An-Najah National University

Faculty of Graduate Studies

Environmental Assessment and Economic Valuation of Wastewater Generated from Israeli Settlements in the West Bank.

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To My Father, Adel Ibraheem Shreim

To My Mother, Ameneh Shreim

To My Wife, Lina Mahmmoud Hamarshi

To My Sisters, Hanin and Thaera Shreim

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My mother and father, you have given me so much, thanks for your faith in me, and for teaching me that I should never surrender.

My wife I love you so much, thank you for your understanding and love during my study.

الاقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان :

Environmental Assessment and Economic Valuation of Wastewater Generated from Israeli Settlements in the West Bank.

أقر بأن ما اشتملت عليه هذه الرسالة إنما هي نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وأن هذه الرسالة ككل، أو أي جزء منها لم يقدم لنيل أية درجة أو لقب علمي أو بحثي لدى أية مؤسسة تعليمية أو بحثية أخرى .

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name : **اسم الطالب :**

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Date: **التاريخ:**

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Environmental Assessment and Economic Valuation of Wastewater Generated from Israeli Settlements in the West Bank.

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Abstract

Since 45 years of the Israeli occupation to Palestine, Israel continues to destroy the Palestinian lands, and the land may be deteriorated over time due to the cumulative effects of several years of practices.

The work of this thesis focused on the environmental assessment and economic valuation of wastewater generated from Israel settlements in the West Bank. The questionnaire was developed to achieve the objectives of the research and the result was analyzed using Microsoft Excel 2010.

Results show the total numbers of settlements in the West Bank are 173 settlements with total population equal 483thousand, which produced around 60MCM/year, this means that the wastewater generated per capita per day per each settler approximately 343liter according to the calculations throw this research.

Results show that the numbers of settlements in the in the Western aquifer are 65 which produced 25 MCM/year, while in the Eastern aquifer are 97 settlements which produced 33 MCM/year and in the Northeastern aquifer are 9 settlements which produced nearly 2 MCM/year.

Results confirm that the wastewater generated from Israel settlements considered as one of the main sources of pollution for Palestinian land, environmental, groundwater resources and it is affect on the economy. Overall, the recommendations call all relevant authorities to assume their

responsibilities and to take immediate actions to control an if possible to prevent deterioration of the Palestinian land and the groundwater contamination.

CHAPTER ONE

INTRODUCTION

1.1 General

From the beginning of the Israeli occupation of the West Bank in 1967, Israel started to negatively impact on the Palestinians environment. There are many associated problems that transpire from Israel practice, which is in fact very common; they destroyed villages, building settlements, changing in land use by these settlements and by opening a new road in the Palestinian land. In addition; Israel controls the water resources in the West Bank from both the Jordan River basin and the groundwater resources.

All these activities are may negatively affect the Palestine environment, one of the potential pollution sources is the wastewater and solid waste that generated from the Israeli settlement.

Settlements are distributed all over the West Bank which generate large volumes of wastewater and solid waste. Approximately 480 thousand Jewish settlers live in the West Bank and east Jerusalem (Btselem, 2007).

Israel produces around 60 MCM/year of wastewater (appendix B). The majority of this wastewater was flow into wadis and agricultural lands. This means that the average amount of wastewater generated by settlements is 343l/c/day.

Disposal of wastewater from settlements introduces contaminants as bacteria, parasites, toxic heavy metals, and other material into wadis and agricultural lands that might be effect on the health and the environment.

The wastewater that generated from the Israeli settlement may have different environmental and economic impact on the Palestinians communities.

1.2 Motivation

The following are the main motivations for carrying out the research:

1. The wastewater generated by Israeli settlement may have a great impact on the Palestinian environmental and economy. Data available regarding this issue is very limited and not covered all aspects.

2. Developing the data regarding the settlement's wastewater. This data will be develop the Palestinian Water Authority (PWA) data base and provide an input facilities to better scale the issues related to wastewater from Israeli settlement.

1.3 Research questions

The research will be tried to respond the following questions:

1- What are the environmental impacts of the wastewater that generated from Israeli settlement in the West Bank?

2- Which of these environmental impacts are quantifiable and how? And which of these are non-quantifiable?

3- What are the economic implications on the income of the Palestinians communities adjacent to the settlements? And how can they be quantified?

1.4 Research objectives

The following are the research key objectives:

1- To develop part of the data base regarding the wastewater generated from the selected Israeli settlements for further development by PWA and other stakeholders.

2- To evaluate the impact of the Israeli settlement on the surrounding environment. This evaluation will consider both quantifiable and non-quantifiable impacts through using the questionnaire.

3- To evaluate the impact of the Israeli settlements wastewater on the economy of the surrounding communities.

1.5 Research Overall Methodology

The figure below (Figure 1.1) describes the methodology that was followed in this research.

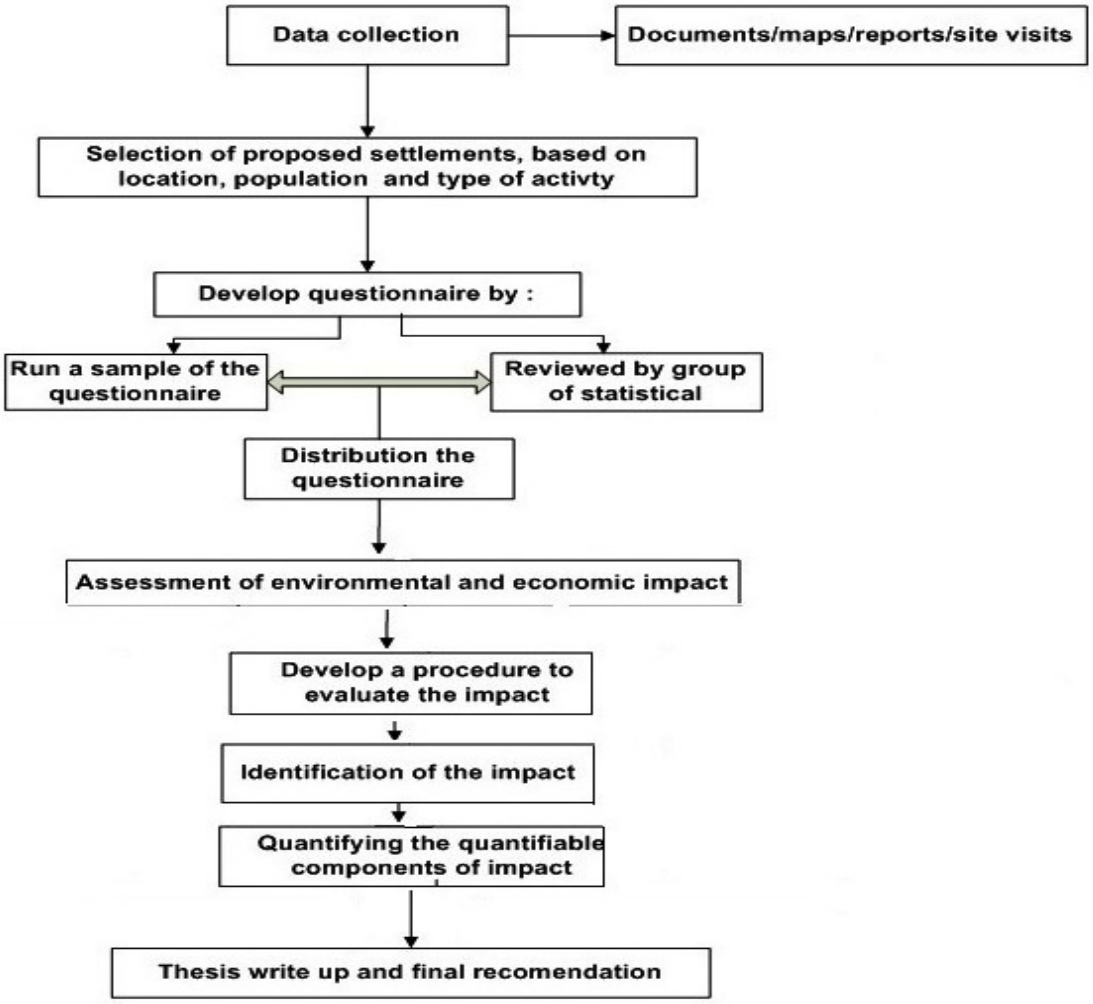

Figure (1.1): A flow chart that depicts the methodology of the research

The methodology starts by the data collection that was carried out for the selected study area. The data were obtained from the main previous studies, the relevant databases of the PWA, by sites visit, and along with other sources.

Then the settlements have been selected taking into account a variety of factors such as the geographic distribution and the location, the size of the settlement, the type of the economic activities within the settlement and the type of Palestinian communities that living near these settlements.

After that the methodology proceeded by the development of a questionnaire. This questionnaire was evaluated and tested for its reliability by statisticians from An-Najah University. Then the questionnaire was distributed to the different communities adjacent to selected Israeli settlements. Different stakeholders within the community will be targeted including farmers and farmers union, community leaders, local authority, NGO's, and other community members.

The outcomes from the questionnaire were analyzed by using Excel program, and the results were assessed the environmental and economic impacts and this is the main part of the research and includes:

a) Identification of the impacts for both environmental and economic aspects and for quantifiable and non-quantifiable impacts.

b) Quantifying of the quantifiable components for the impacts and develop the tool, and the criteria of generalize the outcome.

c) Develop a general procedure that can be used to evaluate the environmental and economic impact of the wastewater that generated from Israeli settlements.

The methodology concludes by setting up a brief summary of the detailed conclusions of the main chapters. The major recommendations were made regarding the potential implementation of the planning and management options to control contamination from the Israel settlements.

CHAPTER TWO`
LITERATURE REVIEW

2.1 The facts and figures on the impacts of the Israeli expansion on the Palestinian occupied land including Jerusalem East (PWA, 2009):

a) According to PWA the total population of settler in the West Bank and Jerusalem are approximately 450 thousands.

b) The average water consumption is 300 l/c/d, this means the wastewater generated from all settlement around 35MCM/year if we considered around 70% of water consumption goes to wastewater.

c) Around 31% of wastewater generated is treated, while the rest (24MCM/years) flowing into Palestinian lands and wadies.

d) The untreated wastewater affect on the Palestinian environment because Lab analysis of wastewater generated from the industrial settlement such as Burkan in Salfeet district proved that there are toxic material and heavy metals.

e) Hundreds of donums of Palestinian agricultural land are polluted with Israeli sewage discharges causing serious pollution not only to land but to produce and animals feeding on grazing land.

f) Several Israeli industrial sites/zones established within the West Bank of unknown number and processes discharge not only liquid and solid waste but also air pollution over Palestinian communities.

2.2 Neglect of wastewater treatment in the West Bank (Btselem, 2009)

a) The amount of wastewater generated from the settlements and Palestinian community around 91 MCM/year.

b) Around 35 MCM/year generated from the settlements in the west bank including Jerusalem.

c) Most of the treatment plant that exists in the settlement is relatively small and the treatment efficiency is low compare with increase the population in these settlements.

d) During 40 years of occupation, Israel has not built advanced regional wastewater treatment plants in the settlements, but in 1983 the israel water planning company made a master plan to develop a treatment system for wastewater water generated from settlements. Until now no schedule for this plan.

e) Kana stream conduit is the only wastewater treatment project; this project was started in 2006 to carries the wastewater from six settlements (Karne Shomeron Emmanuel, Oranit, Sha'are Tikva, Yakir, and Nofim) by the pipe line to the treatment plant inside Israel, but this project took 7 years to complete.

f) This pipe line carries a few million cubic meters per years, less than six percent of the total wastewater generated from the settlements.

2.3 Troubled waters – Palestinians denied fair access to water (AMNISTY INTERNATIONAL, 2009)

a) Israel has caused damage to the aquifer by establishing more than 200 unlawful Israeli settlements in the West Bank and allowing them to discharge large quantities of untreated domestic and industrial sewage over the recharge area of the aquifer.

b) In the 9th of December 2007, a group of Israeli settler enters the Tuwani village in the southern of Hebron, and threw the toxic into rainwater harvesting.

c) A spanish NGO shows that this rainwater harvesting is highly acidic by make a laboratory analysis, and finds that the pH is 2.4, contain a high number of soluble material, so this water is harmful for human and animal consumption.

d) On March 2005 it's found that there are large quantities of toxic chemicals around the main Tuwani water reservoir.

e) Different studies have found nitrate levels above the acceptable standard in the groundwater in several parts of the West Bank close to Israeli settlements, indicating contamination from untreated sewage and fertilizers.

f) In recent years, many of the settlements have been equipped with sewage treatment plants but others still discharge raw sewage and hazardous industrial waste into the fields and streams of the West Bank.

2.4 The impact of Israeli industrial zone on environmental and human health in tulkarm city (Suleiman Al-khalil and Issam Qasem, 2009).

a) The data collected including reports with respect to the association between respiratory disease and air pollution is in agreement with several reports that provided evidence on people living in areas with high levels of pollution.

b) The smell of the air, intensity of smoke and the appearance colored brownish spots are distinguishing features of air contamination in the residential area of the study area.

c) Based on data presented in the questionnaire one can deduce that episodes of a high level of air contamination occur in that area adjacent to the Israeli industrial zones.

d) The findings on disease symptoms strongly reflect the association of these factors with air pollution our finding on asthma cases (61% of respiratory disease related symptoms) strongly indicates the association with air pollution.

e) With this disease and is inconsistent with previous reports in this respect and we would like to add that all asthma cases were confirmed by the medical reports of the concerned cases.

2.5 Pollution of mountain aquifer by sewage (Friends of the Earth Middle East, 2004).

Results from 2004 suggest that only 6% of the sewage conformed to Israeli treatment standards (Environmental Protection Association Samaria and Jordan Valley, 2000), while 48% of the sewage was treated inadequately, or not treated at all. Monitoring results for the other 17% were not available, and the status of 7% was unclear.

2.6 Report (Btselem, 2002)

a) The negative influence of Ari'el on the residents of Salfeet is not confined solely to the question of land and the housing shortage, but also includes such aspects as the pollution of the underground water sources serving Salfeet.

b) Most of the sewage created by Ari'el flows into a streambed at the western entrance to the settlement, and then continues to flow to the southwest.

c) This sewage channel, which seeps into the soil and mixes with the spring water stored in the aquifer, passes just a few meters from a pumping station supplying most of the water used for domestic consumption by the residents of Salfeet.

d) According to the water engineer of Salfeet, Salah Afani, this sewage channel pollutes the water, and he must occasionally order the municipality to stop pumping after routine inspections reveal particularly high levels of pollution.

2.7 Interview (the Department of Health and the Environment in the municipality of salfit, 2010)

a) From an interview with Ashraf Zuhd (head of the health and environment department in salfit municipality) its show that the Purkan settlement contains more than 150 industry, vary between dangerous to very dangerous, especially leather ,dyes and chemicals, which classified as very dangerous materials, because they resulted from heavy metals such as arsenic, lead and others.

b) The danger of those settlement is extend environmentally, physically, biologically and threatening the lives of citizen, especially, the spread of dangerous diseases among the people, because domestic and industrial waste that comes from these settlement. Also, water pollution and air pollution from the smoke, toxic fumes and gases that resulted from this factory.

c) Salfit fall on the largest water basin in the West Bank (Western Basin). The Palestinians take only 5% while the Israel take 95%. The salfit area contains many springs. But the Israel denied the Palestinian people to take them. And pollution this spring from the domestic waste and industrial waste.

d) Almatweh spring is the main water source of salfit city, but some branches of this spring have become very polluted, it's contaminated with serious chemical, resulted from the waste water from Ariel and Purkan.

e) Disinfection of water is not enough, because disinfection end the biological pollution only, put the chemical pollution needs to very high

technical method. And the Israel occupation prevents salfit municipality to dig any artesian well.

f) Wadi Qana, which considered a natural reserve, it's surrounded by seven settlements, the wastewater from this settlements flow through this wadi. This killed the wild life and pollutes the springs.

2.8 Interview (the head of Jalbun council, 2010)

a) From an interview with the head of Jalbun council its show that the wastewater from Jalbu'a and Merav settlement flow into the village land and between the houses, also destroy the crops and spread odors. And cut the routes of some streets, so the residents of this village built the earth mounds to prevent this Waste to enter to the homes.

b) He also said that the wastewater does not flow every day, but when it flows, it flows in large quantities. And the color of this waste is black this indicate that no treatment for it.

c) He also said that the Jalbu'a settlement will be confiscated some of the new land for expansion of this settlement, which is threatening the village.

2.9 Interview (the head of head of Kufur Kadum council, 2010)

a) From an interview with the head of kufur kadum council its show that the wastewater from kadumim settlement flow into the village land, also destroy the crops and spread odors.

b) He also said that the wastewater does not flow every day, but when it flows, it flows in large quantities. And the color of this waste is black this indicate that no treatment for it.

2.10 Investigation on groundwater pollution (PWEG, 2008)

a) There is a sewerage collection network at the Arael settlement; wastewater treatment plant was constructed in the eightieth to accommodate the treatment of wastewater, with inefficient treatment.

b) Big part of wastewater from Arael is not treated and flow from the plant to the wadi Al matwee where Ein Al Matwee (main drinking water source to Salfeet, Farkha and the village of Kherbet Qes) is located.

c) The untreated wastewater from Arael is flowing between the Palestinian houses in Bruqeen and causing serious environmental hazards to the community and health risks.

d) Borkan industrial zone is another pollution source for Salfeet, it contain more than 80 factories with highly toxic material.

e) Industrial wastewater from Borkan is flow to the wadi Al Wadat , causes soil and groundwater pollution, this industrial wastewater contain a heavy metals such as ,Arsine, Zink and Mercury.

2.11 Ecosystem

a) The different ecosystem provides critical service for human and non-human life such as food, water treatment, air purification, flood control, climate regulation and others.

b) Like other ecosystem, treated wastewater provides many services to human society. These services include both market goods and services like

water for irrigation as well as nonmarket goods and services such as biodiversity. Many of the goods and service that may be provides by treated waste water in the Arab States today are not bought or sold which means that it does not have a declared price. For that, the estimation of the economic value of this service must be based on the different factors and the quantitative valuation of treated wastewater requires expertise from both social and natural science. It is believed that the available methods for the quantitative valuation of treated wastewater economics are still evolving, imprecise, and controversial (Wilson and Carpenter, 1999).

c) By estimating the economic value of ecosystem goods and services not traded in the marketplace, social cost or benefits that otherwise would remain hidden or un-appreciated are thus revealed. For this reason, ecologists, social science, and environmental managers are increasingly interested in assessing non market ecosystem goods and service

d) So if treated wastewater quality changes or water pollution occurs and as a result reduces vegetables production, the impact can be valued with the price of the resource, e.g., vegetables. This method requires an interdisciplinary approach involving biologists and economists.

e) Another method is the hedonic properly value method that takes advantage of the fact that many environmental goods are not traded in markets but their presence may have an effect on property values (Smith, 1993).

The above can be summarized in the following paragraph:

It was shown that the total population of settler in the West Bank and Jerusalem are approximately 450 thousands (PWA, 2009). This generated around 35MCM (Btselem, 2009) of wastewater per year, some of this waste is treated, but the other is not treated, the untreated wastewater flowing into Palestinian land, such as Jalbun in Jenin, salfeet, Kufur Kadum in Qalqilia, causes a negatively impact to the Palestine land, this impact can be divided into two type, environmental (soil, water, air, and land pollution) and economical (economic value of the polluted land).

CHAPTER THREE

STUDY AREA

3.1 General Background about West Bank

The West Bank is divided into eleven districts: Bethlehem, Hebron, Jenin, Jericho, Jerusalem, Nablus, Qalqilya, Ramallah and Al-Bireh, Salfit, Tubas, and Tulkarm (See Figure 3.1). The West Bank has an area of 5,640 km² (including East Jerusalem), and 220 km² water (the northwest quarter of the Dead Sea). Approximately 2.5 million Palestinians live in the West Bank (see Table 3.1) (PCBS, 2010).

