</td>
<td>Membrane Filtration Technique, Incubate at 37 ⁰C for 24 h, 9222 B</td>
</tr>
<tr>
<td>Feacal Coliforms</td>
<td>CFU/100 ml</td>
<td>0</td>
<td>Membrane Filtration Technique, Incubate at 44.5 ⁰C for 24 h, 9222 D</td>
</tr>
</tbody>
</table>
Appendix B: Hot Spot Report by the Palestinian Ministry of the Environment (A Study on the Al-Far’a Refugee Camp)

I. Definition of the Hot spot

The refugee camp of Al-Far’a located at the Nablus-Tubas road, 17 km north-east of Nablus in an area which is mostly used as agricultural farmland. The camp which has been constructed on an area of 165 donum (1.65 ha) has been existing since 1949 and at present has an official population of about 6,200 people. The refugee camp is situated on a slope, a little bit higher and a few hundred meters north of Al-Far’a Spring. This spring is the main source of water supply for domestic and agriculture use in the area. The water is pumped to the camp while tankers are used to carry water to the nearby villages.

The refugee camp has no sewage collection system. Cesspits are used to dispose of the black (sewage) water. The grey water is discharged into open drains inside the camp, then flows outside the camps and gets mixed with fresh surface water coming from Al-Far’a Spring that is used for irrigation. Sometimes people also discharge their sewage water through these open drains or in pipes, installed in parts of the camp for the disposal of grey water. The farmers downstream the camp complain of the contamination of surface water by sewage and of other nuisances, like the foul smell, mosquitoes, etc., related to the open flow of sewage. Moreover they fear the contamination of groundwater caused by underground infiltration of sewage and its resulting impact on the Al-Far’a Spring.

This has been selected as a major hot spot in the West Bank. The feasibility pertaining to it investigates the best means of solving the problems related to the present sewage disposal methods by appropriate treatment. Additionally, it will propose means for an efficient protection of Al-Far’a Spring and improvements, which should be made to Al-Far’a.

II. Nature of the Problem

A. Nature of the problem in general (Palestine/West Bank and/or Gaza)

In the West Bank there are at present 19 refugee camps. Eleven (11) of these refugee camps have been already equipped with sewerage systems and have been connected to nearby municipal sewers. In three (3) refugee camps cesspits infiltration pits are used to dispose of all wastewater with no serious problems to the users. The remaining other 5 refugee camps in fact face serious problems with their sewage disposal. Al-Far’a refugee camp is one of these five camps.

The wastewater disposal to open ditches is likely to have an impact on the health for the people living in this area and represents a major risks of pollution of groundwater resources as sewage can easily infiltrate through the fissured rocks and can reach the aquifers. The disposal of sewage without treatment creates an ideal breeding ground for mosquitoes and increases the risk of waterborne diseases.

The water shortage in Palestine and the region calls for sewerage collection, treatment and a reuse in agriculture.

B. Actual situation in the selected hot spot
The situation in the selected hot spots is a particular and is characterized by the following aspects:

1. The camp is situated on a slope, a little by higher and only a few hundred meters away from Al-Far’a Spring. As cesspits and open ditches allow infiltration of contaminated water into the underground, pollution of groundwater has to be feared. Since the groundwater stream is directed towards the Al-Far’a Spring, a contamination of the corresponding aquifer would directly lead to a contamination of the major source of freshwater in this area.

2. Running through open ditches and stagnating from time to time, the sewage disposed of by the camp creates ideal breeding and living conditions for all kinds of flies, mosquitoes, vermin, etc., and a transfer of water borne diseases. Moreover it creates a foul smell. Children cannot differentiate between fresh and grey water, so sometimes they play with the grey water. This can pose a serious health risk to them.

3. After an open flow of about 1-km outside the camp, the sewage that has not infiltrated or been evaporated by the sun, is mixed with fresh surface water coming from Al-Far’a Spring. Some of this water is used for irrigation by the farmers downstream of the spring. The rest runs through Wadi el-Far’a, discharges al Al Malak Bridge into Wadi Al Badhan and finally is used for irrigation further downstream.

4. Very close to Al-Far’a Spring there is water pumping station and a small factory which produce concrete blocks. Due to the absence of a constant electricity supply, they both use diesel-powered generators. The area around these generators is heavily polluted with fuel and lubricating oil, and represents further risks to the spring, which is situated downstream.

5. The spring is not well protected as the filling points for tanks are open and children can easily walk and play in the water that feeds the tank filling point. Moreover, sometimes sheep and goats are brought to the point where the spring water leaves the fenced area and washed there. Sometimes the sheep are sheered near the source itself, thereby polluting the surface water that runs into Wadi el-Far’a. Farmers using this water for irrigation have built there pumping stations with diesel engines from trucks. There are many of these pumping stations in Wadi el-Far’a, which contaminate the environment as well as the pumped water because substantial amount of the fuel and lubricating oil leaks out. Air pollution is also caused by poor operating conditions. These pumps also make a lot of noise.

6. In the area of Wadi el-Far’a there is a lot of fly tipping on the slopes not only of municipal wastes but also all other sorts of waste. This slides down into the Wadi. Especially in winter when more water runs through the Wadi, this waste is carried downstream and leads to a considerable contamination of Wadi Al Badhan.

7. The surface water of Wadi el-Far’a as well as in Wadi Al Badhan and in all other wadis is drunk by animals, especially goats and sheep. When this water is contaminated, by factors described above, the health of the animals may be at risks and this may in turn impair both milk and meat production.

C. Current Water Consumption

The camp is under the responsibility of the United Nations Relief and Works Agency for Palestine refugees in the Near East (UNRWA) and has a regular supply of water from the nearby
spring Al-Far’a. The daily consumption in the camp is 720 m³. At present the water is still supplied free of charge. UNRWA supplied 320 m³ that is pumped from the spring in 8 hours at an average pumping rate of 40 m³ per hour and the rest is supplied by a committee in the camp. Apparent per capita consumption of water is about 115 l/day. This is one of the highest consumption rates in the West Bank. The fact that water supply is regular and free of charge may encourage people to use more water.

On the other hand one has to consider that money more people than are actually registered may be living there. Assuming, for example, the real population of the camp is around 10,000, consumption per head would be about 70 l/d. this appears more realistic, as it is in line with consumption at other camps.

There is no need to have the correct figures for the consumption per head in order to calculate the maximum volume of waste water generated, given that the total water supply is 720 m³/d. but as the pollution, i.e. the biological load of wastewater, is related to number of polluters, i.e. the population, this is of great importance for the design of treatment equipment. Moreover, for the design of the treatment plant it is necessary to have a good estimation of future changes in the amount of wastewater or load, which can be obtained by population projection and an estimation of water consumption and of sewage generated. Values provided by UNRWA and Palestinian Water Authority (PWA), are given in the following table.

<table>
<thead>
<tr>
<th>Year</th>
<th>1998</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>6,200</td>
<td>8,500</td>
<td>11,500</td>
</tr>
<tr>
<td>Water consumed M3/d</td>
<td>720</td>
<td>1,100</td>
<td>1,600</td>
</tr>
<tr>
<td>Sewage produced m3/d.</td>
<td>550</td>
<td>850</td>
<td>1,200</td>
</tr>
</tbody>
</table>

Table 1: present and expected population of Al-Far’a refugee camp

At present UNRWA, in agreement with Palestinian Water Authority (PWA), has begun to install water meters in the camp to be able to charge the population of the refugee camp for water consumption. This is expected to prevent unnecessary water consumption and make people more aware of the value of a decent water supply.

UNRWA also intends to get rid of the cesspits and to install a sewerage system as far as possible. If there were a sewage treatment facility at Al-Far’a, a sewerage system would provide more wastewater for treatment, compare with present volume and would also provide a more constant flow.

At present no data are available concerning the quality of the sewage of the Al-Far’a refugee camp. No investigation has been carried out so far and no samples of this wastewater have been taken or analyzed yet. In order to estimate values for Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Suspended Solids (SS), or other relevant parameters, it is necessary to base calculations not on apparent consumption per head (about 115l/d), which would give relatively low COD or BOD loads, but assume the higher population figure of 10,000 and per capita consumption of only about 70l/d.

D. Situation in similar sites

Similar conditions can be observed in the other 4 refugee camps, which are facing the same problems, as well as in many other areas in the West Bank and in the Gaza strip. Due to the lack
in sewerage systems, cesspit and septic tanks with infiltration of the water into the underground are still the more widespread and traditional method for sewage disposal. De-sludging cesspits and septic tanks are discharging the sludge into wadis, etc. is quite common. Also overflowing cesspits have been reported in official publications and following several investigations.

The general lack of infrastructure makes it difficult to protect the environment efficiently. In some urban areas where sewage collection systems are already available, the collected sewage is disposed of without proper treatment to open valleys. Besides its direct, adverse impact this practice has encouraged some farmers to use the raw sewage for irrigation, which poses a major health risk to the public and helps the infiltration of sewage to the groundwater aquifers.