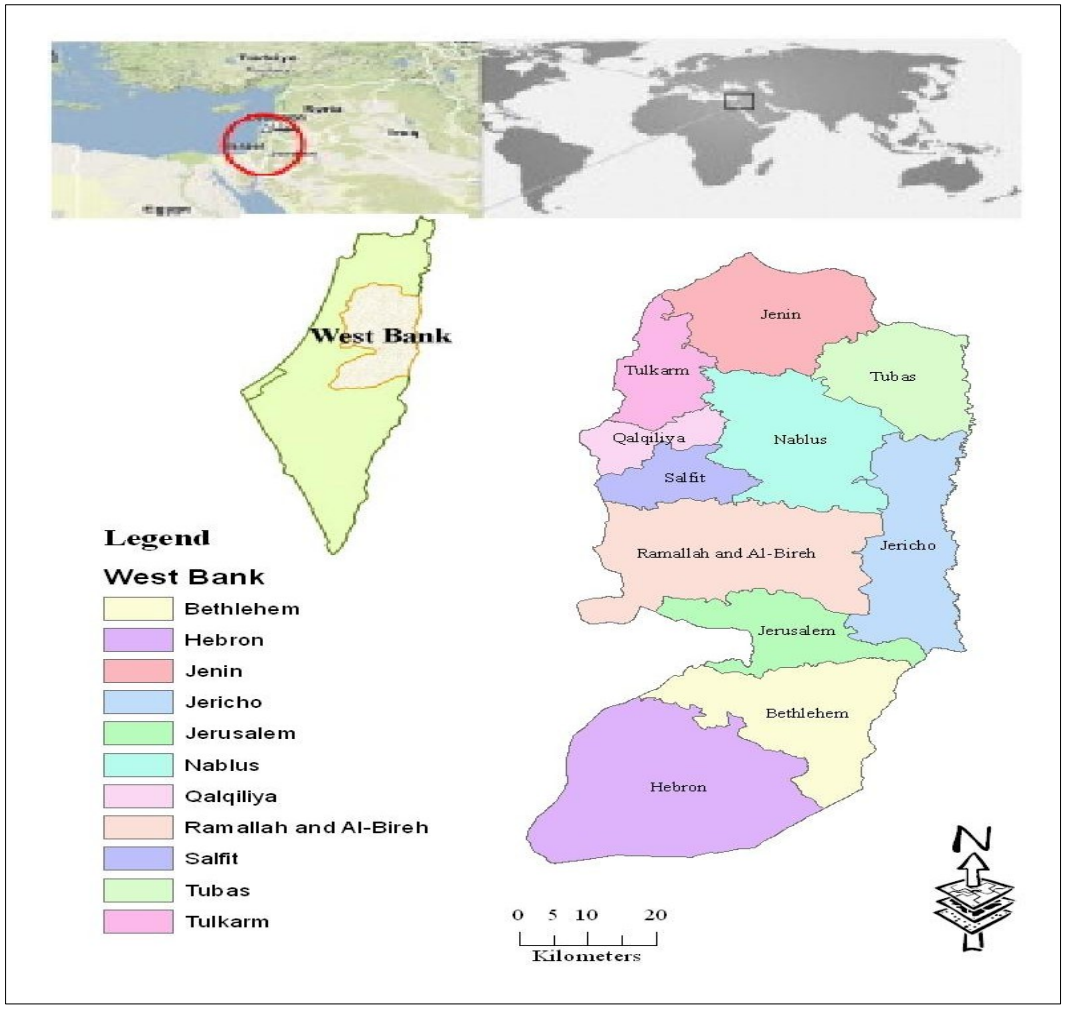

Figure (3.1): The districts of the West Bank.

Table (3.1): Population and area of the West Bank districts

West Bank district	Area(Km²)	Population
Hebron	997	533552
Ramalla and Alberih	855	285452
Bethlehem	659	177385
Nablus	605	331627
Jericho	593	42944
Jenin	583	257987
Tubas	402	47386
jerusalem	345	402712
Tulkarem	246	170333
Salfeet	204	63126
Qalqilya	166	95841

The West Bank has a length of 130 km from north to south and a width between 40 and 65 km (Abdul-Jaber, Rabbo, Scarpa, Qannam, & Younger, 1999). The West Bank is mostly composed of limestone hills that are between 700 and 900 m in high. The lowest elevation of the West Bank is the Dead Sea at 400 m below sea level while the highest is the Tall Asur at 1022 m above sea level (UNEP, 2003).

The climate in the West Bank can be characterized as hot and dry during the summer and cool and wet in winter (UNEP, 2003). The climate becomes more arid to the east and south. Evaporation is high in summer when there is always a water deficit.

The average annual rainfall in the central highlands is 700 mm and becomes less than 100 mm near the Dead Sea. However, great variations in rainfall amounts and distribution exist. The West Bank formations are comprised of limestone, dolomite, chalk, marl, chert, shale, and clays (PWA, 2001).

Groundwater resources in the West Bank are derived from three aquifer basins through wells and natural springs. These aquifer basins are the Eastern, Western, and Northeastern (SUSMAQ, 2004).

The most of Palestine land is an agriculture area. The approximately area of this land is 1834.85 km², this equal 42.5% of the total land of Palestine, the open land is approximately 29.3%, while the pasture form about 12.5%.(PCBS).

3.2 Settlement in the West Bank

There are approximately 173 Israeli settlements within the West Bank (see Figure 3.2), some of the settlements have wastewater treatment plant, and however, the other of the settlements does not have wastewater treatment. In both cases the wastewater and solid waste affect the Palestinian land and cause air pollution.

The total wastewater that generated from all settlement in the West Bank including East Jerusalem is approximately 60MCM/year (appendix B).

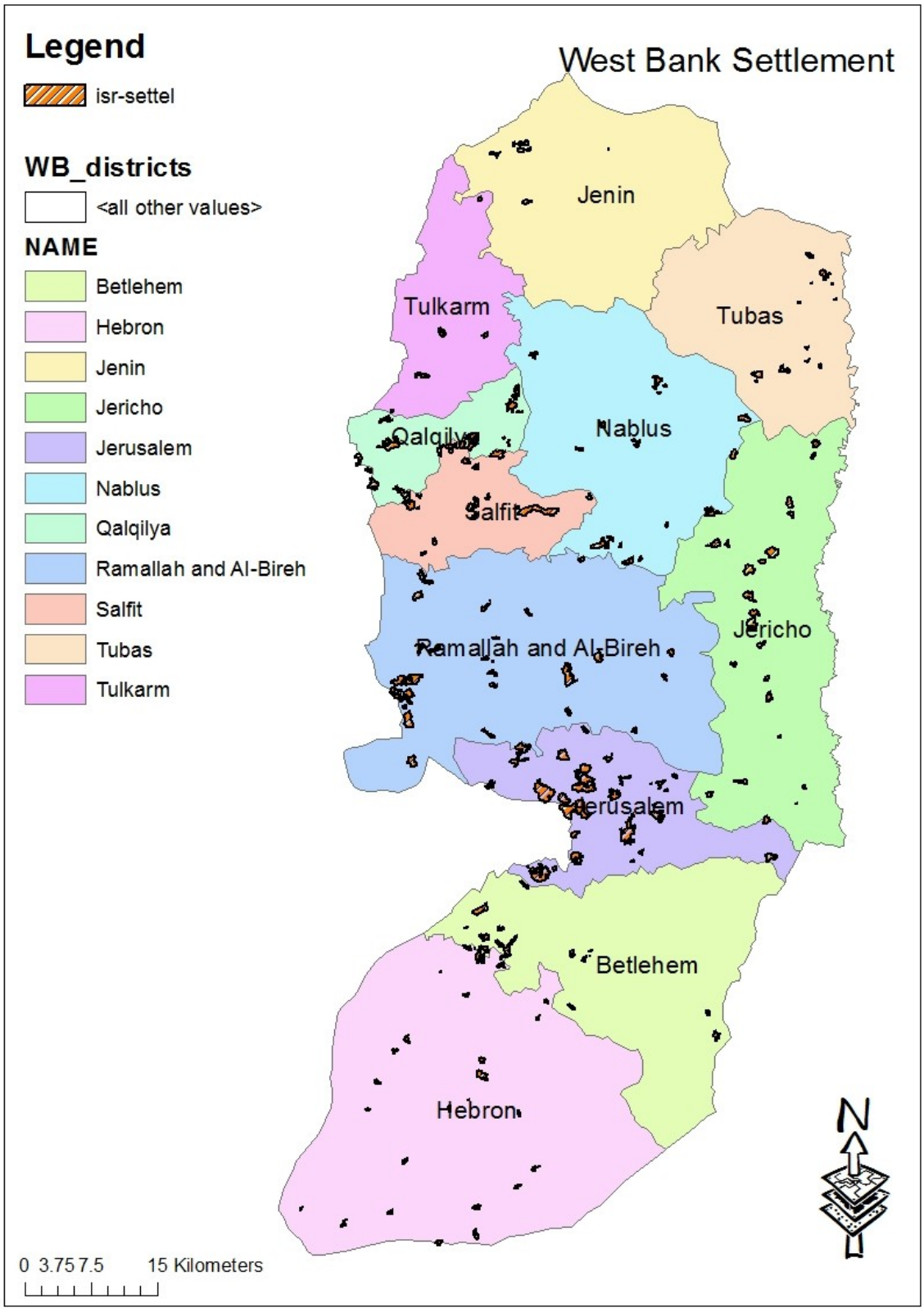

Figure (3.2): The West Bank Settlements

Israel settlements are widespread in all districts of the West Bank. The table below (see Table 3.2) summarized the settlements population and the wastewater generated from these settlements in the West Bank in year 2010.

Table (3.2): The number of settlement, population and wastewater generated. (Appendix A)

West Bank district	Number of settlement	Population	Wastewater generated (MCM/year)
Hebron	30	14534	2.135
Ramalla and Alberih	26	77108	9.26
Bethlehem	16	84216	9.77
Nablus	11	8389	0.9
Jericho	20	5017	0.76
Jenin	7	1800	0.175
Tubas	10	700	0.077
jerusalem	25	216630	28.5
Tulkarem	3	2371	0.252
Salfeet	11	26196	2.9
Qalqilya	14	46278	5.663

3.3 The selection of the Israeli settlements

The research study area covered five settlements within the West Bank (see Table 3.3). The concluded results from these selection settlements used to generalize the other settlements.

Table (3.3): The research case study

Settlement name	Population (2007)	Affected area	District
Ari'el	16613	Salffet city	Salfeet
Alon Morieh	1322	Azmut and Deir Alhateb	Nablus
Sh’ar Teqva	3931	Azun Alatmeh village	Qalqilya
Jalbou ,Merav		Jalboun	Jenin
Kadummim	3382	Kadum Village	Qalqilya

3.3.1 Ari’el

Ari'el is considered as one of the largest settlements in the Wes Bank. It was established by Israel in the West Bank in 1978; Ari'el is situated in the heart of the West Bank. However, Ari'el is a secular and urban settlement attracting settlers from the center of the country.

Ari'el is surrounded on all sides by Palestinian towns and villages (see Figure 3.3). To the south lies the city of Salfit, which functions as the governmental, administrative and commercial center for all the Palestinian villages in its vicinity. To the north of Ari'el, and in close proximity are four villages Haris, Kifl Haris, Qira and Marda, a little further to the north lie Jamma'in , Zeita-Jamma'in, and Deir Istiya, to the east of Ari'el lie the villages of Iskaka and then Yasuf, and on the western edge of the area of jurisdiction of Ari'el lie the villages of Brukin and Kafr Ad-Dik (Btselem, 2002).

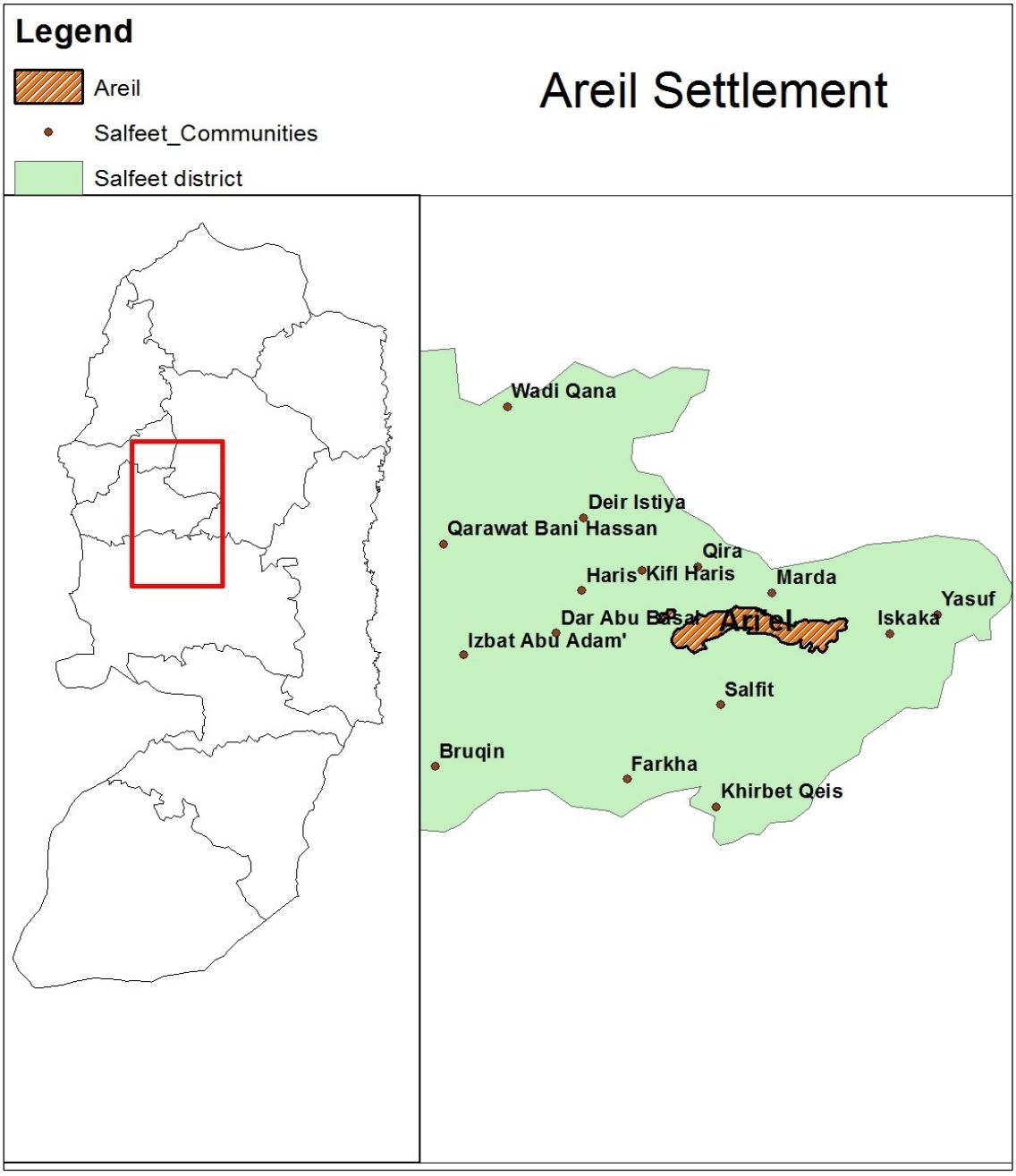

Figure (3.3): Areil Settlement

3.3.2 Alon Morieh

Alon Morieh is located in the northeast part of Nablus and was established by Israel in the West Bank in the year 1979. Alon Moreih is surrounded by many Palestinian towns and villages (see Figure 3.4) included Deir Alhatab, Azmout and Salem, it has a population around 1300 in the end of year 2007.

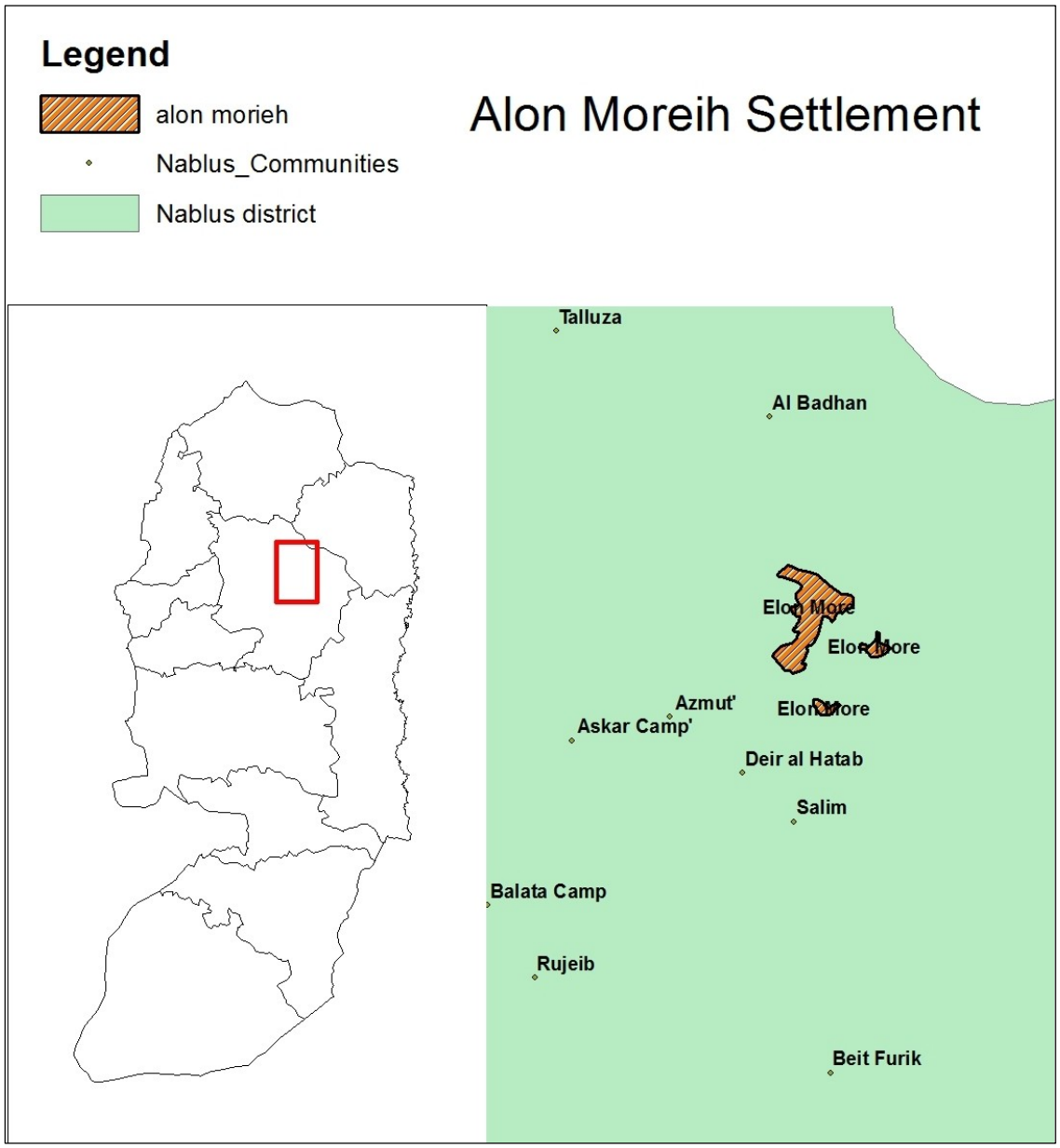

Figure (3.4): Alon Moreih Settlement

3.3.3 Sh’ar Teqva

Sh’ar Teqva is located in the southwest part of Qalqilia and was established by Israel in the West Bank in the year 1983. The area of this settlement is around 1000 dunums. Sh’ar Tiqva is surrounded by Palestinian towns and villages (see Figure 3.5). Azoun Alatmeh, Izbet Salman, Beit Amin and Sanniriya, its population around 4000 at the end of year 2007.

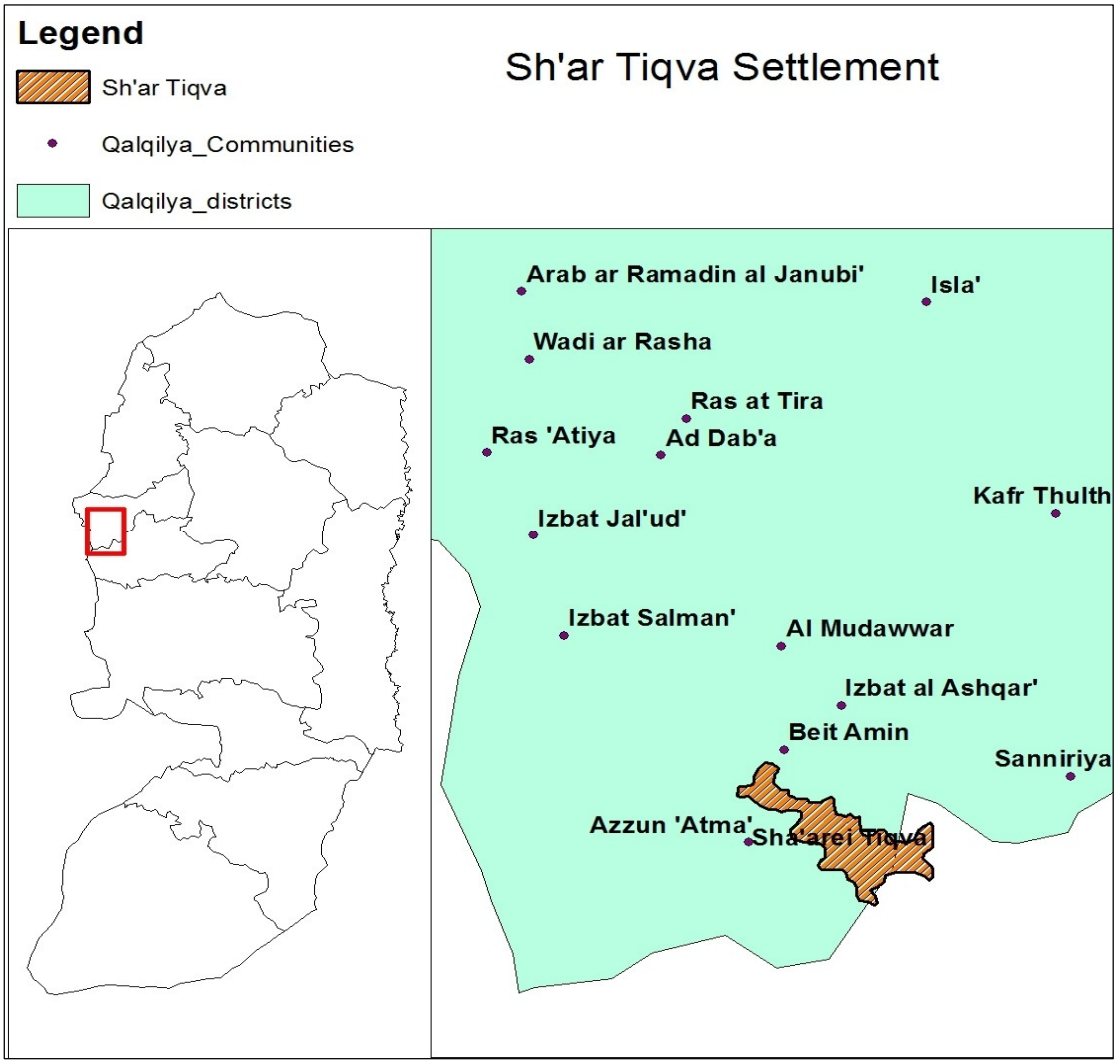

Figure (3.5): Sh’ar Tiqva Settlement

3.3.4 Kadumim

Kadumim is the first settlement established in the West Bank, it is located in the east part of Qalqilia (In 1974). The area of this settlement is around 1100 dunums. This settlement is divided into four places, Central Kev'at, Kadumim Tsufeen, Kev'at Hade'ael and Kev'at Gel'ad. Its surrounded by the Palestinian villages (see Figure 3.6), Kufur Kadum, Jit, Immatin, Hajja, and AlFunduq. The population of Kadumim is around 3400 at the end of year 2007.

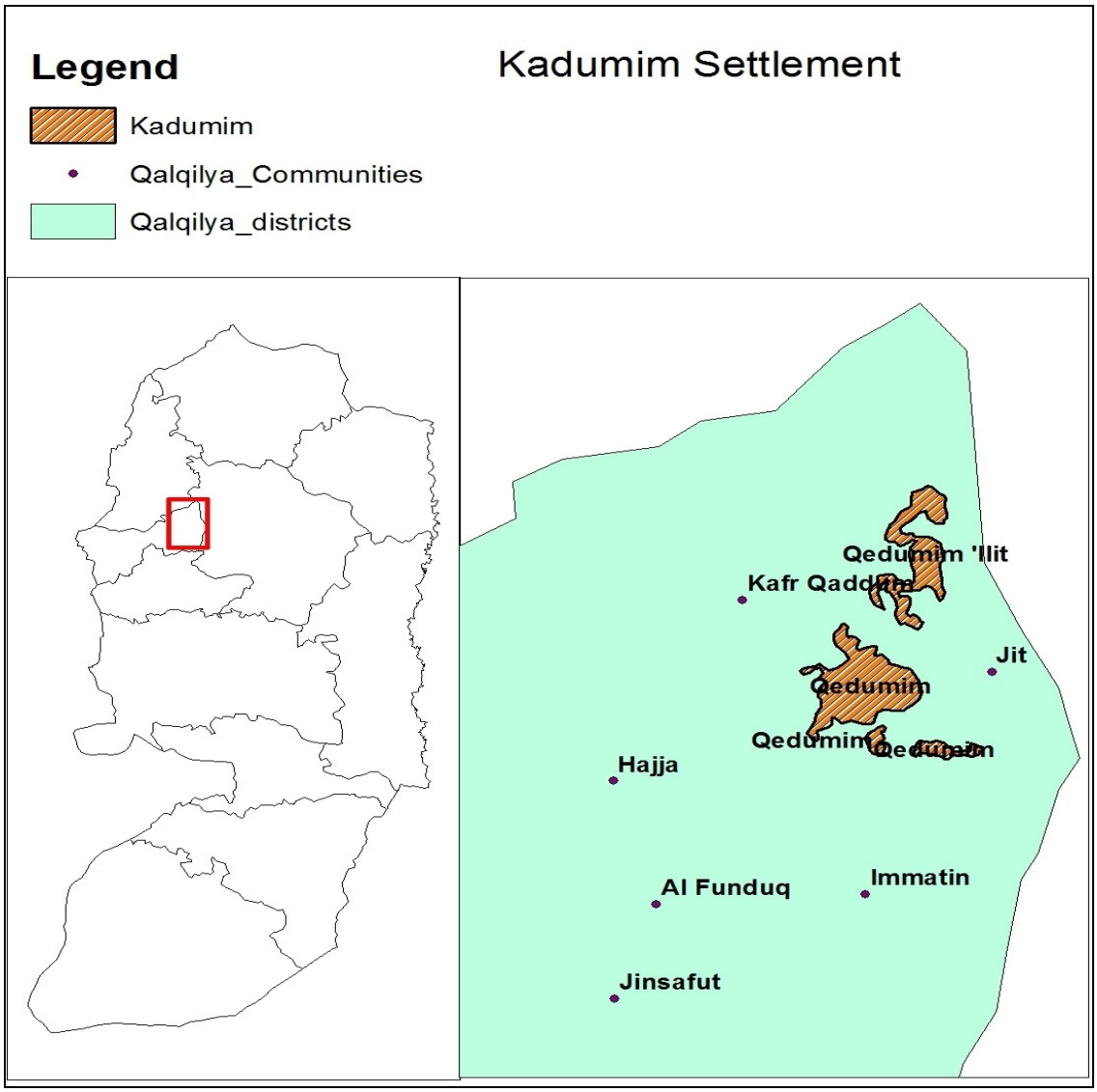

Figure (3.6): Kadumim Settlement

3.3.5 Jalbou and Merav

Jalbou and Merave are located in the East of Jenin behind the green line, it was established by Israel in the West Bank in 1979, these settlements are considered as an agriculture settlement. Jalbou and Merav are surrounded by the Palestinian villages Faqqu'a and Jalboun (see Figure 3.7).

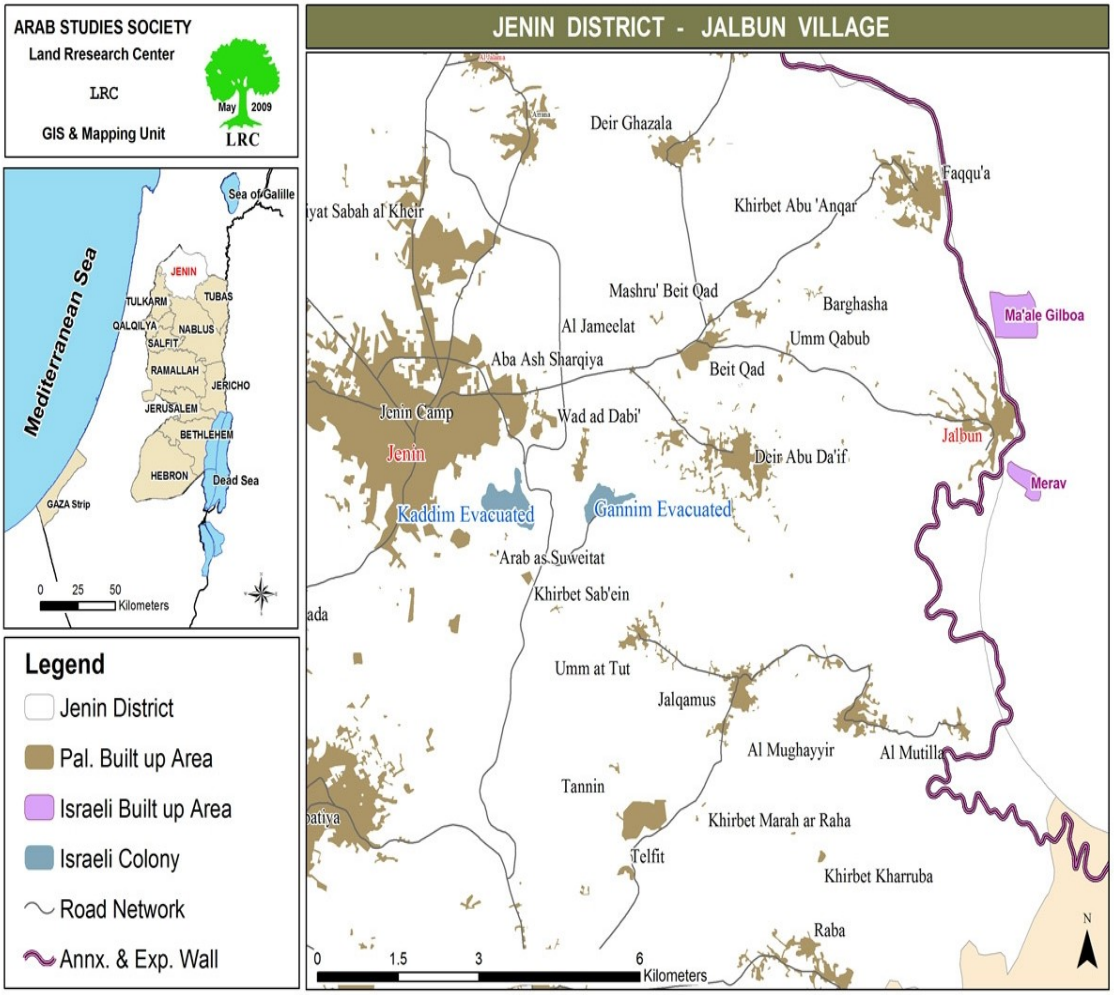

Figure (3.7): Jalbou and Merav Settlement

These settlements have been selected taking into account variety criteria. The table below (Table 3.4) summarized the location, the size, the type of activities within the settlement and the type of Palestinian communities living near these settlements

Table (3.4): The settlements information

Settlement name	Population 2007	Activity	Affected area	Population 2007	District
Ari'el	16613	Residential	Salffet city	8796	Salfeet
Alon Morieh	1322	Industrial	Azmut and Deir Alhateb	2213	Nablus
Sh’ar Teqva	3931	Residential	Azun Alatmeh village	1771	Qalqilya
Jalbou ,Merav		Agricultural	Jalboun	2390	Jenin
Kadummim	3382	Residential	Kadum Village	2908	Qalqilya

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CHAPTER FOUR
QUESTIONNAIRE DEVELOPMENT
AND
STRUCTURE

4.1 The Survey

The research study was performed according to the following steps:

1. The number of population in the villages within the study area was taken from Palestinian Central Bureau of Statistics.

2. Distribute a pilot sample of the questionnaire

3. The questionnaire was modified according the pilot sample.

4. The questionnaires were distributed among the sample study.

5. The answered of the questionnaires were reviewed by the researcher.

6. Finally, the questionnaires were analyzed statistically by Excel program.

The questionnaire was distributed to represent sensitive sampled. The questionnaire covers the different aspects of people's knowledge about the surrounded settlement, and the impact of the settlement in the surrounding environment.

The questionnaire focused on several aspects including the educational level, current work, and other aspects related to the impact of the settlements. A representative sample from the whole population of (Salfeet, Jalboun, Deir Alhatab, Azoun, and Kufur Kadum) was chosen randomly from the households of the study population.

4.1.1The Population of the research study

The population of the research study contains all households in the village within the research study. The table below (Tables 4.1) summarized the total population in the targeted villages.

Table 4.1: The population in the villages within the research study (PCBS, 2007).

Name	Population
Salffet city	8796
Deir Alhateb	2213
Azun Alatmeh village	1771
Jalboun	2390
Kadum Village	2908

4.1.2 Sample of the study

The Questionnaire aims to distribute it among 40 households in different regions of the villages.

4.1.3 Questionnaire design

The questionnaire consists of three basic parts:

4.1.3.1 Part one

This section aims to display the impact degree to the environmental elements including:

1. Groundwater
2. Air
3. Soil

4. Plant

5. Animals

4.1.3.2 Part two

The objective of this section is to show the degree of the negative impact of settlement wastewater flow on the Palestinian environment. These elements summarized as:

1. Noise from settlements.

2. Smell from wastewater generated from settlements.

3. Spread of insect

4. Disposal of wastewater near the grazing place

5. Animal disease

6. Impact to the agricultural lands

7. Quality of groundwater wells

8. Crops which damage due to wastewater flows

9. Loss of money due to the impact of wastewater flows

This section also interested in investigating if people know that their water may be contaminated by wastewater flow from settlements. In addition this part is used to estimate the negative impact on economic due to untreated wastewater flows according to people opinion.

4.1.3.3 Part three

This part from questionnaire worked out in order to represent the attitudes and the levels of awareness toward the problem of wastewater generated from the settlements according to:

1. Governmental institutions

2. Non governmental institutions

3. The people who lives in the surrounding area

4.1.4 Statistical analysis

The outcomes data from the collected questionnaire was analyzed by using Microsoft Excel 2010 that performed to determine the relationships between questionnaire elements.

CHAPTER FIVE

ANALYSIS OF THE QUESTIONNAIRE

This chapter performed the results of the questionnaire and the main findings of its analysis. The results were analyzed as per the different parts of the questionnaire as follows:

1- Environment elements results

2- Palestinian environment results

3- Attitudes and the levels of awareness toward the problem of wastewater generated from the settlements.

5.1 Environment element results

Five environment elements are discussed to show the impact of the wastewater on these elements. This is achieved by use simple classification to represent degree of the influence (extreme, high, moderate, low, and very low).

From the analysis of the questionnaire it’s noted that most of targeted people in the different villages say that, the impact from the wastewater flow from near settlements to the environment is big.

5.1.1 Groundwater

Groundwater considered the main fresh water resource in the West Bank and the only existing source for water supply for Palestinians. Because of that, protecting groundwater from pollution is a priority and a major concern as well (Alfred, 2007).

Most groundwater contamination is the result of human activity. Contaminants can seep into groundwater from different sources (Fetter, 1994).

To protect groundwater from pollution, investigating and targeting the potential sources of pollution is vital (Kouli et al., 2007).

The figure below (Figure 5.1) represent the impact on the groundwater from the wastewater, the distribution was 22% extreme, 40% high, 8% moderate, 20% low, and 10% said that the impact to the ground water is very low.

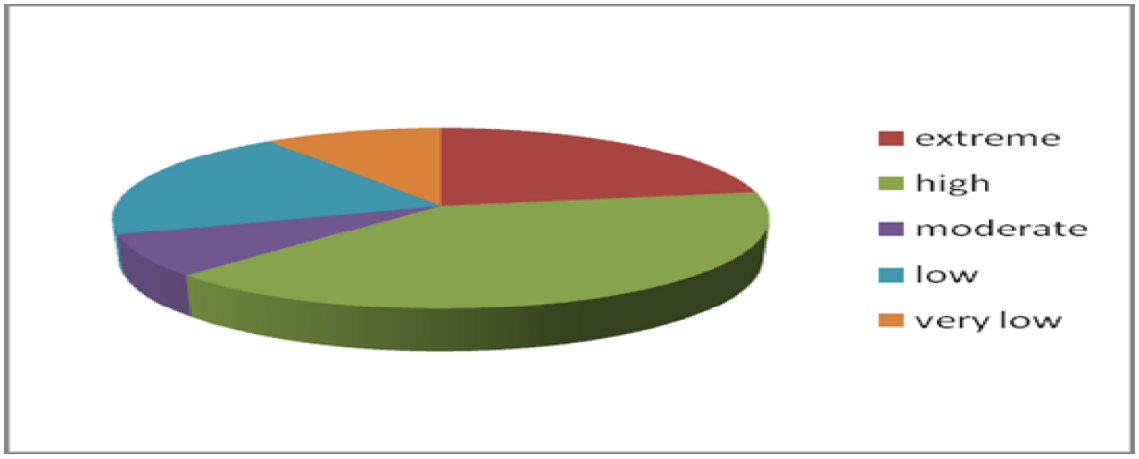

Figure (5.1): Impact to the ground water

Picture 5.1 shows that the wastewater flows from the settlement increased the potential impact on the groundwater wells in Salfeet.

Picture (5.1): The effect of wastewater flow from Ariel Settlement on Almatwei well in Salfeet.

5.1.2 Air

The main sources of air pollution in the West Bank are transportation and industry. Most of heavy Israeli industrial areas are located close to the West Bank regions.

The Burkan settlement considered the big industrial settlement inside the West Bank located in Salfeet district, its produce a very large quantity of air pollutant such as CO2 and Methane.

As shown in the figure below (figure 5.2), the distribution was 12% extreme, 50% high, 20% moderate, and 18% said that the impact to the Air is low.

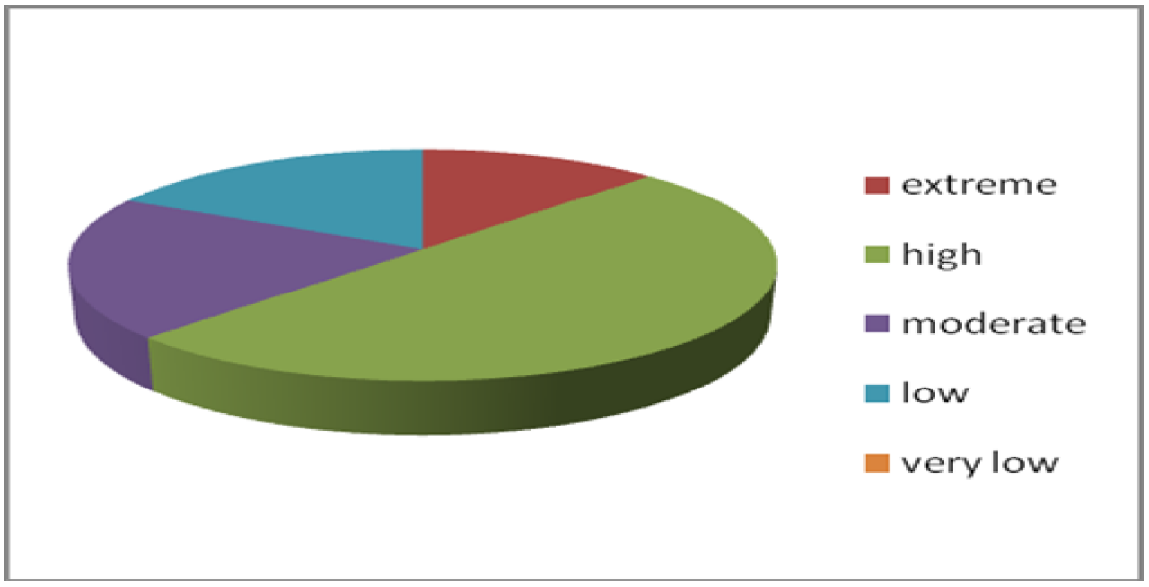

Figure (5.2): Impact to the Air

5.1.3 Soil

The wastewater flow from Israeli settlement may affect the soil, that because the wastewater decrease the ability of soil to infiltrate the fresh water to the plants this lead to desertification of the Palestinian lands that due to the soil became unsuitable to be an agricultural land.

In addition to excavation work for the soil and remove large area of the forest to build a new settlement causes a disintegration of the soil.

The figure below (figure 5.3) present that the distribution was 57% extreme, 53% say that the impact to the soil is high. These results were taken from the people who see this impact directly without any type of analysis or any data.

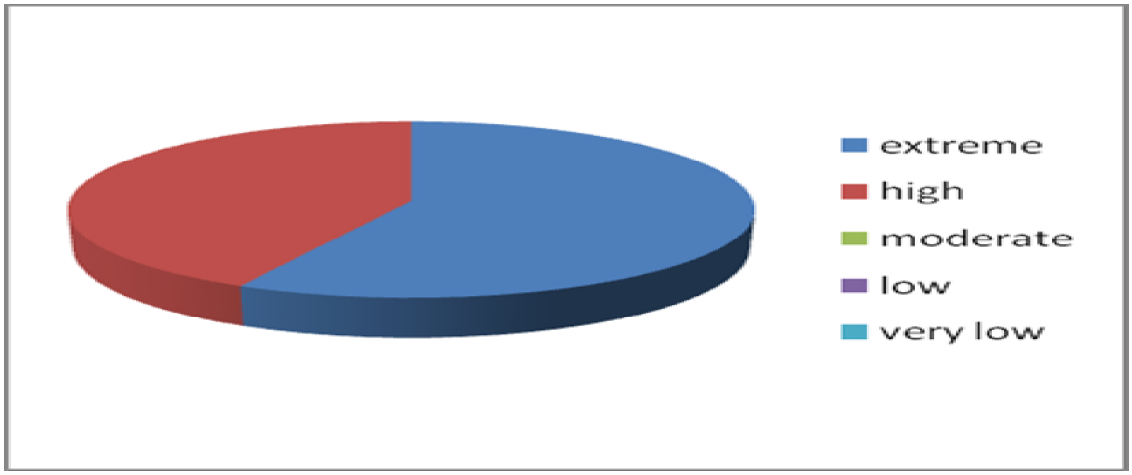

Figure (5.3): Impact to the Soil

The picture below (Picture 5.2) depicts that the wastewater flows from the settlement which increases the potential impact on the soil.