As mentioned before, water coming from Al-Far’a Spring is mixed with the sewage of the camp. Further downstream, this water again mixes with the water of Wadi Al Badhan at a second mixing point. But there are also other points in Wadi Al Badhan, where fresh water mixes with sewage or industrial wastewater. More upstream, sewage from Nablus and effluent from a slaughterhouse, two tanneries and some stone cutting facilities mixed and then run through Wadi Sajor. Further downstream, this waste water mixes again with the fresh water of Al Badhan springs, close to the Wadi Al Badhan recreation farmers have built a kind of simple aqueduct to prevent mixing/pollution and to carry part of the freshwater to the other side of the valley. As mentioned earlier, some kilometers further downstream it mixes with the contaminated water of Wadi el-Far’ a

Finally there is one more mixing point at the end of Wadi Al Badhan, when freshwater from Ein Shibli spring is added. So there is very complex situation in the area of Wadi Al Badhan and the neighboring wadis, situated in the North East of West Bank.

Besides the refugee camps in question, there are several areas in The West Bank as well as in the Gaza strip where municipal sewage- that means only biologically loaded wastewater- could be collected and treated (separately). Since at present mixing with industrial wastewater occurs in the most of cases, it is more difficult to treat and to achieve a quality allowing for some re-use, especially in agriculture. In contrast to other refugee camps, like the Jallazoon refugees camp for example, the area around Al-Far’a refugee camp is intensively farmed. Re-use of as much water as possible is therefore highly desirable.

III. Environment impact
A. The environmental impact of current sewage disposal practices at Al-Far’a Camp is extensive. To identify and evaluate it, the following factors should be taken into consideration:
   1. Surroundings of the refugee camp (farmland, Al-Far’a Spring residential areas, etc.)
   2. Impact on public health.
   3. Impact on landscape
   4. Soil and groundwater contamination
   5. Fauna and flora
   6. Offensive smell.

B. Direct Effects
   Due to the location of the refugee camp of Al-Far’a and geological and hydrological conditions on the one hand, and the present use and the development in the surrounding area on the other hand, the impact of sewage disposal is considerable:
   1. there is a high possibility of soil and groundwater contamination in general due to the sewage infiltration in the underground
2. There is a high possibility of the contamination of Al-Far’a spring by inorganic or organic chemical constituents of sewage and pathogenic germs (diarrhea, amoebae, cholera, etc.)
3. the accumulation of organic material, mixed in part with municipal waste, has partly created inorganic conditions in the open ditches and stagnant small “sewage-lakes”, creating a strong and offensive smell by the release of H2s and other gaseous compounds
4. it has also formed a perfect environment for pathogenic germs, vermin, flies, etc., which directly affect living conditions there
5. puts children at risk, since they easily gain access to the area and play there,
6. animals can easily reach these ditches and drink contaminated water
7. contaminants are carried downstream to wadi al Badhan area due to the mixing of the sewage with freshwater
8. contaminants are spread on agricultural farmland by using mixed water for irrigation
9. Effects on landscape are evident.

Additionally there are consequences that are not related to the refugee camp, but which contribute the complex problematic situation in Wadi el-Far’a and its impact on the environment:
1. the sheering of sheep in the spring or washing them at the spring increases the organic load in the water and can transmit diseases to downstream users
2. there are risk of oil contamination from the diesel generators in the nearby water pumping station and the concrete block factory
3. waste dumping in Wadi el-Far’a leads to a considerable contamination further downstream.

C. Indirect effects

The discharge of raw sewage is associated with risks of infiltration to the groundwater aquifers and Al-Far’a spring. A corresponding infiltration and contamination can lead to rapid spreading of disease and can completely cut the area off from a freshwater supply for domestic and agricultural use.

Indirect effects on fauna, for example birds or butterflies, have been reported frequently, and include a reduced rate of reproduction and lower survival rates. The villagers of Wadi el-Far’a downstream are complaining that the refugees in the camp dispose of their sewage without treatment, accusing them of polluting the irrigation water and increasing the number of mosquitoes that breed in the area near the sewage channels. In the long term this situation might create social problems among different residents of the area.

IV. Improvement Measures

There is an increasing demand for water for private use as well as for agriculture, which cannot be met completely using conventional resources. Wastewater is a cheap resource that can be reused to alleviate water supply shortages for agriculture. Therefore a treatment of the sewage and reuse of this water is indicated.

In order to improve the existing situation and alleviate current problems, it will be essential:
1. to implement a suitable collection system for the sewage generated in the camp and to stop using infiltration pits to prevent the risks of contaminating the aquifer from which the spring is fed
2. to minimize the generation of raw sewage by imposing suitable fees on water consumption
3. to stop the disposal of raw sewage in the open valleys and to construct an appropriate sewage treatment plant
4. to protect the spring itself from possible surface pollution and to construct a suitable filling reservoir for the trucks that collect water and sell it to the surrounding villages
5. to initiate an awareness raising campaign about water borne diseases and environmental health aspects among the residents of the area, both refugees and farmers
6. to demonstrate to the farmers the benefits of recycling the effluent, for example for the irrigation of high value crops
7. to ensure a sustainable development and stable situation in the future, the inhabitants of the refugee camp should be involved in the treatment of their sewage, not only financially but also in terms of institutional aspects and operational control. In accordance with PWA, limit values for the effluent of the treatment plant should be fixed which would allow the use of effluent for irrigation purposes, preferably for high value crops with considerable water consumption.

V. Legal Background

Today no law or regulation exists concerning wastewater, sewage, sludge disposal or treatment or defining standards for required water quality of effluent as well as for discharged wastewater. But in the near future this situation might change, if the draft of the Palestinian Environmental bill (1997) is approved and becomes law. Significant changes in relation to the issue of wastewater could then be expected.

This draft intends to:
1. Guarantee to every individual living in Palestine the right to a sound and clean environment and to the best possible of health care and social welfare…
2. Use the "polluter pays principle", so that all persons responsible for harm on environment shall bear the costs of removing this harm and/or paying compensation…
3. Give top priority to pollution prevention measures…
4. Integrate all persons in required improvement measures and in avoiding any activity that may cause environmental harm…
5. Encourage waste treatment, recycling and processing…
6. Allow incineration of waste only in authorized and designated sites for this purpose, in order to ensure and efficient protection of nature.

VI. Conclusion

Although this draft might be changed to some extent, the aims of the final law will essentially be the same, so, we can take this draft or its aims as a legal guideline for possible measures to solve the problem, or at least to achieve considerable improvements.

The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), has a mandate that restricts its services inside the refugee camps, including sanitation. Water supply in term of quality as well as in quantity and the treatment of wastewater are the responsibility of the Palestinian Water Authority (PWA). As the sewage treatment plan
can not be built inside the camp, certain arrangements and agreements among UNRWA, PWA
and the Wadi el-Far’a Council will have to be reached to identify responsibilities for operation
and maintenance of the treatment plant. In this, the camp committee could be an equal partner.

A tariff system will have to be imposed on the residents of the camp to cover the costs for
operation and maintenance of the treatment plant. Guaranteed values for the quality of the
effluent will have to be defined and approved by the Palestinian Water Authority, the Palestinian
environmental standards, standards for effluent disposal for different purposes have to be taken
from outside. Since such standards have been defined mainly in developed countries, where the
possibility to implement such standards are greater, they have to be adapted to the conditions
prevailing in Palestine. Therefore they can only be used for guidance. Some of them are
summarized in the following table, which lists WHO standards for restricted irrigation and a US
standard for aquifer recharge.
Appendix C: Annotated Bibliography


- Contains guidelines for the use of polluted water for agricultural irrigation. Focuses on the importance of leaching/flushing accumulated salts and pollutants from the root zone on a regular basis as a factor in pollution management.


- Historic study on the Wadi Shueib back to 1944, used for temporal analysis of spring and stream flows. Contains the preliminary planning and design proposal for the Wadi Shueib dam, and the plans for the dam.


- Rainfall, runoff, infiltration and flood data used in the planning of the Wadi Shueib dam.


- This study has effectively answered many answers regarding the geology, hydrogeology, water resources and management within the Wadi el-Far'a. This study is one of the most important work to our study, and touches on many different issues, that we will certainly take into account. His information not only stands as a base from which we can work from, but also as a comparative study for the results that we will get.


- Spanish study on water pollution. Looks at the sources of common pollutants: solid waste disposal leachates, industrial wastes, agricultural wastes, and sewage. Studies the consequences of pollution and over pumping on groundwater resources. Explains the sources and effects of specific common pollutants (NO3, Phosphorous). Proposes agricultural management and pollution prevention solutions to the pollution problem.

- This engineering textbook contains general technical details and theory on biological, hydrological, environmental and mechanical aspects of water and wastewater engineering. Used as background and as a reference for calculations.


- A design project for an irrigation dam on the Wadi el-Far'a.


- In-depth discussion of pollution parameters and their sources and effects on human health.


- Jordan's national water plan makes projections from 1977 to 2000 on all aspects of Jordan's water planning, including agriculture, industrial, and domestic water needs, sources of water, and water management systems (dams, reservoirs, wells, pipelines). A great source of maps and data on the Wadi Shueib. The most recent set of such data available on Jordan.


- Soil map and analysis of suitability for agriculture, including the soils of the Wadi Shuieb. The Wadi Shuieb is a moderately important agricultural area where 30% of the land is suitable for drip irrigation.


- Design criteria for new wastewater collection and treatment projects underway in Jordan.