Picture (5.2): Wastewater from Ariel settlement flow into the soil

5.1.4 Plant

As shown in the figure below (figure 5.4), it's noted that the distribution was 40% extreme, 52% high, and 8% said that the impact to the plant is moderate.

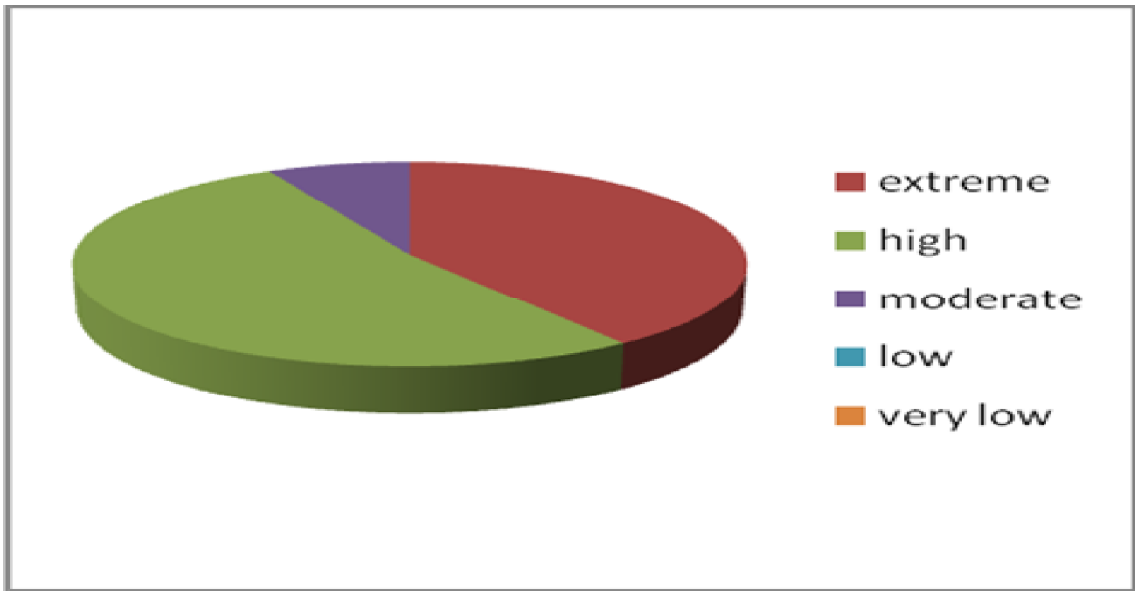

Figure (5.4): Impact to the Plant

The wastewater flow from Jalbou settlement it may be damaged more than hundred dunums of crops (see picture 5.3).

Picture (5.3): Wastewater from Jalbou settlement flow into the plant

5.1.5 Animals

The distribution for the impact of the wastewater from settlement on the animal was 15% extreme, 30% high, 27% moderate, 23% low, and 5% said is very low (see figure 5.5).

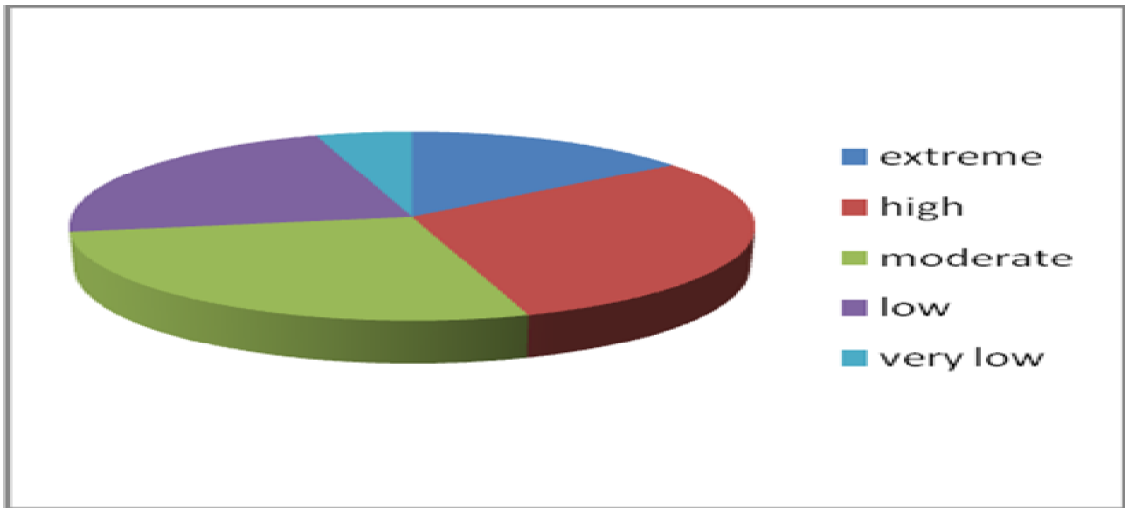

Figure (5.5): Impact to the animals

5.1.6 Statistical Analysis

The hypothesis test in the statistical analysis is there's no difference between the values.

If the result of p-value is less than 0.05, the null hypothesis will be rejected that the states of the two variables are independent. If the p-value is greater than 0.05, the null hypothesis will be failed to reject.

The table below (Table 5.1) summarized the statistical analysis of the part one of the questionnaire.

Table (5.1): Statistical analysis of the environmental elements.

Impact degree to the environmental elements								
Groundwater		Mean	SD	margin of error	lower limit	Upper limit	Chi sq	P value
very big	9	8.00	5.14	1.59	6.41	9.59	13.25	0.01
big	16							
intermediate	3							
small	8							
very small	4							
Air								
very big	23	8.00	11.15	3.46	4.54	11.64	75.5	0.0001
big	17							
intermediate	0							
small	0							
very small	0							
Soil								
very big	16	8.00	9.82	3.04	4.96	11.04	8.25	0.0001
big	21							
intermediate	3							
small	0							
very small	0							
Plant								
very big	6	8.00	4.06	1.26	6.74	9.26	26.25	0.0828
big	12							
intermediate	11							
small	9							
very small	2							
Animals								
very big	11	8.00	7.25	2.25	5.75	10.25	26.25	0.0001
big	18							
intermediate	9							
small	2							
very small	0							

5.1.7 Summary

In light of the results and observations from the analysis of the questionnaire, the following are general conclusions:

1. The wastewater flow from Israeli settlement considered as pollution source to the groundwater in the West Bank.

2. The industrial Israeli settlement in the West Bank such as Burkan Settlement considered as pollution source on the nearby villages.

3. When the wastewater flowed on the land, it may be influence on the ability of the soil. In addition, this flow may affect on the infiltration of the fresh water into the groundwater and affect on the ability of soil to suck water to the plant.

5.2 Palestinian environment results.

This section discusses of the nine impacts to show the influence degree of wastewater from Israel settlements on the Palestinian environmental according to the simple classification (extreme, high, moderate, low, and very low).

5.2.1 Noise from the settlements

The noise from settlements comes from:

- Open new roads around the settlements.
- Sound from the nearest factory.
- Movement of vehicle.
- The barriers.
- Noise from settler.

The distribution showed that 27% extreme, 45% high, 23% moderate, 53% say that the noise from settlement is very low (see figure 5.6).

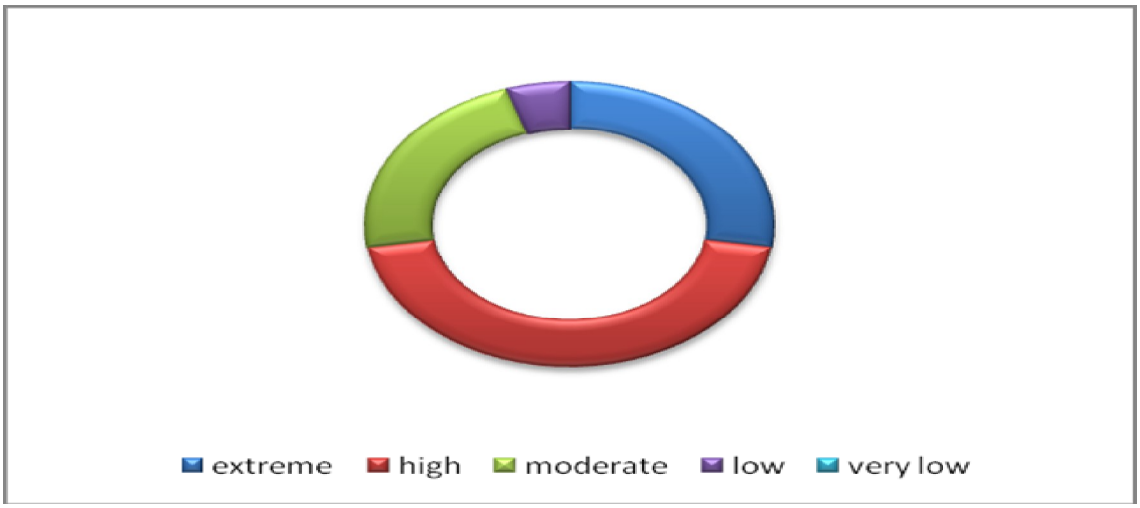

Figure (5.6): Noise from settlements

5.2.2 Smell from the wastewater

The people who live near the wastewater stream or (river) suffered from the bad smell that generated from wastewater, especially when the wastewater flows between the houses from time to time such as in jalboun village (Picture 5.4).

From the analysis of the questionnaire it's noted that the distribution was 25% extreme, 60% high, 15% said that the smell from the wastewater generated is moderate.

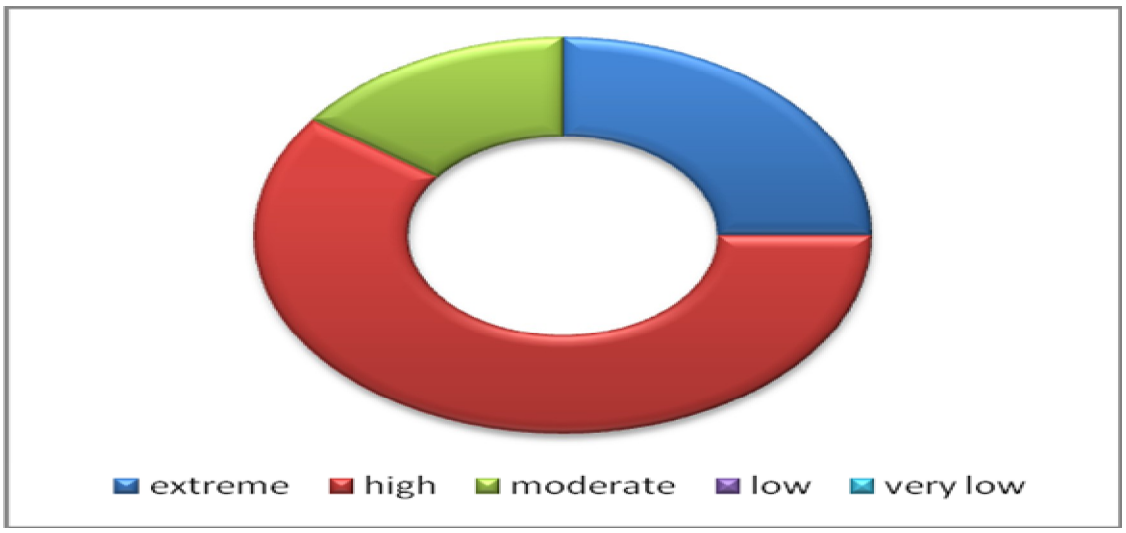

Figure (5.7): Smell from the wastewater

Picture (5.4): Wastewater from Jalbou settlements and its flow between Jalboun houses**.**

5.2.3 Spread of insect

Figure (5.8) depicts the distribution from the analysis of the questionnaire that was 22% extreme, 60% high, 13% moderate, and 5% said the spread of insect is low.

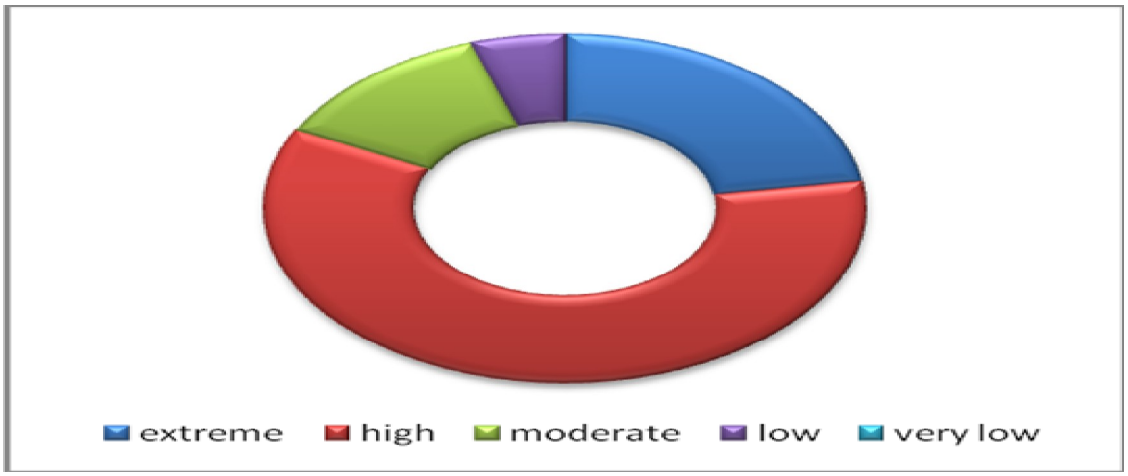

Figure (5.8): Spread of insect

5.2.4 Disposal of wastewater near the grazing place

From the analysis of the questionnaire, the distribution was 2% extreme, 33% high, 20% moderate, and 32% low, 13% said that the disposal of wastewater near the grazing place is very low (see figure 5.9).

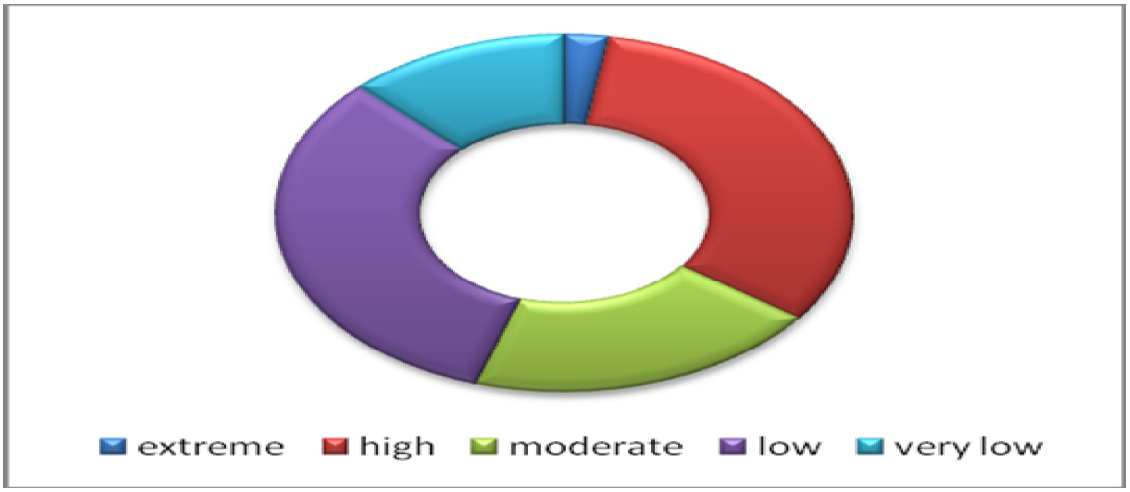

Figure (5.9): Disposal of wastewater near the grazing place

The picture below (Picture 5.5) presents the disposal of the wastewater near the grazing place.

Picture (5. 5): Wastewater from Purkan settlements, flow near grazing place

5.2.5 Animal diseases

The figure below (Figure 5.10) shows the distribution of the animal disease from the wastewater and it was 3% extreme, 18% high, 18% moderate, and 63% said is low.

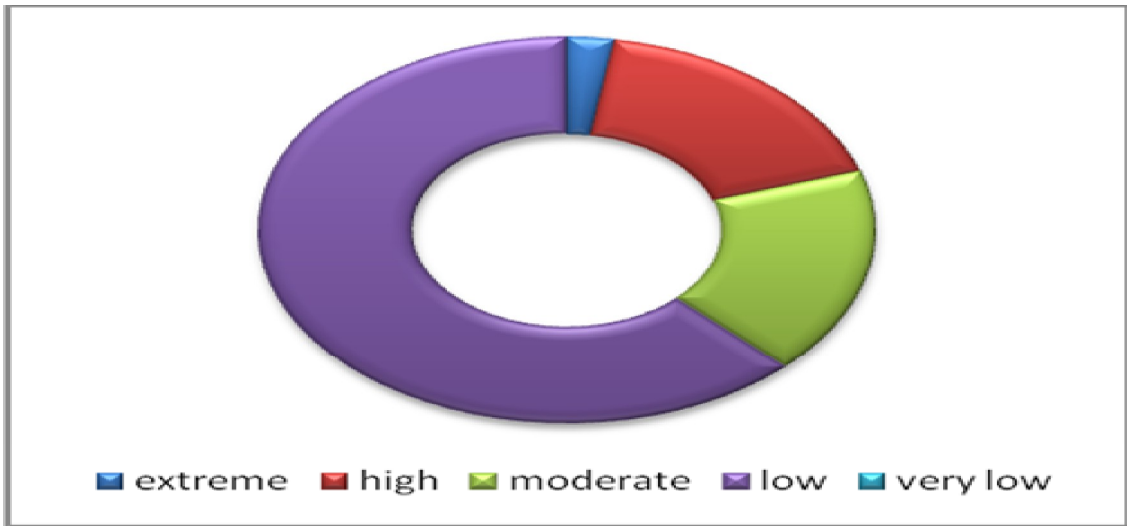

Figure (5.10): Animal diseases

5.2.6 Impact on the agricultural lands

When the wastewater flows from Alon Mreih settlement it may be damaged the olive tree that fall within the area that because the wastewater include an industrial waste from this settlement.

The distribution from the analysis of the questionnaire was 40% extreme, 52% high, 8% said that the wastewater impact to agriculture land is moderate (see figure 5.11).

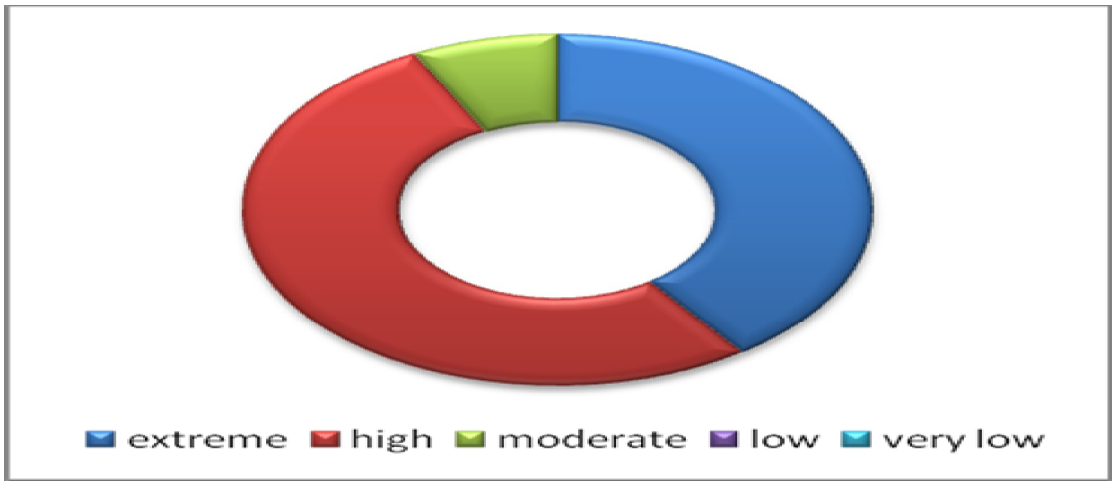

Figure (5.11): Impact to the agricultural lands

As shown in picture (5.6) when the wastewater flows from AlonMoreih settlement it damaged the agriculture lands.

Picture (5.6): Wastewater from Alon Moreih settlement.

5.2.7 Impact on the quality of groundwater wells

In 2007, the department of health and environment in Salfeet municipality made a laboratory test for water sample from the springs that feed almatweih well, and the results showed that the water sample contained fecal coliform. The presence of coliform bacteria and organic matter indicates that the water is potentially polluted from wastewater (ARIJ, 2008).

Figure (5.12) presents the distribution of the affect on groundwater wells was 10% extreme, 15% high, 35% moderate, 32% low, 8% said that the impact of wastewater on groundwater wells is very low.

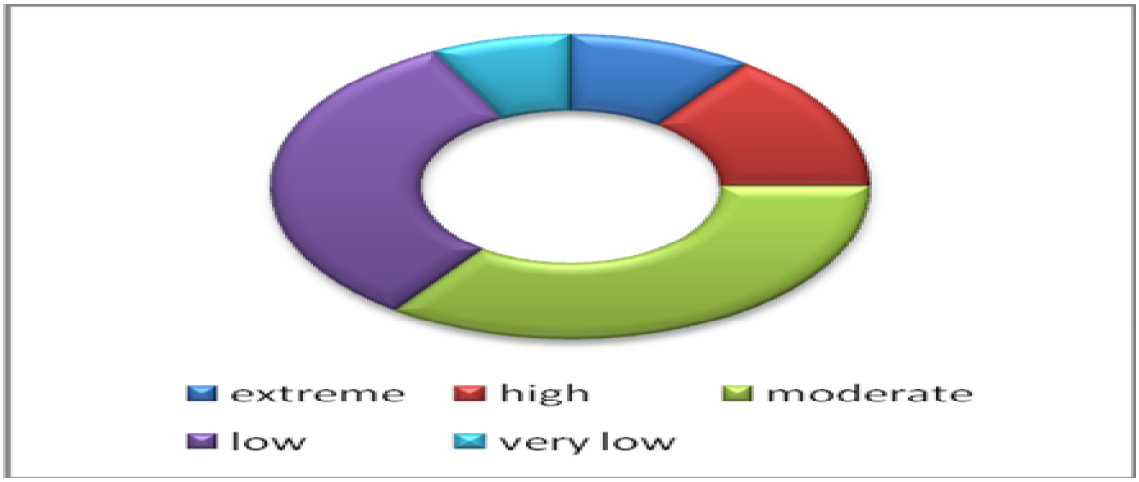

Figure (5.12): Impact to water wells

5.2.8 Crops damage due to wastewater flows.

The wastewater that generated from settlement contains highly concentration of metals, so the crops that exposed to this wastewater may be damaged or died.

The figure below (Figure 5.13) display the distribution was 42% extreme, 50% high, 8% say that the crops damage due to wastewater from the settlement is moderate.

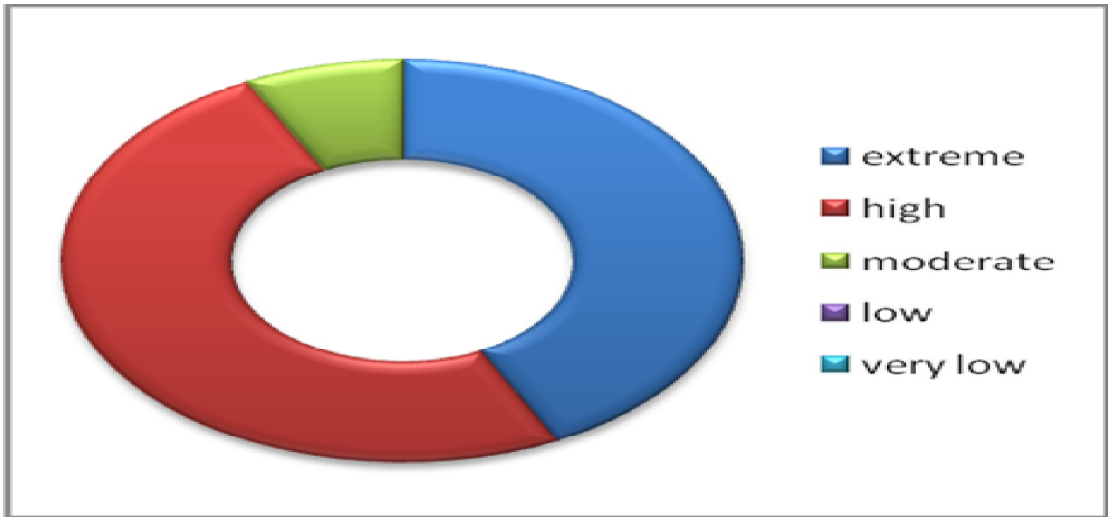

Figure (5.13): Crops Damage

Picture (5.7) depicts the damage of the hundred dunums of grapes when the wastewater flows from Kfar Etsion treatment plant.

Picture (5.7): Wastewater from Kfar Etsion settlement.

5.2.9 Loss of money due to wastewater flows.

As shown in figure (5.14), it's noted that the distribution was 37% extreme, 58% high, 5% said that the loss of money due to wastewater from the settlement is moderate.

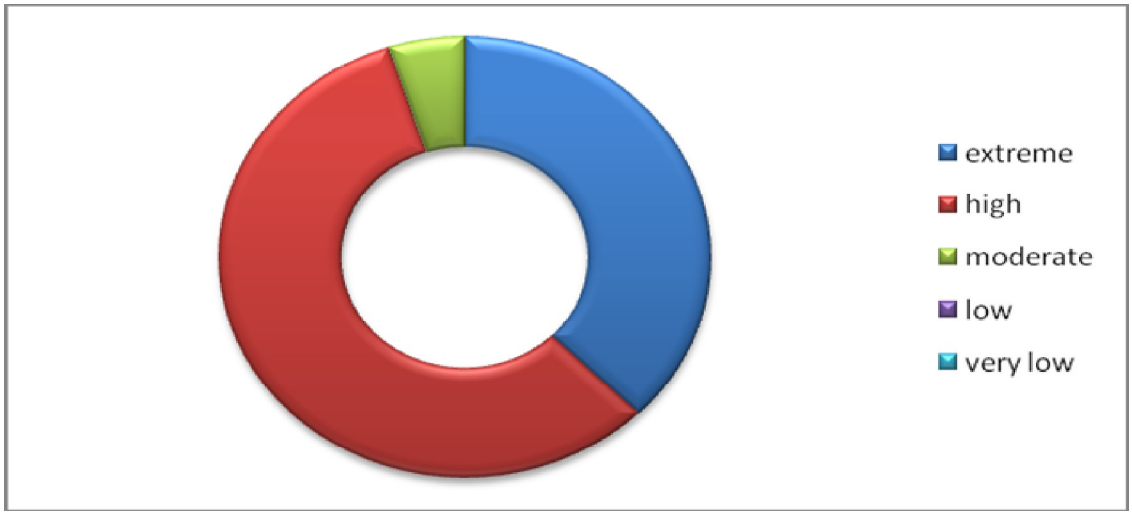

Figure (5.14): Loss of money

5.2.10 Statistical analysis

The table below (Table 5.2) summarized the statistical analysis of the part two from the questionnaire.

Table (5.2): Statistical analysis of the Palestinian environment.

The degree of negative impact in the Palestinian environment.								
Noise from the settlements		MEAN	STDEV	margins of error	lower limit	upper limit	Chi_sq	P_value
very big	11	8.00	7.25	2.25	5.75	10.25	26.25	0.0001
big	18							
intermediate	9							
small	2							
very small	0							
Smell from the wastewater generated from the settlements								
very big	10	8.00	9.90	3.07	4.93	11.07	49	0.0001
big	24							
intermediate	6							
small	0							
very small	0							
Spread of insect								
very big	9	8.00	9.57	2.96	5.04	10.96	45.75	0.0001
big	24							
intermediate	5							
small	2							
very small	0							
very big	1	8.00	5.20	1.61	6.39	9.61	13.5	0.0091
big	13							
intermediate	8							
small	13							
very small	5							
Animal disease								
very big	1	8.00	10.05	3.11	4.89	11.11	50.5	0.0001
big	7							
intermediate	7							
small	25							
very small	0							
Impact to the agricultural lands								
very big	16	8.00	9.82	3.04	4.96	11.04	48.25	0.0001
big	21							
intermediate	3							

small	0							
very small	0							
Quality of water wells								
very big	4	8.00	5.15	1.60	6.40	9.60	13.25	0.0100
big	6							
intermediate	14							
small	13							
very small	3							
Crops damage due to wastewater flows								
very big	17	8.00	9.72	3.01	4.99	11.01	47.25	0.0001
big	20							
intermediate	3							
small	0							
very small	0							
Loss of money due to wastewater flows								
very big	15	8.00	10.46	3.24	4.76	11.24	54.75	0.0001
big	23							
intermediate	2							
small	0							
very small	0							

5.2.11 Summary

In light of the results and observations from the analysis of the questionnaire for the part two, the following are general conclusions:

1. The settlements considered the main source of noise on the surrounded villages and city.

2. The wastewater generated from settlement in the west bank cause spread of very bad smell, and cause spread of insect around the surrounded villages.

3. The wastewater generated from settlements causes money losses.

5.3 Attitudes and the levels of awareness toward the problem of wastewater generated from the settlements

This section will be discussed three categories to show the attitude and awareness toward wastewater flow problem from settlements. This was achieved by use simple classification, (extreme, high, moderate, low, and very low).

5.3.1 Governmental institutions

The figures below (Figure 5.15, 5.16, and 5.17) show the attitude toward wastewater flows problem according to nongovernmental institutions is more than the governmental one, because these institutions are more freedom, more flexible than the other institutions

But the people who live in the surrounding area are more interest than the governmental and nongovernmental institutions because these peoples are more suffered from the wastewater problem than the institutions.

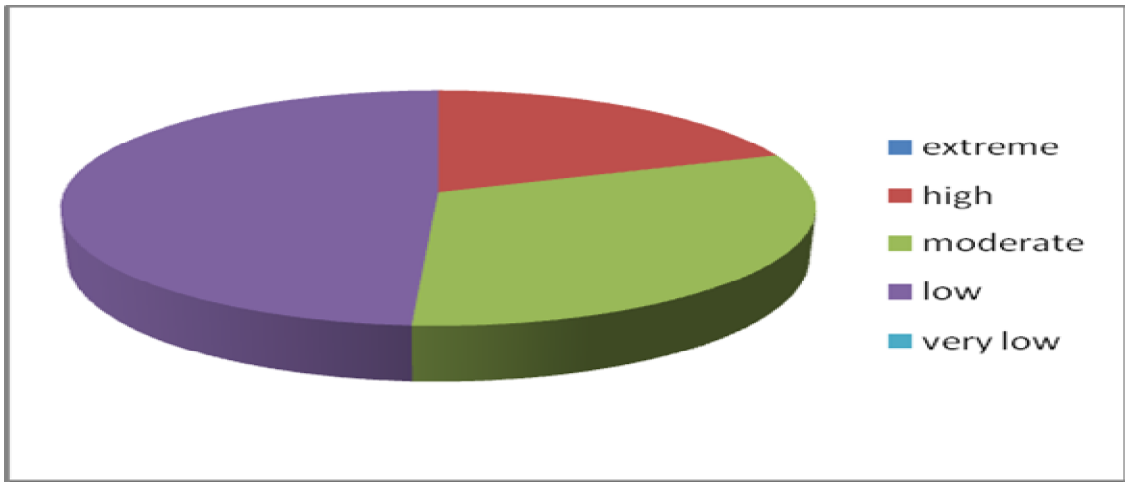

Figure (5.15): Attitude from governmental institution

5.3.2 Nongovernmental institutions

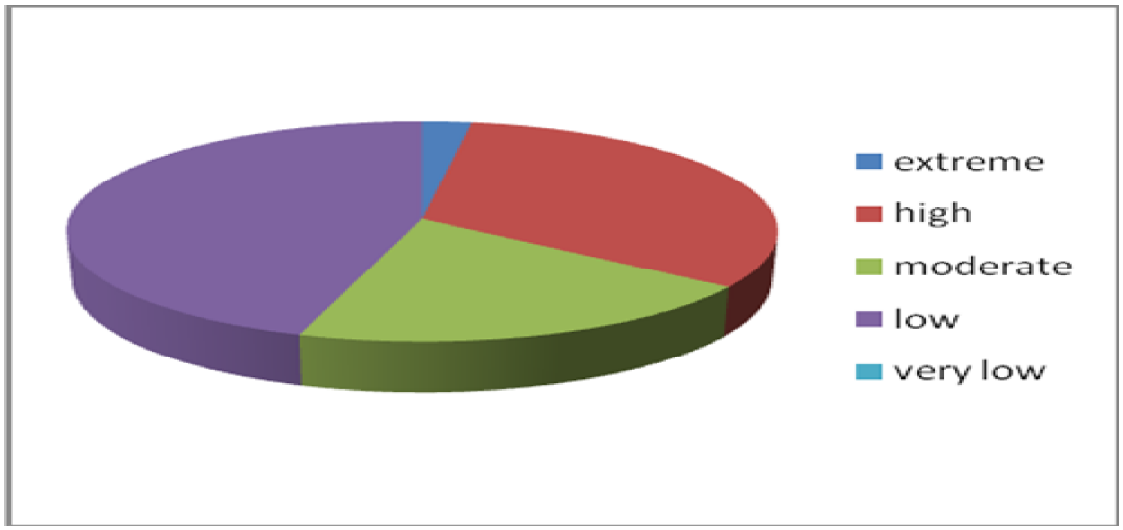

Figure (5.16): Attitude from nongovernmental institution

5.3.3 People who lives in the surrounding area.

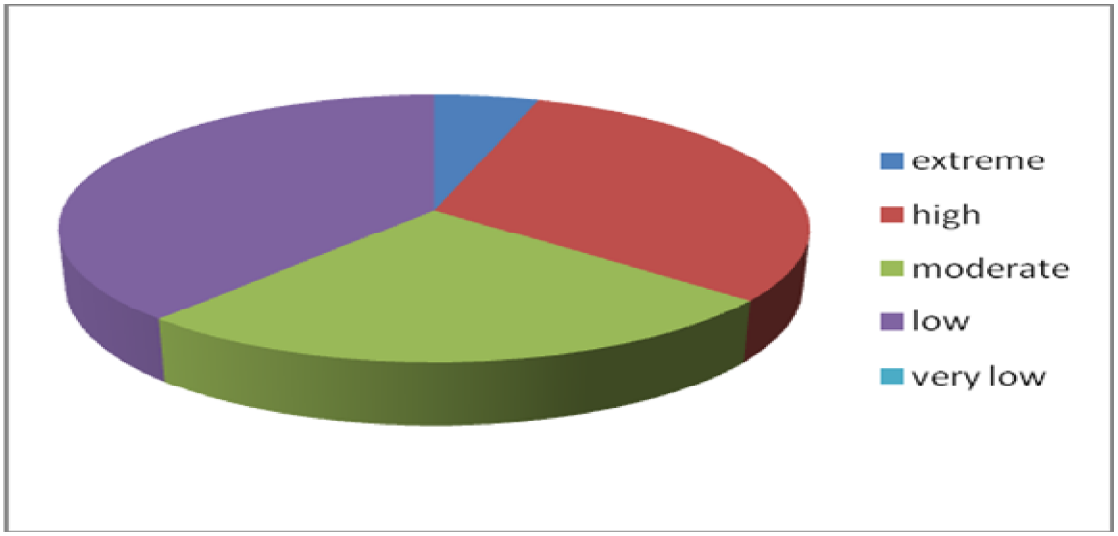

Figure (5.17): Attitude from the people

5.3.4 Statistical analysis

The table below (Table 5.3) summarized the statistical analysis of the previous part of the questionnaire.

Table (5.3): Statistical analysis of levels of awareness.

Attitudes and the levels of awareness toward the problem of wastewater generated from the settlements								
Governmental institutions		MEAN	STDEV	margine of error	lower limit	upper limit	Chi_sq	P_value
very big	0	8.00	10.73	3.33	4.67	11.33	60.62	0.0001
big	10							
intermediate	16							
small	25							
very small	0							
Non governmental institutions								
very big	1	8.00	7.71	2.39	5.61	10.39	29.75	0.0001
big	13							
intermediate	8							
small	18							
very small	0							
The people who lives in the surrounding area								
very big	2	8.00	6.50	2.01	5.99	10.01	21.12	0.0003
big	12							
intermediate	10							
small	15							
very small	0							

CHAPTER SIX

ENVIRONMENTAL AND ECONOMIC IMPACT

6.1 Environmental Impact

Israel is considered as the main source that negatively impact the environment of Palestine by neglecting establishing sewage systems in the settlements, forbidden the Palestinian Authority to build new wastewater treatment plants without connect the settlement with the Palestinian treatment plant. As such the settlements in the West Bank generated large volume of untreated wastewater that dumped in the Palestinian lands.

The main environmental elements that are affected by wastewater generated from settlements and the level of affecting are discussed in the following sections.

6.1.1 Soil and Plants:

The wastewater flows from Israeli settlement pollute the soil because this wastewater including high concentration of metals such as sodium salt that decreased the ability of the soil to infiltrate the fresh water to the plant. The soil become unsuitable for agricultural and the crops that are exposed to this wastewater may be damaged or died.

The Figure 5.3 in chapter five depicted the percentage of citizen opinion about the effect of wastewater from settlements on the soil was 57% extreme, 53% is high. This means that the effect on the soil is huge.

The Figure 5.4 represented the percentage of citizen opinion about the effect of wastewater from settlements on the plants was 40% extreme, 52% high and 8% is moderate. It was explained that the effect of wastewater from settlements on the plant is high.

6.1.2 Groundwater resources

Groundwater considered as the main fresh water resource in the West Bank and the only existing source of water supply for Palestinians.

Groundwater resources in the West Bank are derived from three main aquifer basins through wells and natural springs. These aquifer basins are: the Eastern, Western, and Northeastern aquifer basins (SUSMAQ, 2004) (see Figure 6.1).

Figure (6.1): Groundwater Aquifer Basins of the West Bank and Gaza Strip (UNEP, 2002)

Untreated wastewater from settlements is considered as the main source of contamination, Since contaminants that reach the groundwater generally move very slowly, continued leakage in one spot will lead to increasing levels of contaminants.

The figure below (Figure 6.2) shows the distribution of settlements over the groundwater aquifer in the West Bank.

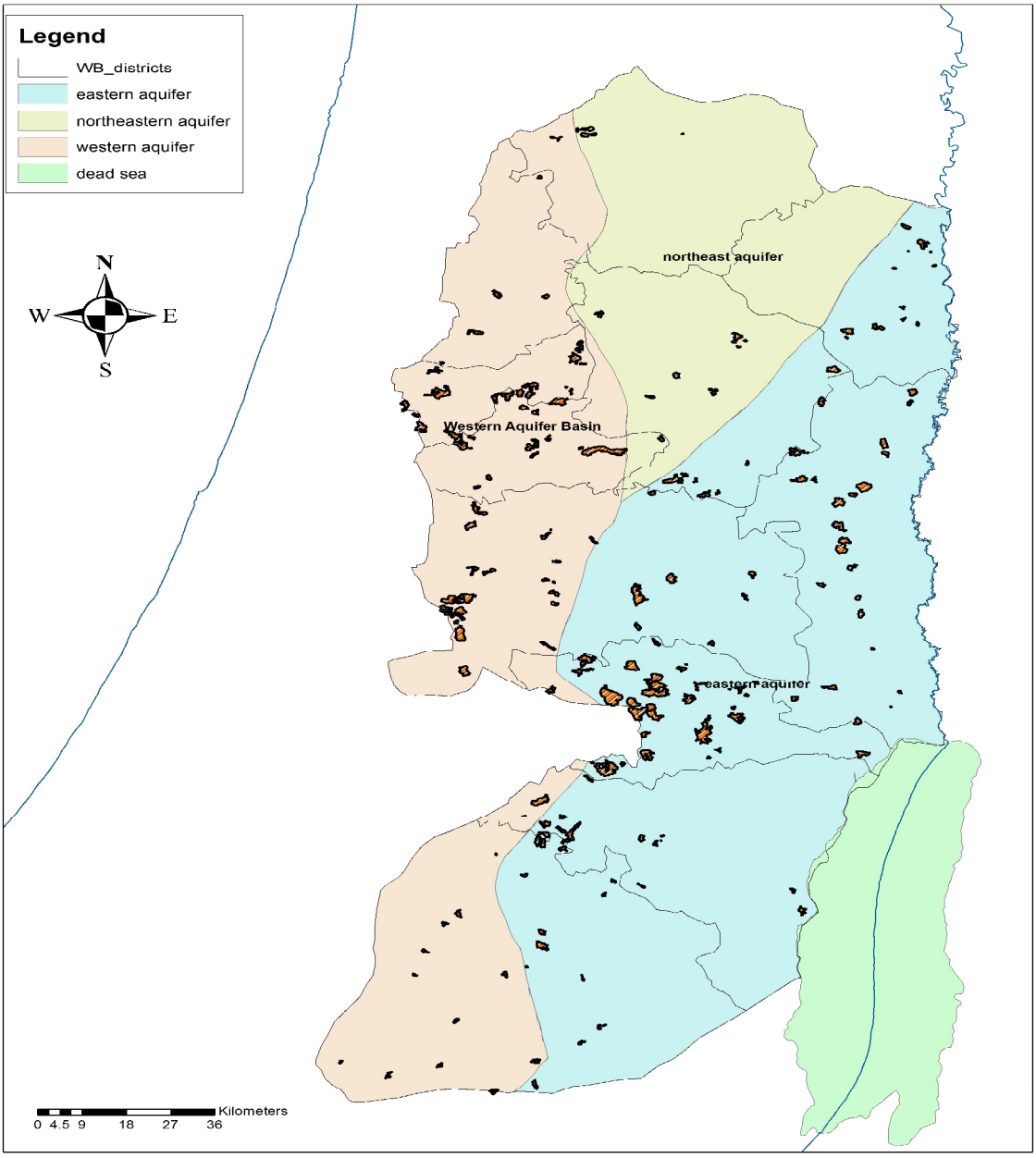

Figure (6.2): Settlements in the aquifers

As shown in the previous figure the settlements in the eastern aquifer are more than the settlements in the other two aquifers. The numbers of settlements in the three aquifer basin in the West Bank are 65 in the Western aquifer which produced 25 MCM/year, while in the Eastern aquifer are 97 settlements which produced 33 MCM/year and in the Northeastern aquifer are 9 settlements which produced nearly 2 MCM/year (Appendix B).