- A comprehensive guide to issues of sewage use in agriculture. Includes evaluation of waste stabilization ponds and soil aquifer treatment systems, both of which are promising for use in Nablus. Case studies of uses of wastewater in agriculture in Jordan, Kuwait and the U.S. are presented. Chapter 10 deals with groundwater recharge as a treatment of wastewater for agricultural use. Sludge recycling as fertilizer is presented and a Saudi
Arabian case study is presented. Relative tolerances of different crops to salinity are tabulated.


- A comprehensive and current study of water issues in the Wadi Shueib, comparable to Marwan Ghanem's thesis on the Wadi el-Far'a. A source of data for comparisons to the Wadi el-Far'a.


- This engineering textbook contains technical details on a broad spectrum of hydro-engineering applications, hydrology, and theory. Used as background and as a reference for calculations.

Safe Water Systems for the Developing World: A Handbook for Implementing Household-Based Water Treatment and Safe Storage Projects by The Department of Health and Human Services; Centers for Disease Control http://www.cdc.gov/safewater/manuals.htm


- An authoritative and practical and technical discussion of all common irrigation techniques

*Sewage Disposal Regulations for Kent County, MI.* Kent County Health Department,

- Official septic and sewage regulations, including technical guidelines, for Calvin College's home county.


- ASCE’s technical advice on the developing practice of artificial groundwater recharge, including technical design, construction, regulatory and management guidelines.


- Water pollution as a result of faulty sewage treatment systems is studied and quantified. The extent and causes of pesticide pollution in Jordan is also analyzed.

Stiftung provides a critical analysis of wastewater treatment plants in Jordan and why they are not functioning as intended. This information will be useful in avoiding the same errors in a Nablus treatment plant. The effects of industrial pollution from heavy industries in Amman are taken into account. Alternative waste treatment systems are presented, including especially Waste Stabilization Ponds (WSP's). WSP's are very effective on a large scale in treating biological wastes, when designed properly and protected from industrial pollutants.


A case study in the application of community-based agriculture as a solution to poor agricultural practices. Integrates education and technology in a community context, and follows the development of the project in a village for four years to a successful conclusion.


Surface irrigation systems can be better than sprinklers or drip systems when polluted water is used and when soil conditions are favorable. Surface systems require proper management and are difficult to get right.

_Water Resources and Irrigated Agriculture in the West Bank._ Applied Research Institute, Jerusalem, 1998

An intensive study of agriculture in the West Bank, including survey data and an analysis of irrigation, pesticide and fertilizer practices and their corresponding effects on the environment and public health. Contains estimates of amounts of fertilizers and irrigation water used. Studies the relationship between soils and irrigation/ fertilization/ pesticide use and crop yields. Presents a soils map of the West Bank and explanations of the different soil types. Discusses the proper application of drip, sprinkler and surface irrigation systems.

_Water-Treated Domestic Wastewater._ Water Authority of Jordan, Amman, 1996.

Jordan's current regulations on the reuse of wastewater for irrigation.


Survey and discussion of the problems surrounding Palestinian springs and spring-fed irrigation systems, and their socio-economic importance. Problems include: water loss through poor irrigation practices and poor transport infrastructure, well pumping near
springs, human and animal use of spring headwaters, and lack of water storage for summer months. Recommendations are presented.

- Wadi Shueib flood data and surface flow data before 1974, useful for historic comparisons
The Wadi Fa’ra and the Colonies Located Within
Holly Byker

Introduction

An ever present, destructive reality to life in the Wadi Fa’ra and throughout the West Bank are the Israeli settlement-colonies. Nehemia Strasler, a journalist for Ha’aretz, once wrote that the colonies are such a reality that “when you drive through the territories, there is, in fact, no spot from where you can view the horizon without seeing the red rooftops of this or that settlement.” The “red rooftops” now number 148 individual colonies. Population figures from 2001 estimate that 401,072 settlers (colonists) live in the territories; 213,672 in the West Bank and Gaza Strip; 170,400 in the “suburbs” of East Jerusalem; and another 17,000 in the Golan Heights. The Israeli knesset annually gives millions of dollars to support the construction, the upkeep and the vitality of them. In March 2002, the Knesset Finance Committee set aside another NIS 136 million for the settlements. It is crucial to understand the historical context from which these colonies were birthed from and to examine why they pose such a threat to the livelihood of the Palestinian community.

Hamra, Massua, Mechora, Elon Moreh, Itamar, and the various outposts surrounding these colonies, dot the Wadi Fa’ra landscape. Although little in numbers, the colonies have discommodated the welfare of the Palestinian people. Elon Moreh and Itamar sit perched above Nablus. These colonies collectively number in the mere thousands, but they act as gatekeepers for Nablus—the largest Palestinian city in the West Bank with close to 200,000 inhabitants—since “settler only” roads pave the circumference of the city. If troubles erupt between the colonists and Palestinians usually Nablus is put under “closure” so that its residents cannot pass through the checkpoints encircling it. Hamra, Massua and Mechora rest upon agriculturally-rich land confiscated from Palestinians. Deprived of their inherited land, Palestinian residents have to look elsewhere for their economic means, but usually come up empty-handed. The Wadi Fa’ra colonies have disrupted Palestinian freedom and have caused economic hardships.

The Wadi Fa’ra colonies were formed under two different pretexts and value strands. First, Hamra, Massua, and Mechora, all located within a ten mile radius of Jordan, began as nahals underneath the Allon Plan of 1967. Their main function is to operate as an Israeli security blanket.

The two other colonies, Elon Moreh and Itamar, founded deep in the heart of the West Bank, possess no security value, but rather were established due to the land’s ‘sacred’ value. Elon Moreh and Itamar are situated around Nablus, the largest Palestinian city. The desire to live as close as possible to the Biblical town of Shechem (present-day Nablus) drove these religiously zealots to this location. The colonists of Elon Moreh and Itamar are convinced that it

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27 Two of the colonies, Mekhora and Hamra, are among the top twenty for the smallest colonies within the West Bank.
is their God-given destiny to redeem the land according to their cultish reading of the Bible, and they will go to great lengths to fulfill this mission.

Thus the occupants of the Fa’ra Valley colonies value the land for two distinct reasons. First, the security strand plays a major role in Hamara, Massu’a and Mekhora. These all act as a buffer zone to Israel’s eastern boundary. Second, the religious value is key to colonists living in Elon Moreh and Itamar. “We have settled in Elon Moreh since we are chosen to settle the land which God gave our forefathers. Our settling here has in itself no security reasons, but rather serves to fulfill this mission,” says a statement made by the colonists back in 1979. Their belief in the historical, God-given right to the land has led to illegal colony building and a number of other travesties.

This paper will show how these two value strands have manifested themselves within the five colonies of the Fa’ra Valley. It will provide a detailed history of each colony, and also analyze the relationship between the Fa’ra Valley colonists to their Palestinian neighbors. Through this one can see how the colonies have proven detrimental to the Palestinians’ wellbeing.

Hamra, Massua, and Mekhora: The Security/Strategic Value Strand

Israel Chief of Staff Rafael Eitan once said: “The Jordan Valley . . . settlements [are] part of Israel’s military formation and I regard them as regular army. The settlers are equipped with highly sophisticated weapons, they are well trained and know their role exactly should a war break out.” The occupied territories are important strategically since it creates a natural, “defensible” border. The Jordan River and the Dead Sea form the eastern borders of the West Bank. Israel claimed that having these natural borders would create a more secure and defendable state. Soon after the June 1967 War, Israel enacted plans that would demarcate a new boundary line. On July 26 1967, only six weeks after the war’s conclusion, Yigal Allon, the Israeli Deputy Prime Minister, called for the creation of a strip of land, extending from the Jordan River to the Dead Sea that would help create a “defensible border” and an Israeli security belt. The “strip” actually stretched across twenty kilometers and equaled about seven hundred square miles, which “comprises at least one-third of the West Bank.” Colonies placed in this swath of land would function as a barrier between Palestinians and their Jordanian neighbors. “The strategic importance of this set up was Palestinians could not have contact with east Jordan and the settlements would encircle the Palestinian populations.” Hamra, Massu, and Mekhora all formed this way and they know the strategic role they play. The settlements are relatively small and the settlers do not have as strong of ties to the “actual land.”

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30 Allon also said that his proposal was in accordance with UN Resolution 242 since the resolution meant some territories not all of the territories.
Hamra

In 1970 Israeli bulldozers razed many houses and crops belonging to the Palestinian village of Beit Dajan--located fifteen kilometers east of Nablus in the Jordan Valley. A year later, the Hamra colony, a moshav, stood on the destroyed land and in 1975 more land was seized for the moshav. Hamra residents see themselves like those pioneering families who came to Palestine in the early 1900s, set up kibbutzim and moshavim across the land, and as they claim, “made the desert bloom.” “We came to barren land, we lived in a shack, and what we made here was by our own hands,” said Rafael Ganani, who helped found Hamra in 1971. “The whole country thought about us as pioneers.” In 1979 Hamra’s total area equaled 4,500 dunams. Many guest workers imported from Thailand live in Hamra to work in the moshav’s greenhouse and fields. Over forty Thais were employed back in 1993. In 2000, Hamra had a total of 147 settlers and forty families living in the colony.