As mention earlier, the percentage of citizen opinion about the effect of wastewater from settlements was 22% very big, 40% big, 8% intermediate, 20% small and 10% said that the impact on the groundwater is very small.

It can be concluded that the effect of wastewater from settlements on the groundwater is high.

6.1.3 Air

Israeli violations against the Palestinian environment and atmosphere have been extensive. In addition the pollution resulting from the use of local transportation in populated areas and Israeli construction of factories in settlements in the West Bank is contributing significantly to increasing levels of pollution. These factories emit toxic gases into the air which have negatively impact on the public health.

One of the most main air pollutants are the huge amounts of dust produced by the West Bank quarries. When these dust particles fall on agricultural crops and trees they also cause significant damage to them. In addition to dust, and as the result of the close geographic proximity large quantities of toxic gasses and noxious by products from Israeli factories located inside Israel’s borders are blown towards Palestinian.

Transportation system that dense vehicular traffic is also a major contributed on air pollution and causing high nitrogen oxide (NOx) concentrations especially in the heavily populated urban centers.

Spread of bad odor from the wastewater flow especially when the wastewater flows between the houses from time to time, such as in Jalboun village.

As mention earlier in chapter five the percentage of citizen opinion about the effect of wastewater from settlements was in 12% very big, 50% big, 20% intermediate and 18% small. It can be concluded that the effect of wastewater from settlements on the air is high.

6.2 Economic Impact.

Economic impact assessment is a way to determine how a development project might affect the economic conditions of people and communities.

An ecosystem service, by definition, contains all "the condition and processes through which natural ecosystem, and the species that make them up, sustain and fulfill human life"(daily 1997).

Different methods are used to evaluate the impact of wastewater on the local economy and the environmental. Some of these methods relied on water and soil analysis while others rely solely on public opinion through a questionnaire or focus group meeting .other methods are more complex and need more date.

This research depends on the public opinion to know the economic value of the polluted land through a questionnaire and meetings with different stakeholders. According to the questionnaires it was noted that wastewater generated from settlement causes a loss of money due to many reasons.

There are divided into three parts that are discussed in the following sections.

6.2.1 Soil and Plants

When the wastewater is flowing from the settlement it was affected the quality of the soil, causes the changed on the soil characteristics and then destroy the plant.

The wastewater flow from Alon Moreih settlementin in 2010 to the agriculture lands in Dier Alhatab village causes damage around 200 olive trees according to the people opinion (see picture 6.1).

Picture (6.1) Wastewater flow between olive trees in Deir Alhatab village

If we suppose that every olive tree produce 15 kg of oil and the price per kg of oil range from 20-25 NIS, this mean that the owner of these agriculture lands loss around 60,000-75000 NIS.

The area of olive tree that exposed the wastewater flow in Deir Alhatab village was around 80 dunums, this mean that the loss of money per dunum around 700-1000 NIS.

The wastewater flow from Kfar Etsion settlement to the agriculture lands in Beit Omar village causes damage around 100 dunums of grapes trees. (See picture 6.2), If we suppose that every grapes tree produce 10 kg of graps and the price per kg of range from 3-5 NIS, and each dunum contains around 70 trees. This mean that the loss of money per dunum
Range from 2000 to 3000 NIS.

Picture (6.2): Wastewater flow between Graps trees in Beit Omar village

The wastewater flow from jalbou settlement to the agriculture lands in jalboun village was damaged around 100 dunums of wheat crops, This mean that the loss of money per dunum range from 1000-2000 NIS according to the farmers opinions.

By using geographical information system (GIS) program it's estimated that the total area of agriculture lands around the settlements in the West Bank approximately 278km².

If we know that the total area of agriculture land in the West Bank is 1834.85km², this mean that 15% of West Bank agricultural lands are affected by the settlements.

6.2.2 Animals:

When the people know that their wastewater flow near grazing place, the people stop to buy the meat from this source.

When the animals such as cows and sheep drink from the wastewater or eating from the plants that irrigated by the wastewater may become a sick, this means the animal need to drugs, and the drugs need money.

In addition, the animals may be died when drink from the wastewater or eating from the plants that irrigated from the wastewater, this causes to loss of money.

6.2.3 Water

When contaminants from wastewater reach the sources of water persistently, contaminant concentrations increase.

Many contaminated groundwater resources by wastewater no longer fit consumption use without prior treatment, so it is important to carry out an economic analysis to assess the potential impacts of this treatment on the local economy.

Almatweh spring is the main water source of salfeet city, but some branches of this spring have become much polluted, it's contaminated with serious chemical resulted from the wastewater.

Elevated concentration of contaminants in drinking water can cause serious diseases when this impaired water is consumed by human beings. This have a negatively impact on the local economy.

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

In light of the results, observations and outcomes from research, the following are the main conclusions:

- Half million settler live in the West Bank and Jerusalem that produced around 60 MCM/year of wastewater and most of them is not treated according to the calculations through this research.
- Hundreds of dunums of agricultural land are contaminated from wastewater that generated from Israeli settlements and cause serious pollution on the lands.
- Some of Palestinian groundwater resources are polluted with physical, chemical and biological substances. And this will be resulted in degradation of the water quality.
- The disposal of untreated wastewater generated from Israeli settlement into Palestinian land will be impacted not only on the environment but also on the economic value of this land and the estimation of the Losing money approximately 500 Million NIS per each wastewater flood per year.
- Several Israeli industrial zones established within the West Bank regions of unknown number and processes discharge not only liquid and solid waste but also air pollution over Palestinian communities.
- Israel has not approved Palestinian request to build wastewater treatment facilities without connect Israeli settlement to this treatment facility.

8.2 Recommendations

The recommendations listed herein support the future studies and address the following issues regarding the management of the wastewater generated from Israel settlements:

- Because the settlements were illegal from the outset, and given the infringement of human rights cause by their presence, the Palestinian authority must take all necessary action to dismantle all the settlements.
- The Palestinian water authority should start soon to evaluate the impact of wastewater generated from the settlements. And make a comprehensive strategy, this strategy should include all impact such as economical environmental, health, etc. and all stockholders should participate in drafting this strategy.
- The Palestinian water authority should start to make periodic laboratory test for all ground water well that located near Israel settlements.
- The Palestinian water authority should start to make workshops that aim to increase the level of awareness toward wastewater generated from settlements.

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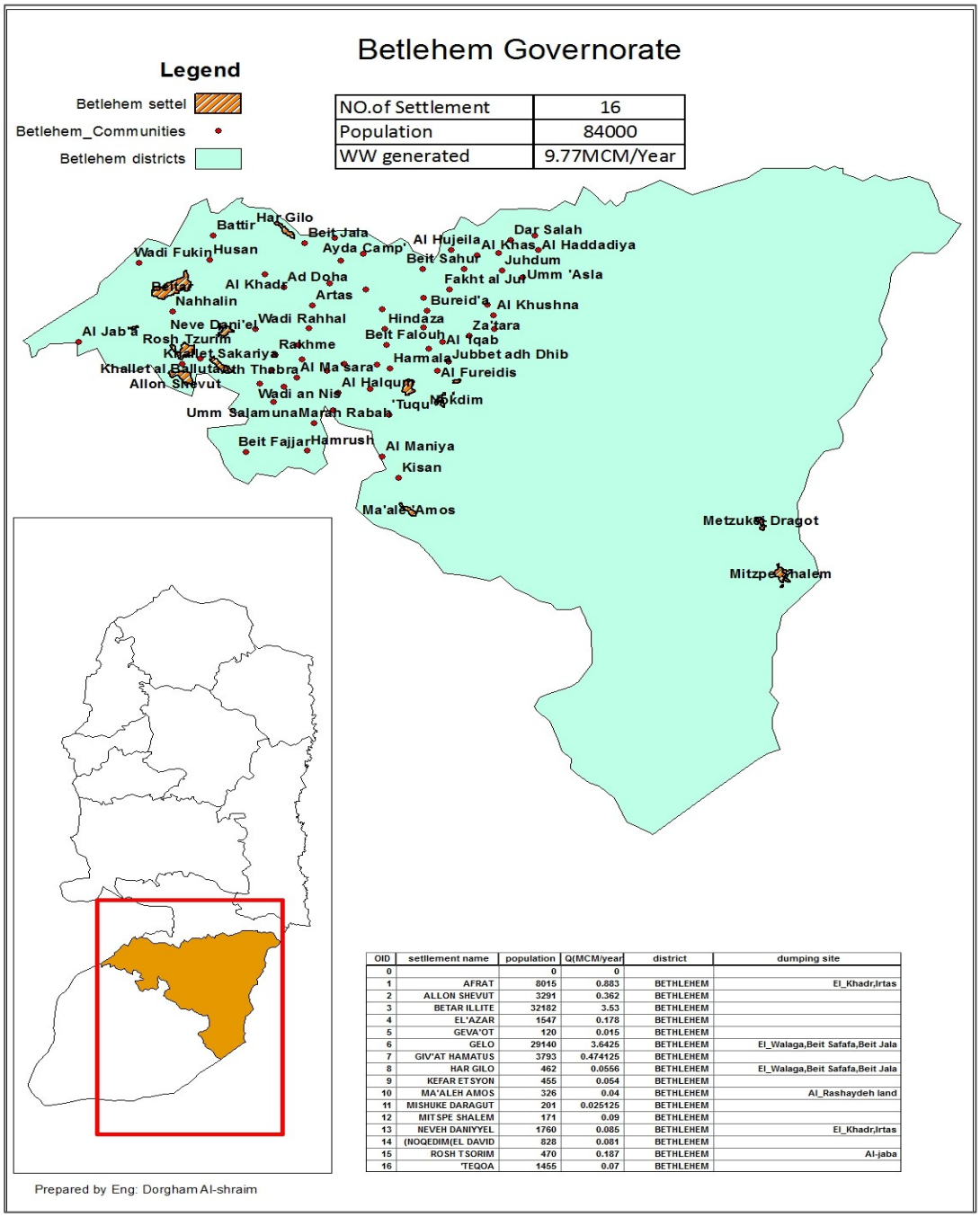
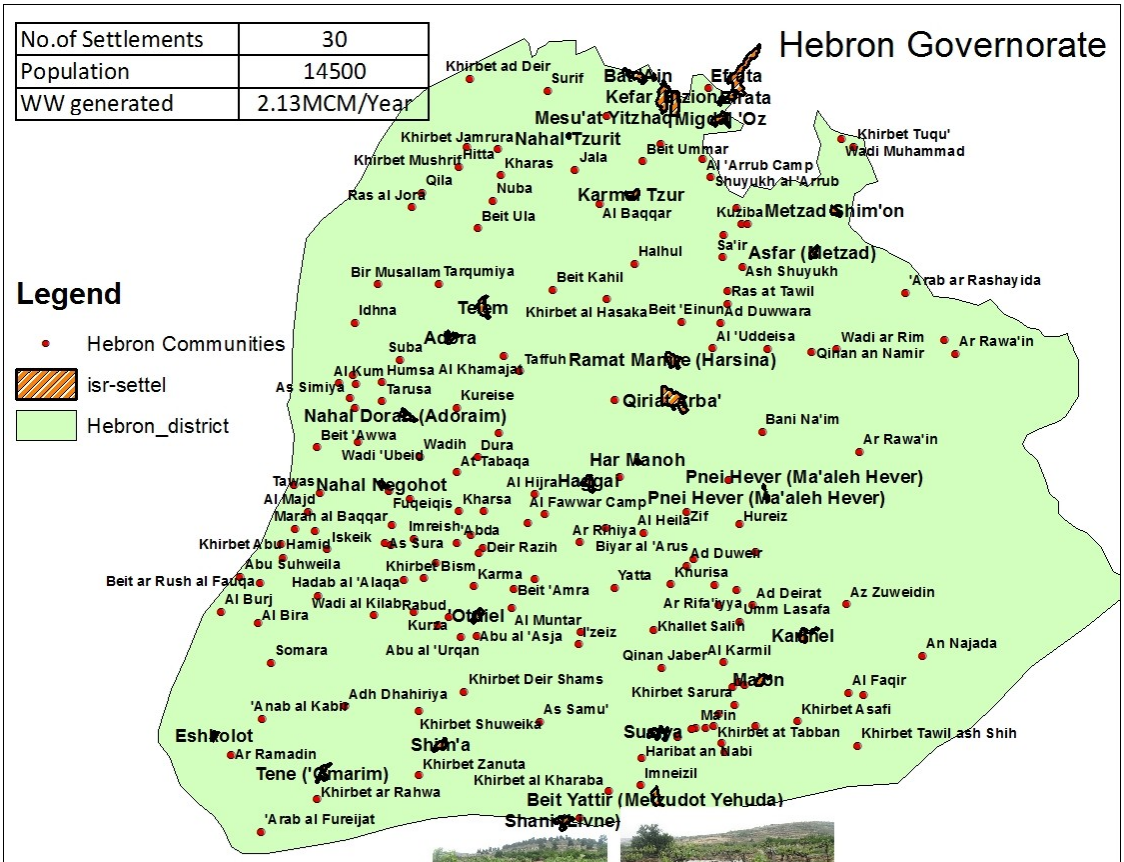
APPENDIX

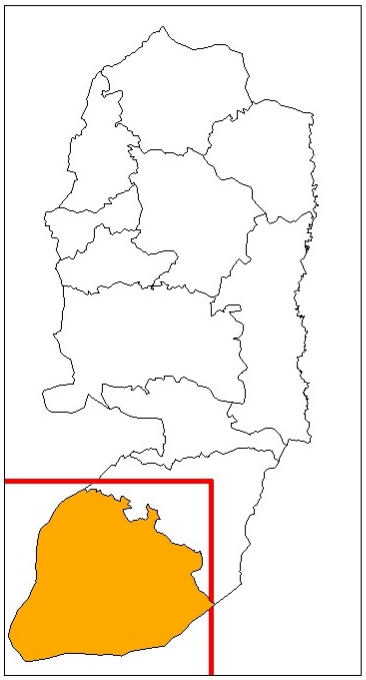
Appendix A: Distribution of settlements in each district of the West Bank



OID	settlement name	population	Q(MCM/year	district	dumping site
0		0	0		
1	AFRAT	8015	0.883	BETHLEHEM	El_Khadr,Irtas
2	ALLON SHEVUT	3291	0.362	BETHLEHEM	
3	BETAR ILLITE	32182	3.53	BETHLEHEM	
4	EL'AZAR	1547	0.178	BETHLEHEM	
5	GEVA'OT	120	0.015	BETHLEHEM	
6	GELO	29140	3.6425	BETHLEHEM	El_Walaga,Beit Safafa,Beit Jala
7	GIV'AT HAMATUS	3793	0.474125	BETHLEHEM	
8	HAR GILO	462	0.0556	BETHLEHEM	El_Walaga,Beit Safafa,Beit Jala
9	KEFAR ETSYON	455	0.054	BETHLEHEM	
10	MA'ALEH AMOS	326	0.04	BETHLEHEM	Al_Rashaydeh land
11	MISHUKE DARAGUT	201	0.025125	BETHLEHEM	
12	MITSPE SHALEM	171	0.09	BETHLEHEM	
13	NEVEH DANIYYEL	1760	0.085	BETHLEHEM	El_Khadr,Irtas
14	(NOQEDIM(EL DAVID	828	0.081	BETHLEHEM	
15	ROSH TSORIM	470	0.187	BETHLEHEM	Al-jaba
16	'TEQOA	1455	0.07	BETHLEHEM	

No.of Settlements	30
Population	14500
WW generated	2.13MCM/Year

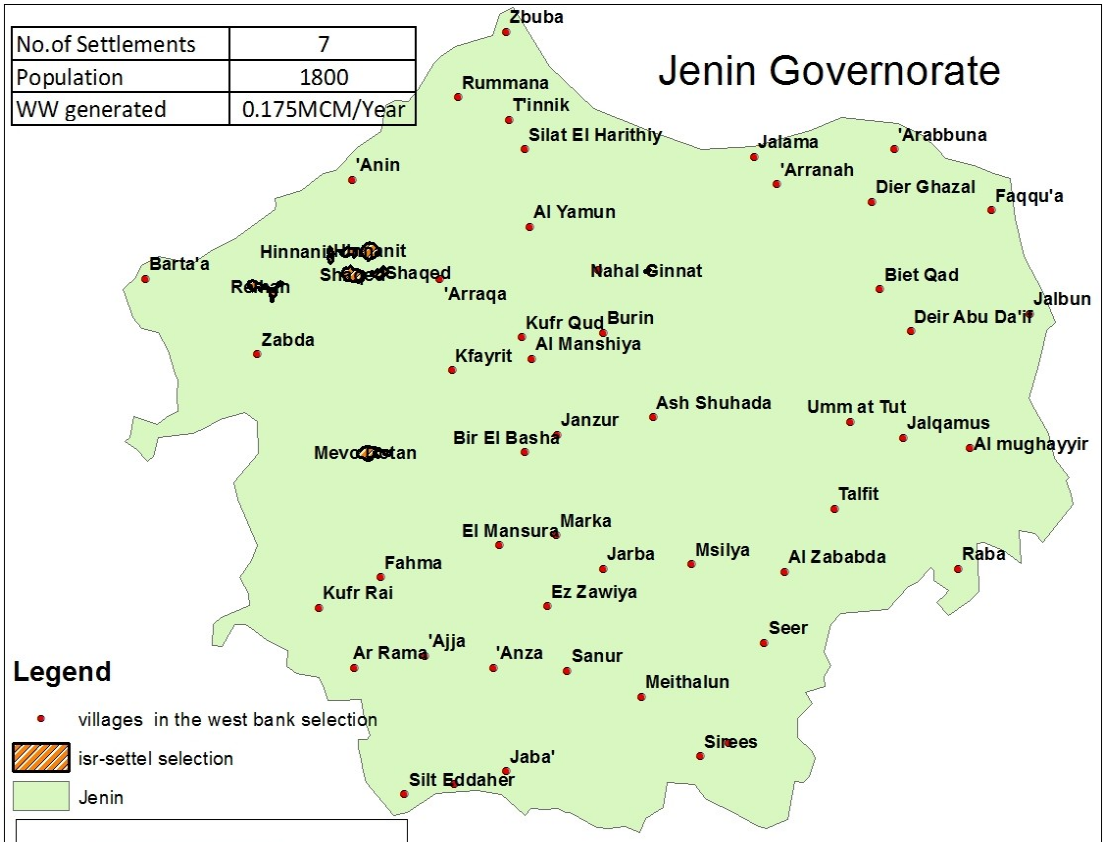


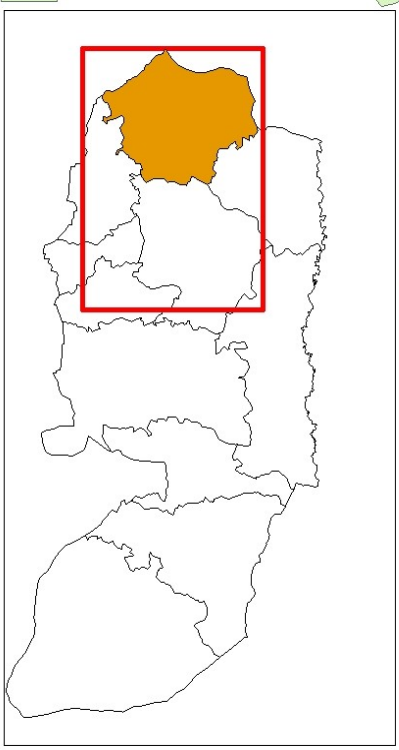


wastewater from Kfar Etsion

OID	Settlement name	Population	Q(MCM/year	District	duping site
0	ADORA	248	0.27	HEBRON	
1	ADURIM			HEBRON	Dura
2	AL HARAM AL IBRAHIMI	400	0.02	HEBRON	
3	ASHKELUT	229	0.028625	HEBRON	
4	BEIT ROMANO	150	0.16	HEBRON	
5	BEIT YATTIR	447	0.055875	HEBRON	
6	BET'EIN/TSOREF	906	0.11325	HEBRON	Jab'
7	HADASSA ALDABBOYA			HEBRON	
8	HAGGAI	545	0.068125	HEBRON	Karma
9	HARMNUSH			HEBRON	
10	KARMEH TSUR	729	0.06	HEBRON	Biet Umar
11	KARMEL	378	0.04725	HEBRON	Yatta
12	KIRYAT ARB'	7039	0.879875	HEBRON	Bani Na'im
13	LIVAH SHANI	417	0.052125	HEBRON	
14	MA'ALEH HAFAR			HEBRON	
15	MA'ON	381	0.047625	HEBRON	Yatta
16	MISO'OT YITSHAK			HEBRON	
17	MIGDALO'Z	332	0.0415	HEBRON	
18	MITSAD/ASFAR	263	0.032875	HEBRON	Alrashayda
19	QUANY			HEBRON	Aldahiriya
20	RAMAT MAMRE			HEBRON	
21	SHIM'A	370	0.04625	HEBRON	Alsail area
22	SHIM'ON			HEBRON	
23	SUSEYA	745	0.093125	HEBRON	Al Samo'
24	TAL ALRUMAYDAT			HEBRON	
25	TELEM	192	0.024	HEBRON	
26	TENE OFARIM			HEBRON	
27	TSORET			HEBRON	
28	YEHODA NEGOHOT			HEBRON	
29	OTNI'EL	763	0.095375	HEBRON	Karma

No.of Settlements	7
Population	1800
WW generated	0.175MCM/Year





Wastewater from Jalboa and Merav Settlements

OID	Settlement name	Population	Q(MCM/year	District	duping site
0	GINNAT			JENIN	
1	HINANIT	811	0.07	JENIN	Ya'bad
2	QUARRY			JENIN	
3	MEERAV			JENIN	Jalbun
4	MOVO DOTAN	315	0.033	JENIN	Araba
5	REHAN	158	0.0158	JENIN	Barta'a
6	SHAQE'D	525	0.057	JENIN	

No. of Settlements	10
Population	NA
WW generated	NA

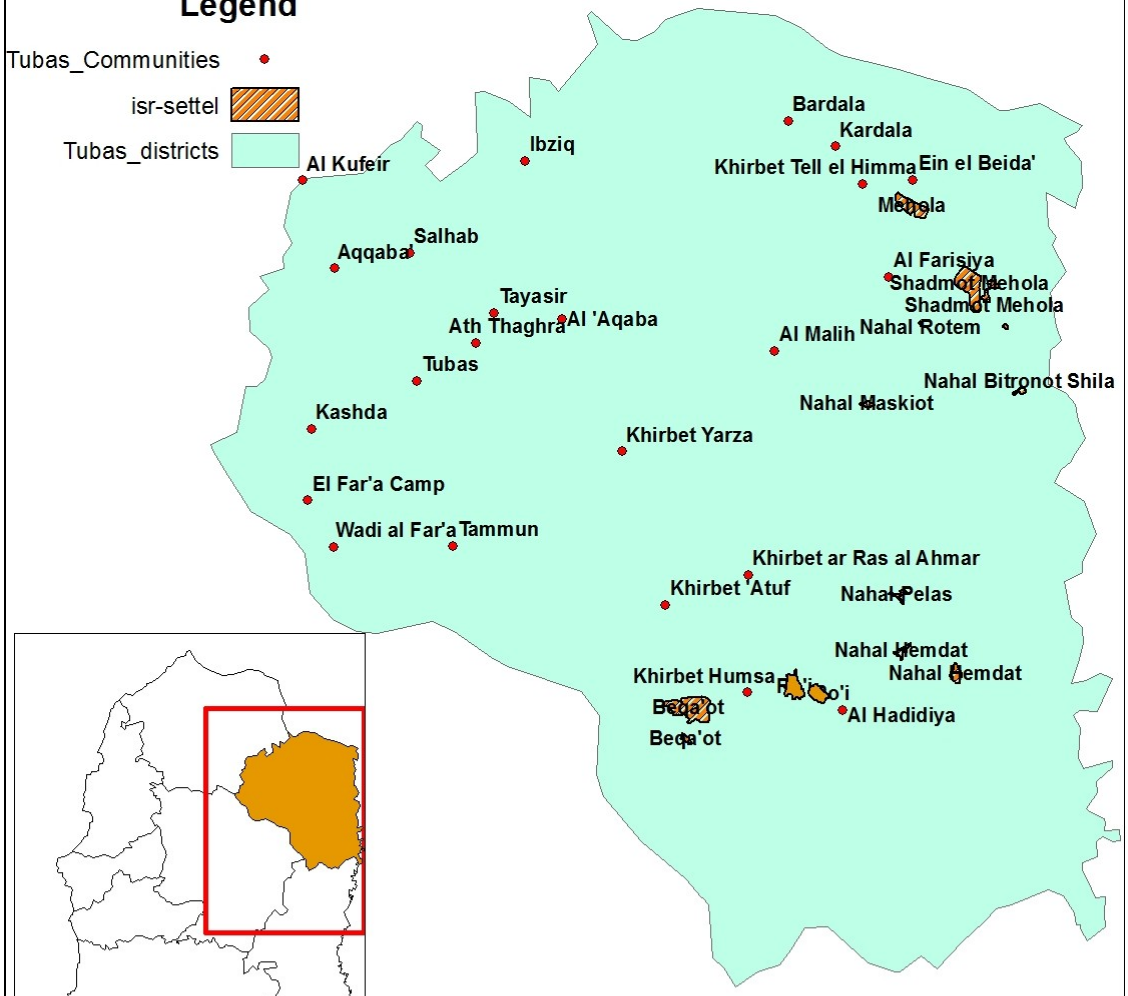
Tubas Governorate

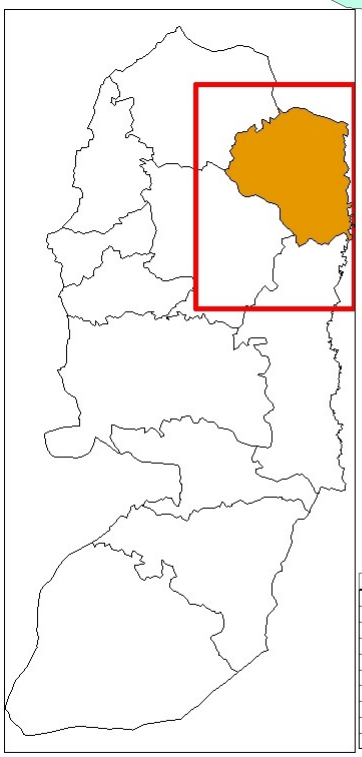
Legend

Tubas_Communities

isr-settel

Tubas_districts

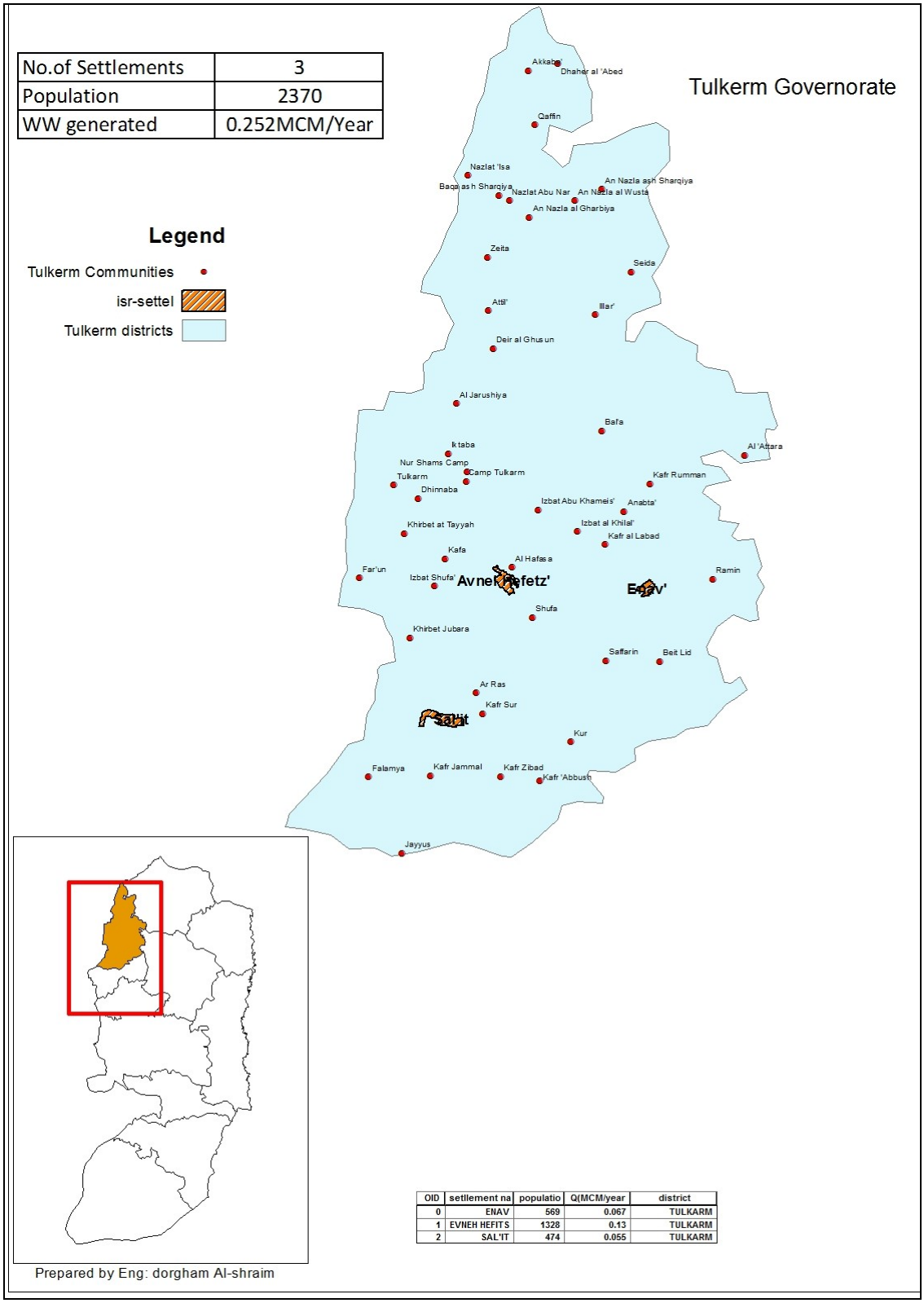




OID	setllement name	Population	Q(MCM/year	district	Dumping site
0	ARETE	0	0	TUBAS	Tubas
1	BAKOAT	175	0.024	TUBAS	Tammun
2	BITRONOT SHELLA	0	0	TUBAS	
3	HEMDAT	0	0	TUBAS	
4	MASKIOT	0	0	TUBAS	
5	MEHOLA	357	0.036	TUBAS	
6	PELAS	0	0	TUBAS	
7	RO'E	126	0.0175	TUBAS	Tammun
8	ROTEM	0	0	TUBAS	
9	SHADMOT MEHOLA	0	0	TUBAS	

Prepared by:Eng.Dorgham Al_Shraim

No.of Settlements	3
Population	2370
WW generated	0.252MCM/Year

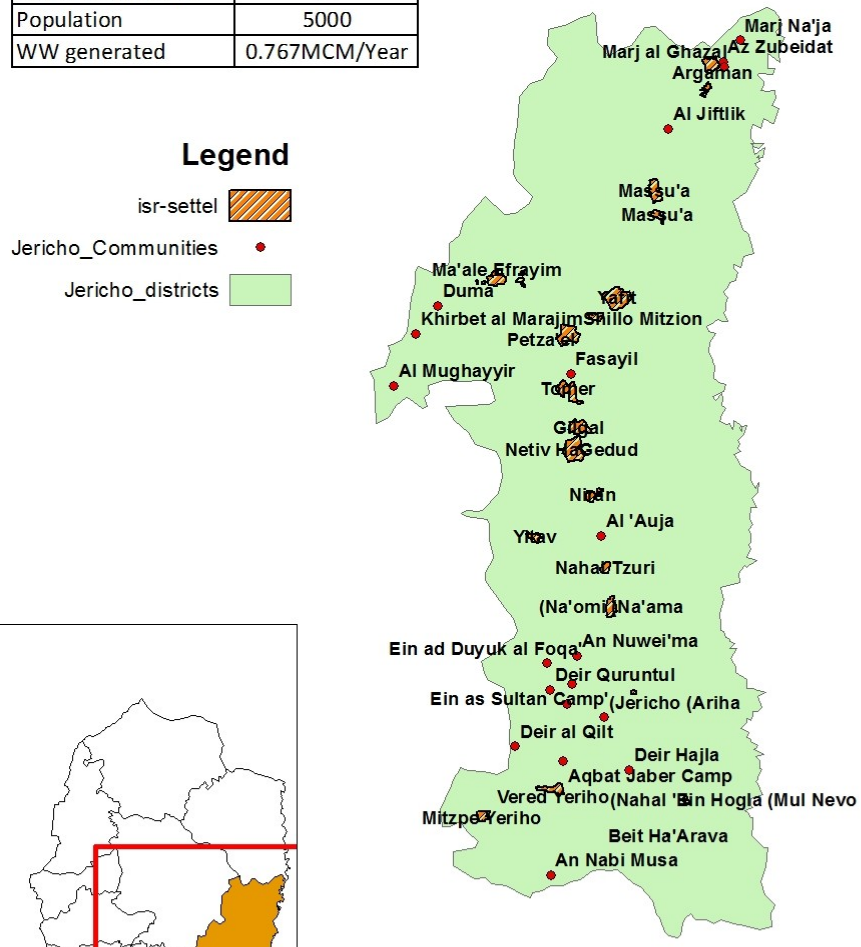


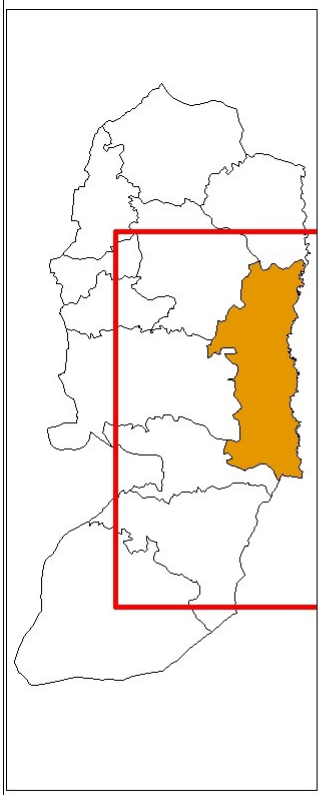
OID	setllement na	populatio	Q(MCM/year	district
0	ENAV	569	0.067	TULKARM
1	EVNEH HEFITS	1328	0.13	TULKARM
2	SAL'IT	474	0.055	TULKARM

Prepared by Eng: dorgham Al-shraim

Jericho Governorate

No. of Settlements	20
Population	5000
WW generated	0.767MCM/Year



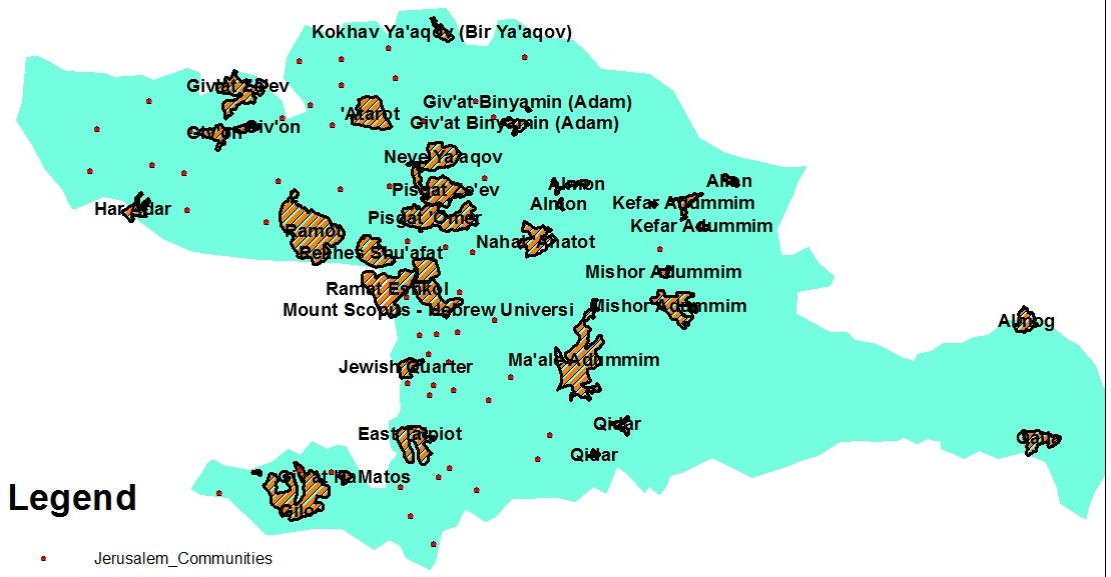


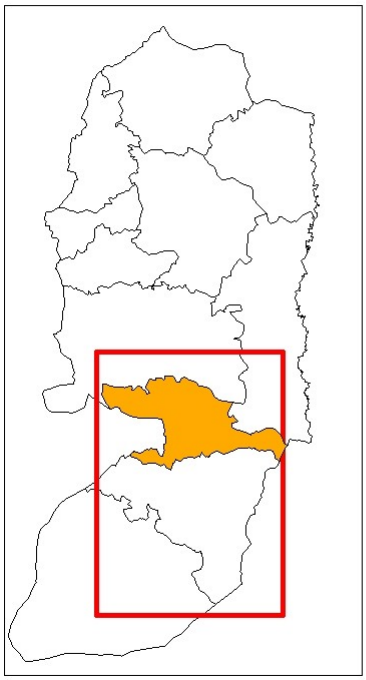
OID	setllement name	Population	Q(MCM/year	district	dumping site
0	ALMOGE	188	0.02	JERICHO	
1	'ALLEISHA	0	0	JERICHO	
2	ARJMAN	170	0.02125	JERICHO	
3	BEIT HARVA	102	0.073	JERICHO	
4	FERD YERIHO	190	0.028	JERICHO	Aqbit Jabier
5	GILGAL	148	0.0185	JERICHO	
6	HAMRA	119	0.014875	JERICHO	Al Jiftlik
7	MA'ALEH EFRAYIM	1377	0.172125	JERICHO	
8	MESOWAH	136	0.017	JERICHO	
9	MITSPE YEREHO	1701	0.212625	JERICHO	
10	MOULNEVOH	0	0	JERICHO	
11	NA'AMA	128	0.015	JERICHO	
12	TSURI	0	0	JERICHO	
13	NETIV HAGEDUD	114	0.0095	JERICHO	
14	NIRAN	56	0.007	JERICHO	
15	PETSA'EL	0	0	JERICHO	
16	SHELEMTSYYON	0	0	JERICHO	
17	TOMAR	290	0.031	JERICHO	
18	YAFIT	111	0.107	JERICHO	