The colonizing of Hamra and the other Jordan Valley settlements have deeply hurt the neighboring Palestinians income revenue. Already in 1983 Beit Dajan had “lost an estimated 80 percent of its prime land as a result 90 percent of its population has lost its livelihood.” For example, in 1970, Azzat Abu Iash, from Beit Dajan, owned and cultivated one hundred dunams of land inherited from his father. Then the government told Iash that he did not have a proper title and they confiscated all of his land. They later let him “rent” his house and six dunams of his original property for an annual fee. Iash now has to work as a day laborer to make ends meet and pay for the ‘rented’ property. The remaining ninety-four dunams are now owned by the people of Hamra.

Such loss of agricultural land, resort to day labor, and unemployment have destroyed the quality of life of many Palestinians in Beit Dajan. Now landless and unemployed, these erstwhile farmers sometimes take out their frustrations on the Hamra colonists. Two confrontations happened in the early 1990s. In 1990, Zvi Elbaz, a resident of Hamra, suffered from serious injuries when four Palestinians stabbed him while he was irrigating his fields. In 1993 another stabbing took place. This time three men entered the moshav’s greenhouse and stabbed Tilat, a Thai worker, in the back.

Such violence between Hamra and her neighbors have continued. On 7 February 2002, a man belonging to the Al-Aqsa Martyrs Brigade, entered the settlement garbed in an IDF uniform. He then proceeded to the Ohana family’s house, where he shot and killed 45-year-old

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37 List of Localities and their GET THE REST OF THIS DATA!
39 Jan Metzger, Martin Orth, and Christian Sterling, This Land is Our Land, 22-23.
Miri Ohana, and her 11-year-old daughter Yael. He also killed a soldier, before a Golani Brigade officer killed him.\textsuperscript{41}

Hamra does not have as strong of an ideological connection to the land as the more religious colonies. Thus when the Intifada began and violence became more frequent, many of the settler-colonists left Hamra. “Since the fighting began, dozens have left the strip of land [the Jordan Valley]. . .emptying the valley of more than 8% of its 3,000 Jewish residents.”\textsuperscript{42} Lior Halperin, a young adult, has lived in Hamra his whole life. He enjoyed the scenery and the “pioneer experience,” yet he recently decided to move to Tel Aviv, because the commute out of Hamra became too dangerous. Halperin only comes to Hamra on the weekends. He remarked that many of his contemporaries were leaving the settlement. “Most of them—98 percent—don’t come back here. . .if the situation does not improve, in a few months, years, I think this will be—how do you say it?—an elderly house,” Halperin asserted.\textsuperscript{43}

The Smith family, immigrants to Hamra from Lancashire, England, has only lived in Hamra for a year. Kevin Smith remarked after the Ohana killings, “We are starting to regret what we have done.” The colonist feel an increasing sense of vulnerability. But some, like Yigal Daniehi, one of the founders of Hamra, will not leave. “Backbreaking struggles with droughts and unforgiving earth have made him stubborn,” said reporter James Bennett.\textsuperscript{44} However, most of them agree that the only way to attain peace with the Palestinians is to close and leave the colonies. Rafael Ganani, a founder of Hamra and an ambulance driver, was asked about the necessity of closing settlements to achieve peace. He responded, “The honest, painful truth?. . .you have to close everything—and I’ve lived most of my life here.”\textsuperscript{45}

**Mekhora**

In 1969 the government expropriated land from Beit Furik and established Mekhora. Located in the Jordan Valley foothills, Mekhora extends across 5,000 dunams of land. The Beit Furik locals used the land beforehand as wheatfields.\textsuperscript{46} From 1978 through 1979 the government, claiming security reasons, seized even more land from Beit Furik so that Mekhora’s total area increased even more while Beit Furik’s shrunk.\textsuperscript{47} In Beit Furik “an estimated 60 percent of its land holdings were seized or closed off for the colony of Mekhora—80 percent of the village population has become totally or partially landless.”\textsuperscript{48} Today Mekhora has 113 residents, and is the smallest colony in the Wadi Fa’ra. It decreased by seven from 1999 to 2000, and has seen more people leave because of the Intifadah. Mekhora is valuable, cultivable, and strategic land since it is located so close to Jordan. The colony’s fields are highly irrigated. The

\textsuperscript{42} “Child’s Terror in Palestinian Raid on West Bank,” *The Herald (Glasgow)*, 8 February 2002, 14.
\textsuperscript{44} Ibid.
\textsuperscript{45} Ibid.
\textsuperscript{47} Ibrahim Matar, “Israeli Settlements and Palestinian Rights,” 128, 133.
\textsuperscript{48} Ibid., 130.
colony values “manual labor and an agrarian lifestyle,” which is quite different from the religious settlements located within the highlands.49

Violence between Mekhora and surrounding villages has occurred. Back in 1999, The Jerusalem Post reported gunshots fired at a settler’s vehicle who was traveling down the Allon Road to Mekhora.50 But hostilities are less frequent here than at those settlements deep in the heart of the West Bank.

Massua

The history of Massua is also relatively brief. The colony, the third one established after the Allon Plan, was used as a military outpost before being converted to a farming kibbutzim. The colony stands on the ruins of the villages of al-Ajajreh and Sattariyeh which the Israeli government razed in August 1967. These Palestinian villages were cultivated and irrigated from the waters of the Fa’ra canal.51 As of 2000, 148 people lived in Massua, increasing by eight people since 1999.

All three colonies provide a strategic value for the IDF, but they also also possess economic benefits. The land holds rich agricultural and hydrological resources.52 The advantages are “the existence of tens of thousands of dunams of land, in an area with a temperate winter climate, which can be made into a source of Israeli agricultural exports.”53 Hamra, Mekhora, and Massua, were some of the first colonies within the occupied territories and were some of the only colonies in the occupied territories during the first ten years of occupation. “Between June 1967 and May 1977, when Labor was defeated, the official settlements established numbered twenty-five in the Jordan Rift, seven elsewhere in the West Bank outside Jerusalem, and sixteen in Gaza-Rafia.”54 The number of settlers living in the Occupied Territories was pretty meager. In July 1977, there were “only 7,000 settlers in 45 civilian outposts in the West Bank and Gaza.”55 56 The reason for settling was security, but this soon changed due to the influence of Gush Emunim group and the Likud government of Menahem Begin.

Religious Value

The Gush Emunim, “The Block of the Faithful,” colonists, espouse the religious significance the land holds for devout ultra-Orthodox Jews. Rabbi Zvi Zehuda Kook, the son of Rabbi Avraham Yitzhak Hacohen Kook, was the spearhead behind the Gush Emunim movement--its precursor was the Movement for the Whole Land of Israel pressure group and the National Religious Party.57

49 Ibid.
52 The water run off from the Wadi el-Far’a uplands is collected and stored for use by these Jordan Valley colonists.
54 Sheila Ryan, “Plans to Regularize the Occupation,” 361.
56 See Appendix 4: Settlements Founded under the Labor Government.
57 Rabbi Moshe Levinger, the leader of Kiryat Arba, also partook in Gush Emunim.
Rabbi Zvi Kook espoused three stages of redemption for the Jewish community. First, the return of the Diaspora Jews to Israel; second, a complete resettlement of ‘Judea and Samaria;’ that is, the West Bank and third, a turning toward God and practicing of the Torah and a “repentance of love.” Redemption entails obedience to the Lord by worshiping in the Biblical heartland—the West Bank. Kook asserted: “This land is ours; here are no Arab territories or Arab lands, but only Israeli territories—the eternal land of our forefathers, which belongs in its Biblical boundaries to the government of Israel.”

Their main doctrine is God gave “Judea and Samaria” back to the Jews during the June 1967 War; thus, to relinquish the land to the Palestinians would defile God and His Torah. God, therefore, has appointed the Gush Emunim on a special mission to confiscate and sustain all of the Bible derived Eretz Israel—especially the sacred places within the territories. Kook claimed that becoming politically active in the Zionist endeavor would make redemption a “concrete reality.” He states:

The true redemption, as revealed in the full realization of [Jewish] settlement of the land and the resurrection of the Jewish people here, in the ongoing ingathering of the exiles. . . It appears when we fully inherit the land and achieve complete sovereignty over it, when our public life is thoroughly infused with the holiness of its concreteness.

With this type of ideology compelling the Gush Emunim, they resolutely embarked on settling as close as they could to “Shechem” and the other sacred places in Jewish tradition. No land titles, no government policy, nor UN Resolution would stop them in this pursuit. The Gush Emunim proclaimed in its 1974 manifesto:

Our aim is to bring about a large movement of reawakening among the Jewish people for the fulfillment of the Zionist vision in its full scope. . . the sources of the vision are the Jewish tradition and roots, and its ultimate objective is the full redemption of the Jewish people and the entire world.

The results of the October War in 1973, devastated the Gush Emunim. They believed that should apply more pressure on the Israeli government to settle in the occupied territories or redemption could never be achieved. After the October War, the group officially became established and they emphatically set out to colonize (against the Israeli governments’ will) in the Occupied Territories. “Gush members made eight attempts in 1974 and 1975 to evade army 

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60 The Gush Emunim are pretty radical and zealous in their views. Their leader, Rabbi Tzvi Yehuda Kook one said, “Torah, war, and settlement—they are three things in one and we rejoice in the authority we have been given them.” Cited in Michael Palumbo, *Imperial Israel*, 178.
roadblocks and establish a colony in the Nablus area.” Both Elon Moreh and Itamar are products of Gush Emunim land grabs.

The religious compulsion the Gush felt towards the land fermented during the 1970s. However, the Begin government abetted these religious zealots by collaborating with them and supporting them after the 1997 Likud victory in the Knesset and Menahem Begin’s election as Prime Minister. The Begin government “introduced a forthright candor together with a more vigorous program of territorial acquisition. Begin acted on the conviction that Jews should settle on Arab lands by right and obligation.” Begin and his Likud government affirmed the Gush’s stance that the West Bank was a vital part of Israel. Begin’s Cabinet Secretary, Aryeh Naor, told the Jerusalem Post Magazine in 1997: “Israel cannot be deemed to annex that which is rightfully hers... Jews cannot be barred from settling anywhere within their eternal, pre-ordained domain.” From now on, security did not have to be the only reason for establishing a site; religious conviction could now be the sole reason.

One of Begin’s first acts as Prime Minister was visiting the illegal colony of present-day Kadum. Begin extended his blessing to the settlement and then resolutely announced:

There will be many more Elon Morehs... Since May of this year the name of these areas has been changed from occupied to liberated territories. This is liberated Israeli land, and we call on young volunteers in this country and the diaspora to come and settle here.

In response, Hanan Porat, one of the Gush leaders, announced that their new mission “is to grab and settle.” In April 1979, less than two years after Begin made his statement about “many more Elon Morehs,” fifteen Gush Emunim sites, with close to two thousand religious zealots, stretched across the West Bank landscape. By 1982, in only five years, the West Bank colonies in “Judea and Samaria” increased from six to sixty-two. This is a remarkable increase in such a short period.

Both the Israeli government and religious realms had no respect for their Palestinian neighbors. The Gush Emunim, in particular, viewed the Palestinians as the Amalekites who did not belong in Israel and could have their own Palestine over in Jordan. If the Palestinians continued to reside in the Jewish land then they would have to be subjugated to Jewish law. Meir Indor, a spokesman for Gush Emunim who lived in Kiryat Arba, said in 1982:

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63 Ian S. Lustick, For the Land and the Lord, 46.
66 At that time Kadum was called Elon Moreh, but it is not the same Elon Moreh which the paper will discuss later.
68 Found in Israelect #107. Cited in Ibid.
The Arabs must know that there is a master here, the Jewish people. It rules over Eretz Israel. . . . The Arabs are temporary dwellers who happen to live in this country. There are commandments in the Bible concerning such temporary dwellers and we should act accordingly.71

Both Elon Moreh and Itamar harbor religious zealots devoted to the “heartland of Israel” as understood from their liberalist interpretations of the Hebrew Bible. One settler commented, ‘My husband and I are convinced that we are living in a most faithful period. If we prove to be the exclusive proprietors of Eretz Yisrael, of the parts we have managed to liberate, it will hasten redemption.”72 Elon Moreh and Itamar function under this value—to redeem the land and bring about the coming of the Messiah. They perceive their Arab neighbors as inferior. One woman said, “the proper role for West Bank Palestinians was to live under Jewish sovereignty and do the dirty work for the settlers. ‘Isn’t that the way it is in the Bible? Weren’t there hewers of wood and carriers of water? For murderers that’s very little punishment! It’s mercy.”73 This perception of the Palestinians cultivates a spirit of hatred in these colonies.

**ELON MOREH**

In 1973, a group of students at the yeshiva in K’iryat Arba (where Rabbi Moshe Levinger was the leader), who were also members of Gush Emunim, embarked on a mission to settle in “SAMARIA” without government approval. This group, led by Benny Katzover and Menahem Felix, called themselves *Gariin (the nucleus) Elon Moreh*; and they professed that God had called them to live in Nablus.74 “Much of the ethos of *Gariin Elon Moreh* was built around the return to [Shechem].”75 This group has had a lasting influence on government policy and they have been described as “professional pioneers.”

In 1975, 150 members of the *Gariin Elon Moreh* founded a colony close to Sebastia, an ancient site located five miles away from Nablus. But the colony did not last long; the IDF forcibly removed the settlers. One year later the group returned to the site, evaded the IDF and set up another colony. “This time, the IDF made no attempt to remove them. . . instead, Defense Minister Peres permitted supplies (including two prefabricated buildings) to be brought in.”76 The group later relocated near the village of Kafr Kadum at an army camp close by and called the colony Kadum. By March 1976 the group had running water and electricity and no longer lived in the army camp but a caravan. This illegal outpost survived through the Labor government of Yitzhaq Rabin. In May 1977, Begin won the election and the tide turned for the *Gariin Elon Moreh.*

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72 Michael Palumbo, *Imperial Israel,* 199.
73 Ibid.
75 Ibid., 149.
76 Ibid., 38.
Menahem Begin made his Kadum speech mentioned above and exclaimed: “There will be many more Elon Morehs.” And there have been many more Elon Morehs. Elon Moreh has become a symbolic name that signifies the problems of the collective settlement-colonies within “SAMARIA.” The group of Elon Moreh settlers later called this site Kadum and now it is known as Kedumim. However some of the more restless settlers within this colony were unhappy with the location of Kedumim since they wanted to live in closer proximity to Nablus. Kedumim is still five miles away.

During the summer of 1979, some of the “professional pioneers” of the Elon Moreh group packed up their belongings and attempted to form a colony on a hill overlooking Nablus. Sharon’s Ministerial Committee on Settlement gave the group two million dollars to complete this new endeavor. The Gush Emunim also rented out a helicopter so they could execute their mission efficiently.

However, Palestinian landowners from the villages around Nablus protested the legality of the land confiscation and they took the Elon Moreh settlers to court. The military argued that the reason they confiscated land for Elon Moreh was security reasons. Elon Moreh’s purpose was to protect the roads leading out of Nablus if a war ever occurred. Chief of Staff Rafael Eitan told the courts that Elon Moreh “commands a number of these roads.” The Israeli courts rejected Eitan’s security claims and on October 22, 1979 the court ordered the evacuation of Elon Moreh.

To compensate the Elon Moreh colonists, the Begin government offered to let them resettle on another hill close to the one which they evacuated. On 17 January 1980, they decided to abandon their site and head to Jebil Kabir, which became the furthest settlement from the green line at that time. Dominating the approaches to Nablus, Jebil Kabir is strategically situated. The government had already built fourteen portable homes for the displaced settlers on about 100 dunams worth of land. Fifteen families resettled at Jebil Kabir.

The Jebil Kabir land is now home to present day Elon Moreh. This was the groups’ seventh and last move from different sites within the “Samarian” region. Located in the heart of Samaria about four kilometers northeast of Nablus, the colony resides on confiscated lands belonging to the Palestinian villages of Azmout, Salem, and Deir Hatab. And like many colonies in the West Bank, it is perched on a hilltop overlooking a Palestinian city.

The colony traces its conception to a four-thousand-year old founding myth: the story of Abraham’s stopover in the city of Shechem (Elon Moreh is as close to Shechem as they can get). Israel Rosenberg, a seminary student from Boston, decided to move to Elon Moreh because “the whole of Jewish history has been funneled through this spot.” Elion Moreh colonists call the area “the cradle of the Jewish nation in Israel,” since Abraham, Jacob, and Joseph all visited there. Joseph’s Tomb is located in Nablus and the settlers in Elon Moreh take great concern to

77 Speech transcript found in Israeli newspaper, Yediot Ahronot, 20 May 1977. Quoted in Ibid., 66.
78 Ibid., 112.
Obviously, this has led to some bitter disputes between the Palestinians in Nablus and the colonist-settlers.

Elon Moreh has grown from seventeen families in 1981 to 250 families in 1991 to the current 200 families equaling 1,060 people, mostly immigrants and religious zealots. For being small it provides a lot of services, of which other settlements around the area take advantage.  

Services

The colony contains all of the conveniences of a small town. It has a post office, bank, supermarket, bookstore, hardware store, and shoe store. The newest addition to the town is a large sports center containing a gym and weight room. Some of the settlers work at Ma‘adanei Sharf, the local meat factory, or the Pirchei Hashomron textile center, or Konegsberg, a factory that prepares animal skins for religious functions. Electricians, plumbers and gardeners all live in the town and help those in need. Some of the settlers commute daily to Jerusalem or Tel Aviv for work.

Education

Elon Moreh strongly values education and many schools, religious by nature, are located within this small colony. These schools service the other neighboring settlement-colonies. “Nahalat Zvi” Elementary school (named in honor of the late Zvi Yehudah Kook, founder and leader of the Gush Emunim movement) has over 350 students with children coming from the surrounding settlements of Bracha, Yitzhar, and Itamar. The community’s educational goals is to teach the children love—“Love of his fellow man, and love of his Land.”

Higher education facilities are found in Elon Moreh too. The School for Torah Study and Technology is a boarding school for Israeli boys who come from broken homes or need special education. One of the oldest schools in the community is the Beit Hamidrash Letorah Vehoraah which was established only six months after the founding of Elon Moreh. The kolel prepares men for teaching and spiritual leadership positions. Russian immigrants have their own high school in Elon Moreh which helps the students adjust to life in the West Bank.

Elon Moreh desires to expand their industrial center, add a public bussing system, construct better educational facilities and turn Elon Moreh into a bustling city and the hub of Jewish life in the West Bank. They hope to grow to 500 families in the next five years and officially be considered a “city”.

Ideology

The entrance sign leading into the settlement speaks volumes about the character and ideology of the people in Elon Moreh. The signboard strongly states, “We will never leave here.” It took seven tries for the Elon Moreh group to establish a colony by Nablus and now

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84 Ibid.
they will not depart. The settlers are vehement in their religious beliefs and neither Palestinians nor Israelis nor the United States have any authority over their future at the site.

Although the Elon Moreh website says that one need not be religious in order to join the settlement, almost all are religious. It holds allegiance to the Gush Emunim movement and it explicitly espouses the movement’s ideology. Their website states, “All of us are strong and steadfast in our commitment to continue to live in the Land of Israel together, and in coexistence with the Arabs who wish to live with us in peace.” They have “the Torah in one hand and an assault rifle in the other... The Arabs are seen as little more than squatters and can stay only if they maintain “good neighborly relations.”

Benny Katzover, the hardline colony leader, controls Elon Moreh with a tough fist and pounds his views on settlement-colony policies. Katzover has played a major role in every settler battle against Israeli policies for the past thirty years. His 1985 call to fight the unity government of Shimron and to keep increasing in numbers has set the tone for most of the colonists:

“Despite all the problems, we have to remember that our condition in the field is very encouraging. About 50,000 Jews live in Yesha today and we hope to double this number shortly...only in this way we can stop the shameful show of a nation which gives up the heart of the heart of its homeland.”

This is the stance many colonists in Elon Moreh take. They stress that no government, including their own Israeli government, could tell them where they could or could not live. God gave the land to the Jewish people and if He called them to settle then they must obey Him. Israel Rosenberg, a New York native who immigrated to Elon Moreh during the 1980s, remarked, “Quite honestly, there’s no going back. We are building cities here. It’s simply a fact that the Jewish people have come back to this area.”

When the Madrid Peace talks began and settlement policies were being discussed, Katzover stated that they would not accept any agreement that gave Palestinians autonomy. He believed that the conflict would end by either group breaking down. He said, “If we don’t break, the Arabs will. I believe we won’t break.”

Violence between Elon Moreh and the different villages

88 Larry Defner, “Still No Worries in Samaria.”
89 From “Return to the Struggle Methods of Sebastia is Possible,” cited in Ehud Sprinzak, The Ascendance of Israel’s Radical Right, 149. (Sebastia is the first location in which the Elon Moreh group tried to settle.)
92 Larry Defner, “Still no worries in Samaria.”
The Elon Moreh settlers have a hostile relationship with its Palestinian neighbors. This partially has to do with the composition of the group—religious zealots who see the Palestinians as being a major detriment to redemption since they refuse to leave their land.

One of the first violent incidences occurred in January 1983 when a fourteen-year-old boy threw stones at an Elon Moreh car, the enraged settler fired his submachine gun and killed him. The settler was arrested but later released on bail. The town of Nablus retaliated the death by throwing stones at soldiers and chanting against Israel’s occupation. The government punished the students who did this by shutting down the Kadri Tukan School in Nablus for a month.93

A confrontation during the 1988 Passover holiday received widespread notoriety, and embittered the two sides even more. The world community harshly rebuked and condemned the Palestinians when the story first hit the airwaves, but later people learned what really happened. One Israeli scholar, Ehud Sprinzak, alleges, “The case was paradigmatic of the behavior of the Gush Emunim settlers during the first intifada.”94

The incident happened between Elon Moreh colonists and Palestinians from Beita. Settlers Romam Aldubi and Menachem Illan, led sixteen teenagers on a hike around the surrounding area for the express purpose of showing the youth “whose land it was.”95 These escorts were notoriously known as being aggressive and militant with a past history of hostile confrontations with their Palestinian neighbors.96

The first reports of the incident painted the Palestinians in a negative light. The Los Angeles Times reported that Arab youth from the village of Beita (which is about 10 miles southeast of Nablus) attacked the innocent group with stones. Aldumi then fired a “warning” shot to make the youths disperse but this did not work and they led the group to Beita where a mob of people was waiting. There Tirza Porat, fifteen-years-old, was stoned to death.97 Meir Kahane, Prime Minister Shamir, Ariel Sharon, all attended Porat’s funeral. At the funeral Shamir declared that the “entire nation is boiling. God will avenge her blood.”98

Israel enacted different measures to exact retribution for Porat’s death. Elon Moreh responded by looting homes, smashing cars and assaulting Palestinians in the Arab village

94 Ehud Sprinzak, The Ascendance of Israel’s Radical Right, 150.
95 Michael Palumbo, Imperial Israel, 262.
96 Romam Aldubi was already a questionable character. His resolve to live in Nablus led him to establish a yeshiva at the Tomb of Joseph in 1987 and also the Gariin Shechem. “The students of the yeshiva and the members of the Gariin have become a focus for many illegal acts and confrontations with the military. . . . Aldubi himself has obtained notoriety for his aggressive behavior in the area.” (Ehud Sprinzak, The Ascendance of Israel’s Radical Right, 150) The IDF had even banned him from going into Nablus because many reports had listed him an accomplice to the murder of a Palestinian child. (Dan Fisher, “Israeli Girl, 2 Arabs Killed on West Bank: Teen-ager Stoned to Death, 14 Others Hurt in Attack by Villagers,” Los Angeles Times, 7 April 1988, 1) The other leader, Menachem Illan, was convicted in 1984 for tampering with evidence and “obstructing justice in connection with the killing of an 11-year-old Arab girl by another Elon Moreh settler.”(Glenn Frankel, “Nightmare on the West Bank: Misunderstanding, Fear Blamed in Clash that Killed 3,” The Washington Post, 14 April 1988, A1)
97 Ibid.
Hawwara. Eight men also entered into another Palestinian village, Deir al-Khatab, and shot bullets into the air and razed a house. One settler screamed out of his vehicle, “The Arabs are bloodthirsty. They show only cruelty. They’re vicious. They’re people who can’t be trusted.” 99 Zevulun Hammer, the Religious Affairs Minister, summoned the army “to cut off the arms of these wild men and smash the skull of the viper of death.” 100 The army did not go to those extreme measures, but it did place Beita under curfew and conducted house-to-house searches for the suspects. But the suspect to the murder was in the Elon Moreh settlement’s midst. One seems to forget that two Palestinians died during the melee but the settlers involved were neither questioned nor arrested for their deaths.

Two days after the death of Porat, the army declared that an autopsy revealed a bullet in Tirza’s brain. The bullet came from Aldubi’s M-16 rifle. The first reports failed to mention that Aldubi had killed a Palestinian man as well during the groups first encounter with the villagers. An army report even admitted, “If the Arabs would not have been provoked, the situation would not have escalated as it did.” 101 After this first death, Aldubi’s group began walking toward Beita and the residents feared that Aldubi would shoot at them. The residents surrounded the group and a riot ensued. In this interaction both Porat and another Palestinian man were killed by Aldubi’s gun. Some Palestinians tried to resuscitate Porat, and Azzam Bani Shamesh even brought some of the Elon Moreh teenagers to his house to protect them, but his “reward” for helping was having his house demolished.

Even though the immediate army investigations revealed that the Beita residents did not kill Porat, the army subjected the town to extreme measures, including the demolition of fourteen houses, the destruction of seven acres of olive trees and the interrogation of 200 Beita residents (these were all the males in the village, ages 15 to 60). 102 “The army took these actions without trying or convicting anyone and, in the case of the house demolitions and the uprooting of trees, allowing no time for legal appeal....[they even] destroyed the house of a family who had helped the Jewish youngsters.” 103 A year after the incident a journalist came to Beita and detected that the incident had changed the town and made the embittered. One resident told him: “Now we know how the Israelis treat the Palestinians, the way a wild animal treats a victim.” 104

Following the incident, three of the Elon Moreh hikers, ages 16 to 17, were interviewed about their thoughts about the events. Most of their comments reflected their hatred toward their Palestinian neighbors. “I have always hated the Arabs, even before this latest incident.....What happened on Wednesday has simply strengthened my hatred for the Arabs,” said Yaacov. 105 Another youth, Meira Katzover, who is the daughter of Benny Katzover, said that dialogue with the Arabs would not solve anything. She said, “People believe that if we stick to the Arabs we

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102 “Girl was Killed by Israeli Rifle Army Sources Say,” The Toronto Star, 9 April 1988, A3.
104 Michael Palumbo, Imperial Israel, 262.
105 David Bernstein, “Young Settlers Feel Only Hate for Palestinians,” The Times (London), 14 April 1988.
will be able to make peace with them and live as good neighbors. I see no chance of that at all."  

Yaacov and Meira both agreed that “Judea and Samaria” would soon have no “Arabs” living in their land. Yaacov asserts, “I believe the Messiah is just around the corner. There will be only Jews here. The Arabs will either be sent packing, back to all their own countries, or they will leave on their own accord.”  

Besides terrorizing with stones and submachine guns, Elon Moreh settlers have also uprooted Palestinian fields and trees. The villages retaliate and then the mess escalates until the village is put under a curfew. In 1991 the result was that the army imposed a curfew on the nearby village of Deir al Khatab. The rabbis from the colony even advise the community to uproot trees and shoot Palestinians if one “thinks he can prove in court he was in danger.”

Rabbi Elyakim Levanon, the colony’s spiritual leader, said in 1992:

The people are very hot. They are ready to do anything, to go to the barricades. We have responded by telling them to do the maximum within the law to make clear to the government that this situation cannot go on. If a person feels threatened and can prove that he is in danger, it is permitted for him to take out his gun and open fire.

Elon Moreh during the Oslo Peace Accords

The Elon Moreh settlers stand united on one issue: peace cannot be granted to the Palestinians. They fear that any deal that the government would broker would lead to the dismantling of the site. They take a hardline stance against the any group, like B’telem and Peace Now, that tries to work for Palestinian autonomy. They do not want to be under any Palestinian jurisdiction.

The settlement reacted negatively to Yitzak Rabin election victory back in the summer of 1992: “We are very disappointed; we never thought there would be such an upheaval. For the first day, I felt as if the ground had been taken from under my feet. My eight-year-old daughter asked me if the army would leave us and we would have to defend ourselves alone against the Arabs.”

The “creating facts on the ground” policy personally took root in the Elon Moreh settlement during this time. If the colony could grow in numbers then it would be harder to evict the people if a peace agreement did come about. Elon Moreh numbered about 430 families when Rabin took office, but soon after his election they added another 2,000 dunams and constructed another two hundred homes, space for an increased 1,500 residents.

Violence during the Intifada

106 Ibid.
107 Ibid.
The Oslo Peace Accords neither removed Elon Moreh, nor did it bring peace to the area. Hostilities are still a never-ending reality in Elon Moreh’s relationship to the surrounding areas. One settler said soon after the Declaration of Principles, “We are not in Eretz Greater Israel to make peace. We are here in order to live. And if there is no choice, we are ready to live here for all eternity without peace.”

Colonists continue to uproot olive trees and destroy Palestinian property. The Al Aqsa Intifada has brought about latest round of hostilities. One of the first Israeli casualties in this latest Intifada was Hillel Lieberman. Lieberman, a New York native and a graduate of Yeshiva University in Manhattan, had lived in Elon Moreh since 1985. He was active in the settlement and was a rabbi for the yeshiva located by Joseph’s Tomb.

On 7 October 2000, Lieberman received notice that the Jewish Army had evacuated Joseph’s Tomb. He hastily left for the holy site to see if there was any damage and to prevent any further destruction from happening. Reports claim that Palestinian rioters abducted him on his way there. His beaten body was found in a gully closeby to Nablus.

Lieberman’s death enraged the settlers and at the funeral, which over 1,000 people attended, many spoke of avenging his death and many questioned Israeli policy. But when asked if they could survive in the West Bank, they became defiant. One man exclaimed, “We’ll never leave. This is our country, this is our home. Only our dead bodies will leave this place.”

Elon Moreh does employ some Palestinians to work in their industrial area. Some work in the Elon Moreh factory that produces Torah parchments. In 1999, Larry Defner, from the Jerusalem Post, interviewed eight of these workers while their boss was away. He reported that all of them wanted peace. He then asked what would happen to Elon Moreh if peace were attained. Almost all of the men agreed that “not one Palestinian wants any of the settlements to remain.” One of the men remarked:

If you asked an Israeli he would agree to move Palestinians into the middle of Tel Aviv, he’d say no, wouldn’t he? That’s the way we feel about the settlements. They have to leave. It’s the only way to make peace.

ITAMAR

117 Ibid.
Itamar (also called Tel Hayim) is a militant religious colony like Elon Moreh. The people call their home “the Gem of the Hill.” Itamar was founded in 1984 on Mount Gahar on land confiscated from the villages of Rujeeb and Awarta. Expansion of land still continues, even though Itamar is relatively small. Though only three hundred people reside in Itamar, the settlement’s major long-term goal is to have over 2,300 families live there.\(^{118}\)

The settlement survives on its agricultural production, with most of the colonists working for the Gideonim Farm. Itamar also has greenhouses, chicken farms, and an organic vegetable farm and the settlers have contended that because of them “the mountains are no longer barren. The very climate is changing.”\(^{119}\)

The “barren land” includes property taken from the Palestinian villages. In the summer of 2000, *Ha’aretz* listed Itamar as one of the few settlements constructing new buildings and roads on land “that they recognize as Palestinian, leading in some cases to clashes between settlers and Palestinians.”\(^{120}\)

On many occasions, Itamar settlers have tried to plant another settlement on Hill 777 (Gidonim), which is only 5.5 km away from Itamar. In 9 March 1999, ten families lived there and were supposed to be evacuated,\(^{121}\) but Netanyahu kept on intervening for the families and his actions forestalled an evacuation.\(^{122}\) More building activity continued throughout the summer of 1999. And finally in November 1999 an agreement was reached with the Yesha Council that authorized the Itamar’s master plan “which validated the existence of four outposts to be included in the 7,000 dunams [1,750 acres] of the new plan,”\(^{123}\) including Hill 777.

Ehud Barak enabled even more land grabbing by the Itamar residents. In November 1999, Barak approved five rogue outposts in the Nablus region, which allowed Itamar to expand “almost seven miles eastward.”\(^{124}\)

### Ideology

Those in Itamar perceive themselves as a special breed, and as the “emissaries of the people of Israel.” Since Itamar is “the bellybutton of the earth,” their “mission is to assure that the bellybutton won’t be cut off from the body.”\(^{125}\) For instance, Meyer Licksenberg, one of Itamar’s first settlers, “saw himself on a divine mission of strengthening the very fabric of life on Itamar and the whole settlement region.”\(^{126}\)


\(^{119}\) Ibid.


\(^{125}\) Nadav Haetzni, “We Are the Emissaries of the People of Israel, Except the People of Israel Don’t Realize It,” *Maariv*, 7 August 1998, 4-9.

Hostilities between Itamar and her Palestinian neighbors

Although Itamar is small, it is frequently featured in the media because of its militant harassment of her Palestinian neighbors which occurs almost daily. Itamar’s website featured a letter from Savta Chanan Krantz to the people of Itamar in which he alleged:

The one sore point and never ending anguish is the problem of trying to live in peace with the hostile Arabs who won’t let us live in peace. Pray to Hashem that all evil be removed from the earth. . . . Arab murderers and terrorists are taking Jewish lives every day.

The colonists speak of the path of terror “which accompanies the residents of the area the way chronic cancer penetrates the body,” but they insist that through all of this, their determination has not weakened.

They have engaged in their own “path of terror” on the Palestinian peoples. The United Nations General Assembly stated back in 1997 that they had received reports from the Nablus region of “settlers torching Palestinian vehicles and trying to forcibly enter homes. . . . [And] uprooting fruit trees, destroying crops and contaminating drinking water.” In 1998, Itamar colonists bludgeoned to death Mohammed Zalmout, a 68-year-old from the Beit Furik village. “The skull of the elder peasant was totally smashed. The only thing that appeared in his head area was his lower jaw. His brother Sulieman, 60; asked in tears, “What brutes in this world could have done this to a powerless old farmer?”

Many terrorist acts occurred in October 2000—in the beginning days of the Intifada. On the 9 October settlers from around the region of Nablus attacked seven Palestinian villages by firing gunshots and smashing windows. The following week, settlers from the Gideonim Farm (an outpost of Itamar) shot at Palestinians from the town of Beit Furik who were out harvesting olives nearby. The settlers wounded five and killed Farid Nasara. Those arrested for this atrocity, Yaron Degani and Gad Tena, only served a five-day sentence, but when the court issued their sentence, some settlers became so enraged that they attacked the police.

The government also helped Itamar with state-sponsored terrorism. Soon after the beginning of the Intifada, the IDF blockaded the road to Beit Furik, a village located near Itamar. Gideon Levy reported:

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128 Ibid.
129 Nadav Haetzni, “We are the Emissaries of the People of Israel, 4.
The IDF brought in forbidding cement blocks which no soldier, however humane and compassionate, can remove, not for a woman about to give birth and not for a dying man. A few days after that, an army bulldozer appeared and dug an impassable trench, just to be on the safe side. The safe side, that is, for the handful of settlers from Itamar and Elon Moreh who pass by on the main road, and the hell with the lives of the thousands of other residents in the area. Beit Furik has been under siege for three months; 8,500 people cut off from the outside world.”

Itamar colonists also launched a full-scale horrifying assault on the livestock of a Palestinian shepherd in August 2001. When the Bani Jaber family took their sheep out to graze in pasture near the village of Aqraba, Itamar colonists chased them away with a barrage of gunfire. The Jabers came back to retrieve their sheep several hours later and found “about 145 dead or dying sheep and goats, languishing in a sparse field like so many mounds of fluff.” The Jabers also discovered a container of chemical fluid at the scene. The settlers had poisoned the livestock. Ya’acov Hyman, an Itamar resident, said the settlement knew nothing of the event. Instead, he blamed it on the Palestinians. He exclaimed: “The Arabs are liars. Whatever they are saying it is what they are thinking of doing to us. If they say we have poisoned their sheep, it is probably because they are thinking of poisoning our sheep.”

The police and autopsies have confirmed that chemical fertilizers poisoned the animals. “The loss is a major blow to the livelihood of people already barely making ends meet. Palestinians see this kind of action, along with the uprooting of olive trees and the destruction of crops, as part of an Israeli campaign to strangle their economy.”

**Conclusion**

The colonies located within the Wadi Fa’ra serve two purposes: a strategic and a religious. Hamra, Mekhora, and Massua, all played an important role for Israel during the 1970s in creating a strategic barrier between Jordan and Israel. They had a negative impact on Palestinian economy as their land was confiscated and so they have had to look elsewhere for sustenance.

Itamar and Elon Moreh were founded by religious fanatics who rationalized land theft with Biblical “proof texts.” The campaigns of constant anti-Arab hostilities and violence, for which they have managed to enlist the protection of the IDF since the fall of 2001, have made the prospect of constructive development in much of the Wadi el-Far’a non-existent for the time being.

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137 Tracy Wilkinson, “Palestinians Believe that Israeli Settlers Killed their Flock as Part of a Campaign to Strangle their Economy,” *Los Angeles Times*, 1 September 2001, 3.
139 Tracy Wilkinson, “Palestinians Believe that Israeli Settlers Killed their Flock,” 3.
## Part II: Maps and Statistics

### Table 1: Outposts within the Wadi el-Far’a

<table>
<thead>
<tr>
<th>Nearest Colony</th>
<th>Name of Outpost</th>
<th>Date of Discovery</th>
<th>Number of Settlers Inside/Outside Settlement Planning Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elon Moreh</td>
<td>Point 792</td>
<td>1/99</td>
<td>2 families O</td>
</tr>
<tr>
<td>Benjamin Regional Council</td>
<td>British Police Junction</td>
<td>6/02</td>
<td>Undetermined O</td>
</tr>
<tr>
<td>Benjamin Regional Council</td>
<td>Megron</td>
<td>5/02</td>
<td>12 families O</td>
</tr>
<tr>
<td>Itamar</td>
<td>The Point</td>
<td>1996</td>
<td>Undetermined I</td>
</tr>
<tr>
<td>Itamar</td>
<td>Hill 851</td>
<td>10/98</td>
<td>30 I</td>
</tr>
<tr>
<td>Itamar</td>
<td>Hill 782</td>
<td>5/99</td>
<td>4 families I</td>
</tr>
<tr>
<td>Itamar</td>
<td>Hill 836</td>
<td>11/98</td>
<td>6 families I</td>
</tr>
<tr>
<td>Itamar</td>
<td>Givat Olam</td>
<td>11/98</td>
<td>NA</td>
</tr>
<tr>
<td>Itamar</td>
<td>Hill 777</td>
<td>3/99</td>
<td>3-4 families O</td>
</tr>
</tbody>
</table>

### Table 2: Number of Official Jewish Settlements in Occupied Territory until 1977*: Sites Foundings Under Labor Governments (Excluding East Jerusalem)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GOLAN</td>
<td>17</td>
<td>2</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>JORDAN RIFT</td>
<td>13</td>
<td>2</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>RIFT WEST BANK</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>GAZA-RAFIAH</td>
<td>9</td>
<td>3</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>REST SINAI</td>
<td>4</td>
<td>0</td>
<td>-1</td>
<td>3</td>
</tr>
<tr>
<td>ALL REGIONS</td>
<td>47</td>
<td>7</td>
<td>24</td>
<td>77</td>
</tr>
</tbody>
</table>

* Excludes the three unofficial Gush Emunim sites.

### Table 3: Expenditure of the World Zionist Organization on West Bank Settlements--1974-1983 (millions of U.S. Dollars)

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rift Valley</td>
<td>3.87</td>
<td>3.90</td>
<td>3.11</td>
<td>5.22</td>
<td>3.70</td>
<td>11.15</td>
<td>13.70</td>
<td>12.85</td>
<td>12.65</td>
<td>12.89</td>
</tr>
<tr>
<td>Rest of West Bank</td>
<td>1.22</td>
<td>1.20</td>
<td>.72</td>
<td>5.06</td>
<td>10.14</td>
<td>18.59</td>
<td>23.40</td>
<td>28.20</td>
<td>22.14</td>
<td>21.24</td>
</tr>
<tr>
<td>Subtotal</td>
<td>5.09</td>
<td>5.10</td>
<td>3.83</td>
<td>10.28</td>
<td>13.84</td>
<td>29.74</td>
<td>37.10</td>
<td>41.05</td>
<td>34.79</td>
<td>34.13</td>
</tr>
<tr>
<td>Jewish National Fund (JNF) land development</td>
<td>.47</td>
<td>.36</td>
<td>.29</td>
<td>.30</td>
<td>1.20</td>
<td>3.53</td>
<td>3.10</td>
<td>3.27</td>
<td>1.94</td>
<td>1.40</td>
</tr>
<tr>
<td>Total</td>
<td>5.56</td>
<td>5.46</td>
<td>4.12</td>
<td>10.67</td>
<td>10.58</td>
<td>33.27</td>
<td>40.20</td>
<td>44.32</td>
<td>36.73</td>
<td>35.53</td>
</tr>
<tr>
<td>% spent in West Bank</td>
<td>24</td>
<td>24</td>
<td>19</td>
<td>49</td>
<td>73</td>
<td>63</td>
<td>63</td>
<td>69</td>
<td>64</td>
<td>62</td>
</tr>
</tbody>
</table>

**SOURCE:** Ministry of Agriculture, Budget Book, 1983.

### Table 4: Jewish Colonies Established in Palestine, 1961-1982

<table>
<thead>
<tr>
<th>Period</th>
<th>Total</th>
<th>Galilee Mountain</th>
<th>Northern Region</th>
<th>Central Region</th>
<th>Negev &amp; Arava</th>
<th>Judea &amp; Samaria</th>
<th>Jordan Valley</th>
<th>Golan Heights</th>
<th>Gaza Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961-1963</td>
<td>9</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>1964-1966</td>
<td>13</td>
<td>5</td>
<td>--</td>
<td>5</td>
<td>3</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>1967-1971</td>
<td>33</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>9</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>1972-1976</td>
<td>32</td>
<td>---</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>1977-1982</td>
<td>205</td>
<td>64</td>
<td>4</td>
<td>6</td>
<td>29</td>
<td>62</td>
<td>17</td>
<td>14</td>
<td>9</td>
</tr>
</tbody>
</table>

**Source:** Pamphlet Published By Settlement Department of Jewish Agency and World Zionist Organization, July, 1982.
**Cited in:** Ibrahim Matar, “Israeli Settlements and Palestinian Rights” in Occupation: Israel over Palestine, 119.
Map1: of the Wadi Fa’ra Settlements

Source: The Perry-Castaneda Library Map Collection--University of Texas
http://www.lib.utexas.edu/maps/middle_east_and_asia/westbank_nabulus_east92.jpg
Map 2: The Allon Plan --1967

Source: Middle East Maps
http://www.dartmouth.edu/~gov46/
Graph 1: Settlement Activity from 1967-1990

Source: Foundation for Middle East Peace
http://www.fmep.org/bar2sr91.jpg

Figure 2: Jewish Population Growth from 1972 to 1992

Source: Foundation for Middle East Peace.
http://www.fmep.org/bar2sr91.jpg

Israeli Settlements-Colonies in the Wadi el-Far’a, 190
**Figure 3:** Settler Population Growth from 1990-1997

Source: Foundation for Middle East Peace
http://www.fmep.org/images/charts/chart0007_4.jpg

**Figure 4:** Settler Growth in West Bank and Gaza Strip: 1972-1998

Source: Foundation for Middle East Peace.

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Israeli Settlements-Colonies in the Wadi el-Far’a, 191
Map 3:
West Bank Hilltop Settlements and Land Confiscations - June 1999

Source: Foundation for Middle East Peace
Table 5:

<table>
<thead>
<tr>
<th></th>
<th>Sources of Population Growth: Total Israeli Population and Settler Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual population growth %</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>Israel</td>
</tr>
<tr>
<td></td>
<td>West Bank and Gaza</td>
</tr>
<tr>
<td>1996</td>
<td>Israel</td>
</tr>
<tr>
<td></td>
<td>West Bank and Gaza</td>
</tr>
<tr>
<td>1994</td>
<td>Israel</td>
</tr>
<tr>
<td></td>
<td>West Bank and Gaza</td>
</tr>
<tr>
<td>1993</td>
<td>Israel</td>
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<td></td>
<td>West Bank and Gaza</td>
</tr>
<tr>
<td>1991</td>
<td>Israel</td>
</tr>
<tr>
<td></td>
<td>West Bank and Gaza</td>
</tr>
</tbody>
</table>

- Annual settler population growth is more than three times the annual population growth in Israel proper (1998: 3.1 times; 1996: 3.5; 1994: 3.6; 1993: 4.1; 1991: 3.0).
- The settlements absorb annually about 1,000 new immigrants. Israel, it will be remembered, committed itself in 1992 to a policy of not encouraging immigrant settlement in the territories.
- Israelis are still moving across the Green Line in large, though declining, numbers. This internal migration is also considered by the U.S. to be part of the "natural increase" in settler population and, therefore, has not been a topic of U.S. criticism since the August 1992 understanding between President George Bush and Prime Minister Yitzak Rabin.
- The natural increase of the settler population has doubled since 1991 and now almost equals the migration balance.
- Includes emigration.