Prepared by:Eng.Dorgham Al_shraim

No.of Settlements	25
Population	216630
WW generated	28.5MCM/Year

Jerusalem Governorate

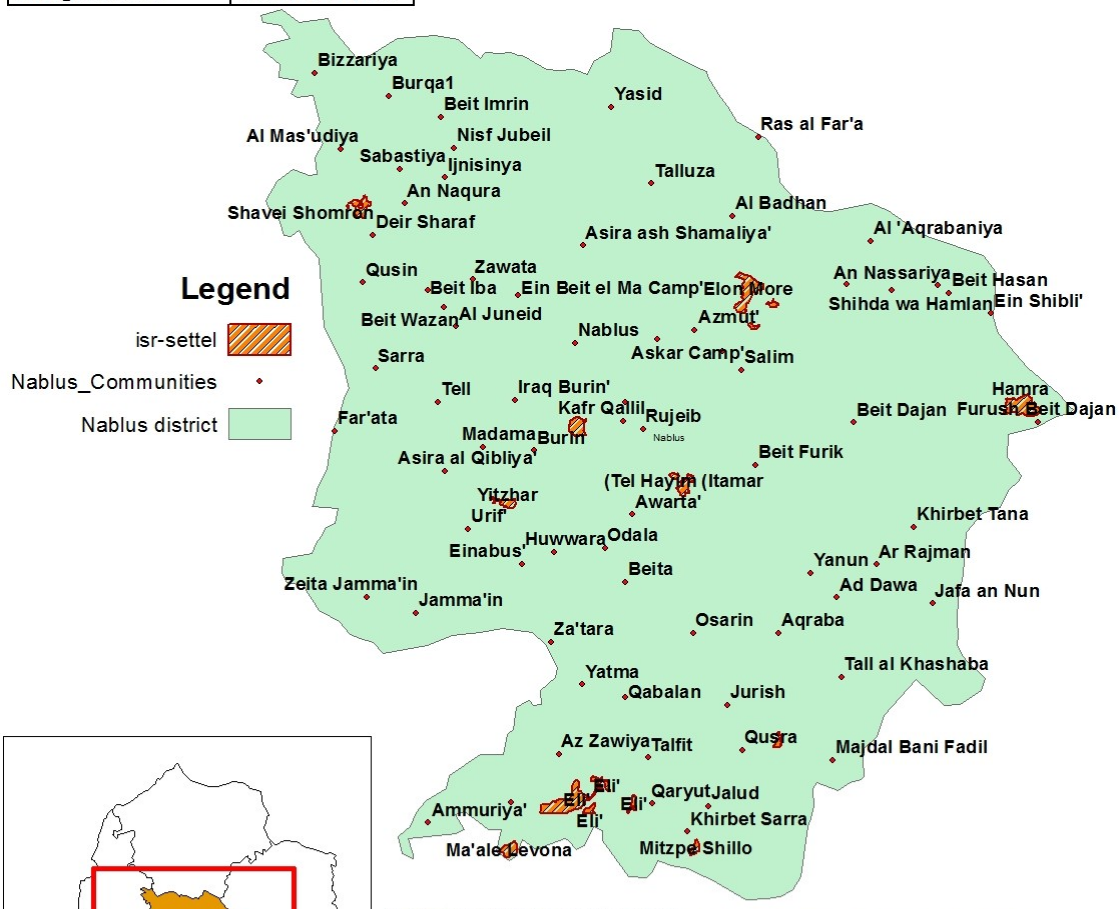


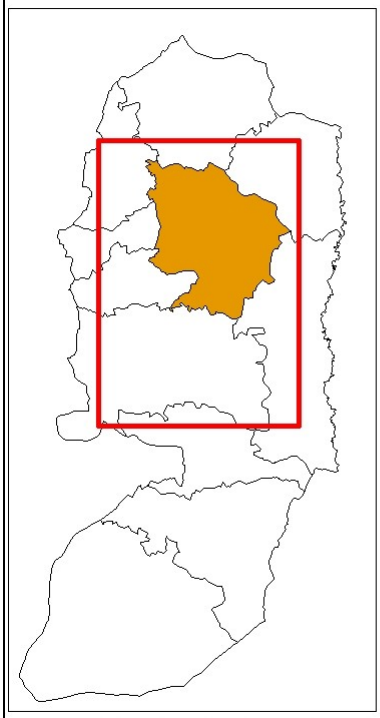


OID	Settlement name	Population	Q(MCM/year	District	duping site
0	ALLON			JERUSALEM	
1	ALMON	854	0.0928	JERUSALEM	
2	ALTALEH AL FARANCIYA	7000	0.875	JERUSALEM	
3	ANANUT			JERUSALEM	
4	ATAROT	438	0.058	JERUSALEM	Beit Hanina,Qalandya,El Ram
5	QALYA	274	0.03425	JERUSALEM	
6	GIV'AT HADASHA	7009	0.876125	JERUSALEM	
7	GIV'AT BINYAMIN/ADAM	3574	0.4	JERUSALEM	
8	GIV'AT ZE'EV	10873	1.22	JERUSALEM	
9	GIV'ON	1192	0.044	JERUSALEM	
10	HARADAR	2743	0.342875	JERUSALEM	
11	KEFAR ADUMIM	2542	2.1	JERUSALEM	
12	MA'ALEH ADUMIM	33019	4.127375	JERUSALEM	Al Tour , Al Eizarya
13	MISHOR ADUMIM			JERUSALEM	
14	NEVEH BRAT			JERUSALEM	
15	NEVEH YA'AQOV	21404	2.6755	JERUSALEM	Hizma
16	PISGAT ZE'EV	40889	5.111125	JERUSALEM	
17	QEDAR	801	0.100125	JERUSALEM	
18	RAMOT	41215	5.151875	JERUSALEM	
19	RAMOT ESHKOL	6336	0.792	JERUSALEM	
20	REKHIS SHU'AFAT			JERUSALEM	
21	TELBYUT	13309	1.663625	JERUSALEM	
22	RAMAT SHLOMO	13553	1.694125	JERUSALEM	
23	MA'A LOT DAFNA	8416	1.052	JERUSALEM	
24	HAR HOMA	1189	0.148625	JERUSALEM	

No. of Settlements	11
Population	8400
WW generated	0.899MCM/Year

Nablus Governorate





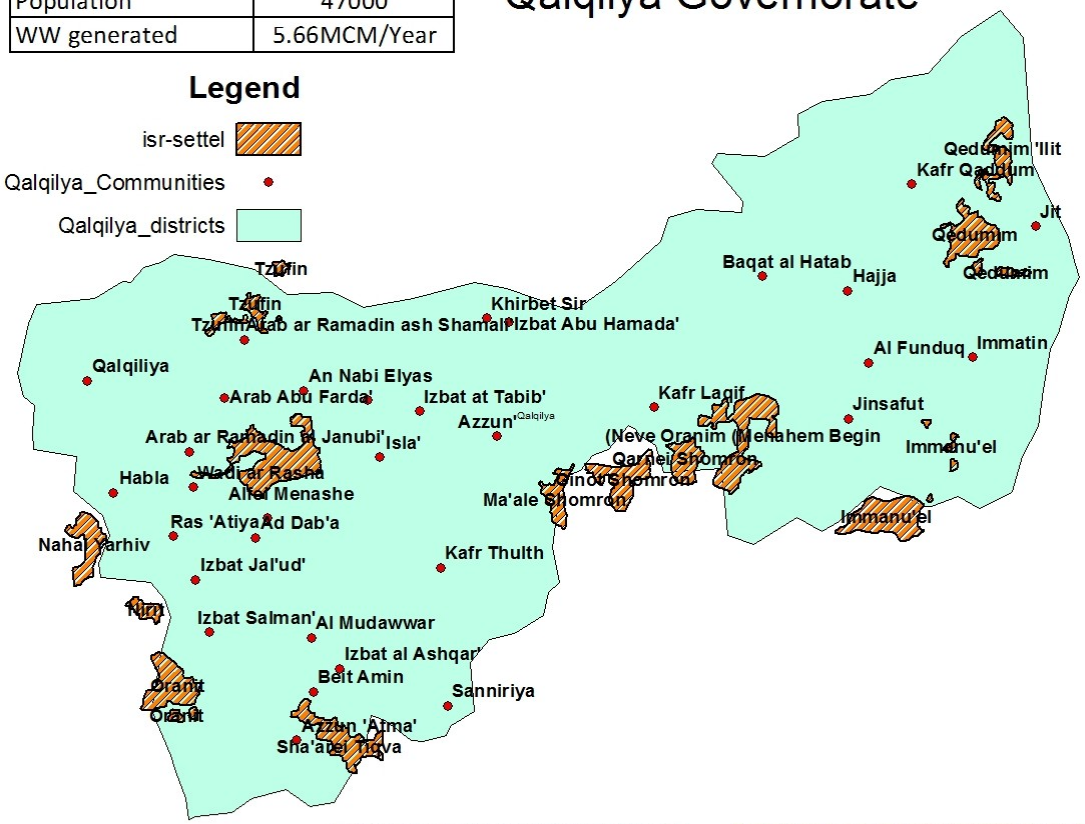
waste water fromn Allon mori

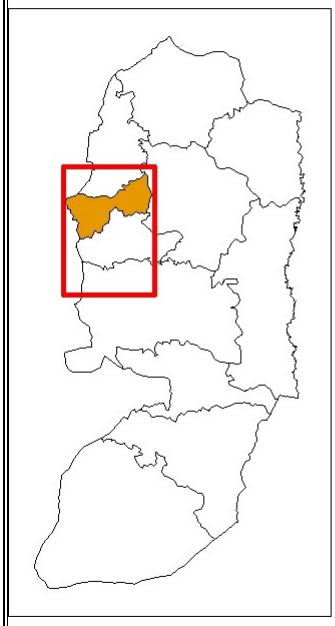
OID	settlement name	population	Q(MCM/year	district	dumping site
0	ALLON MORI	1322	0.14	NABLUS	Beit Foreek,Azmut,Salim,Deir Alhatab
1	BARAKHA	1275	0.14	NABLUS	Borin
2	ELI	2625	0.243	NABLUS	Allebben
3	GITTIT	214	0.02675	NABLUS	
4	MA'ALEH LEVONA	559	0.06	NABLUS	
5	MEKHORA	112	0.013	NABLUS	
6	MIGDALIM	139	0.014	NABLUS	Qosra,Jurish
7	MITSPE SHILO			NABLUS	
8	SHAVE SHAMERON	650	0.07	NABLUS	sabastia,Deir Sharaf
9	TAL HAYIM/YITMAR	750	0.1	NABLUS	ElLubban,As Sawiya,Qaryut,Awarta
10	YITSHAR	743	0.092875	NABLUS	

prepared by : Eng.Dorgham Al-shraim

No. of Settlements	14
Population	47000
WW generated	5.66MCM/Year

Qalqilya Governorate





Wastewater from Kadumim Setllement

Wastewater from Sha'r Tiqva

OID	Setllement name	Population	(Q(MCM/year	disstrict	dumping site
0	ALFEI MENASHE	6164	0.7	QALQILYA	Qalqilya city ,Hableh
1	GINNAT SHOMRON	5300	0.6625	QALQILYA	Wadi Qana
2	IMMANU'EL	2775	0.31	QALQILYA	Wadi Qana
3	KADDOMIM	3382	0.538	QALQILYA	Jensafout,Deir Estyah,Kafr laqef
4	KADDOMIM I'LLIT	3010	0.37625	QALQILYA	
5	MA'ELEH SHOMRON	577	0.062	QALQILYA	Wadi Qana
6	NIREET	0	0	QALQILYA	
7	NEVE MINAHEM	2000	0.25	QALQILYA	Wadi Qana
8	ORANIT	5987	0.86	QALQILYA	Ezbet salman,Beit Amin
9	QARNEH SHOMERON	6439	0.64	QALQILYA	Wadi Qana
10	SH'AR TIQVA	3931	0.47	QALQILYA	Beit Amin ,Azun Al'Atme
11	TSOFIM	1143	0.098	QALQILYA	Jayyus
12	TSUREGAL	0	0	QALQILYA	Qalqilya city
13	YIRHAV	5570	0.69625	QALQILYA	

Prepared by: Eng. Dorgham Al-shraim

Ramallah and Al-Bireh Governorate

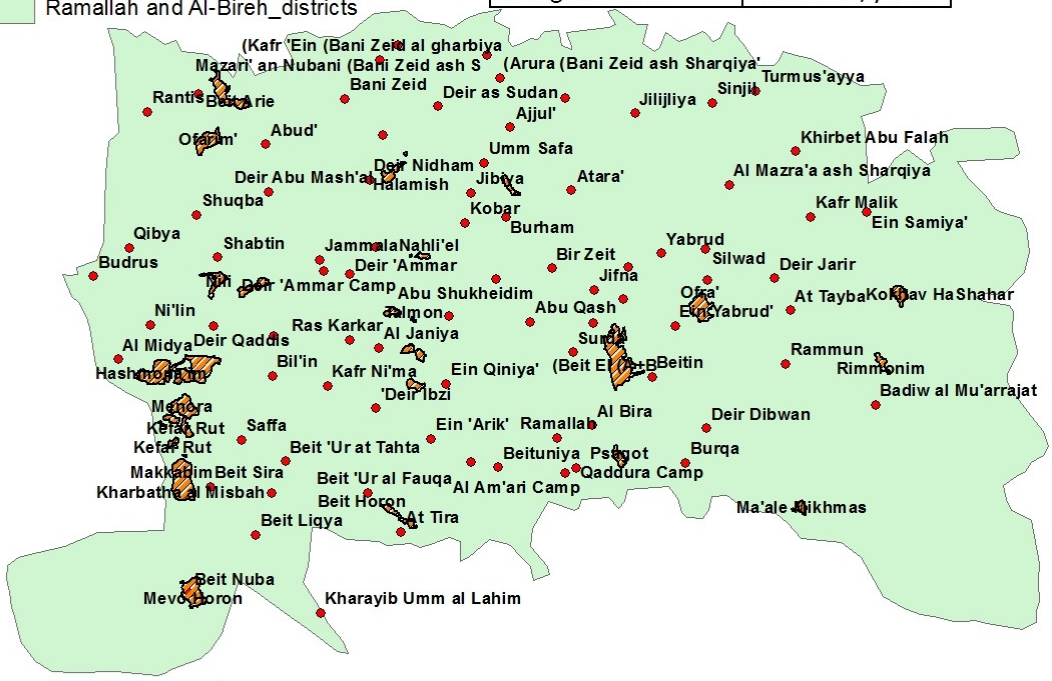
Legend

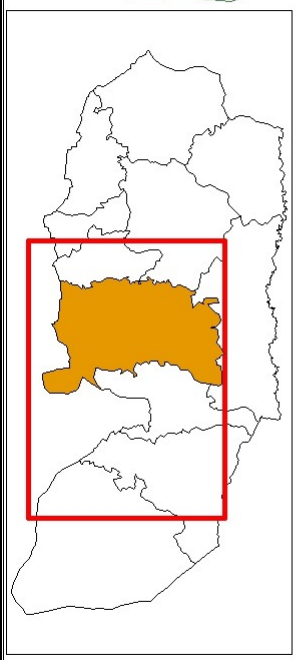
isr-settel selection

Ramallah and Al-Bireh Communities

Ramallah and Al-Bireh_districts

No. of Settlements	26
Population	77000
WW generated	9.3MCM/years



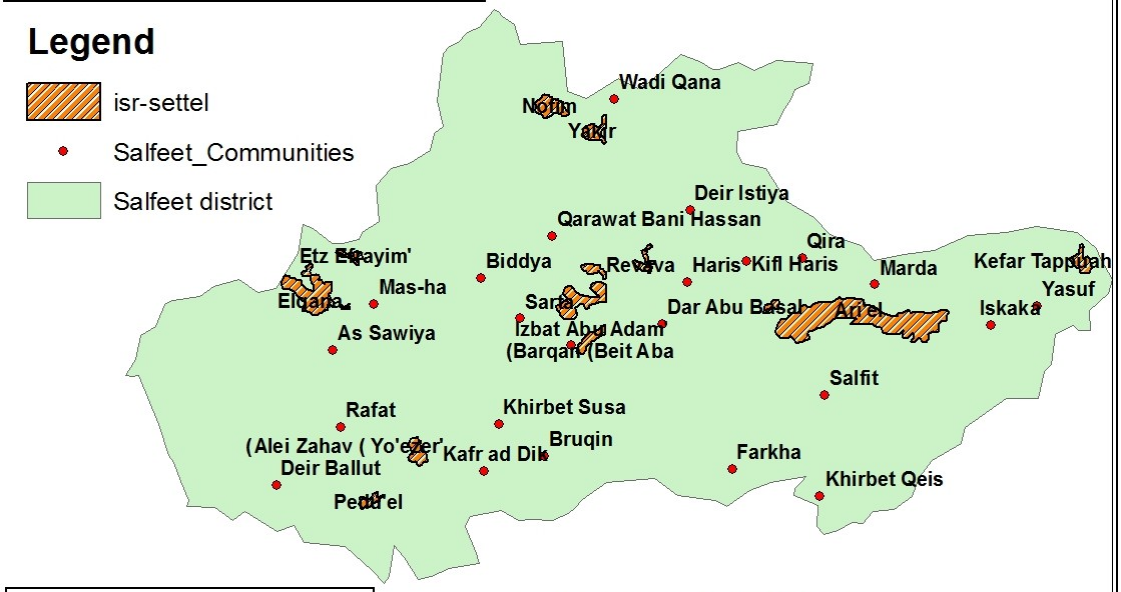


OID	settlement name	Population	Q(MCM/year	district	dumping site
0	ATERETE	438	0.048	RAMALLAH	
1	BETARYA	3606	0.45075	RAMALLAH	A'bud
2	BET'EL	5288	0.62	RAMALLAH	Dora Al-Qarea' ,Ein Sinia , Atara
3	BETHORON	979	0.106	RAMALLAH	Beit Oor Al Foqa ,Bitonia ,Al-Tira
4	DOLEV	1154	0.12	RAMALLAH	
5	HALLAMISH	956	0.105	RAMALLAH	Al-Nabi Saleh , Beir Zeit
6	HASHMONA'IM	2506	0.277	RAMALLAH	
7	KEFARRUT	0	0	RAMALLAH	
8	KOKHAV HASHAHAR	1619	0.177	RAMALLAH	(Nearby Wadi(Al-Auja
9	KOKHAV YA'AQOV	5627	0.703375	RAMALLAH	
10	MA'ELEH KHAMAISHA	0	0	RAMALLAH	Qatanna
11	MA'ELEH MIKHMAS	1229	0.13	RAMALLAH	
12	NAHA'AIL	335	0.0358	RAMALLAH	
13	MAKKABIM	0	0	RAMALLAH	
14	MENORA	2028	0.2535	RAMALLAH	
15	MITTIYAHU	1371	0.142	RAMALLAH	
16	MOVOHORON	1169	0.106	RAMALLAH	
17	N'ALI	710	0.08875	RAMALLAH	
18	NILI	912	0.114	RAMALLAH	Shibteen,Deir Qedeas
19	OFRA	2664	0.286	RAMALLAH	
20	PESAGOT	1545	0.167	RAMALLAH	Al bireh
21	QIRYAT SEFER	38047	4.755875	RAMALLAH	
22	QUANY	0	0	RAMALLAH	Ramallah,Kafr Malek
23	RIMMONIM	619	0.07	RAMALLAH	(Nearby Wadi(Al-Auja
24	SHILLO	2171	0.247	RAMALLAH	
25	TALMON	2135	0.266875	RAMALLAH	

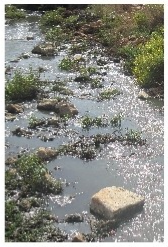
Prepared by:Eng.Dorgham Al_Shraim

No. of Settlements	11
Population	27000
WW generated	2.98MCM/years

Salfeet Governorate



wastewater from Areil Settlement



OID	settlement nam	Population	(Q(MCM/year	district	dumping site
0	ARI'EL	16613	1.83	SALFIT	Kefel Hares ,Salfit, Marda
1	ELI ZAHAVA	772	0.0965	SALFIT	Kafr Al Deek, Deir Ballut
2	ELKANAH	3000	0.32	SALFIT	Wadi Qana
3	ETS EFRAYIM	704	0.075	SALFIT	Wadi Qana
4	KEFAR TAPPUAH	798	0.09975	SALFIT	
5	NUFIM	406	0.0416	SALFIT	Ezbit Salman ,Beit Amin
6	PEUD'EL	1168	0.124	SALFIT	
7	PURQAN	1267	0.137	SALFIT	Kafr Al Deek, Borquen, Hares
8	QIRYAT NETAFIM	479	0.06	SALFIT	Qarawet Bani Hassan
9	RAVAVA	989	0.111	SALFIT	Wadi Qana
10	YAKIR	0	0	SALFIT	Wadi Qana

Prepared by: Eng.Dorgham al-shraim

Appendix B: Information about the settlements in the West Bank

Settlement name	Population	Q (MCM/Y)	District	Dump location	Aquifer
Afrat	8015	0.883	bethlehem	El_Khadr,Irtas	Eastern
allon shevut	3291	0.362	bethlehem		Eastern
betar illite	32182	3.53	bethlehem		Western
el'azar	1547	0.178	bethlehem		Eastern
geva'ot	120	0.015	bethlehem		Western
gelo	29140	3.643	bethlehem	El_Walaga,Beit Safafa,Beit Jala	Eastern
giv'at hamatus	3793	0.474	bethlehem		Western
har gilo	462	0.056	bethlehem	El_Walaga,Beit Safafa,Beit Jala	Eastern
kefar etsyon	455	0.054	bethlehem		Eastern
ma'aleh amos	326	0.04	bethlehem	Al_Rashaydeh land	Eastern
mishuke daragut	201	0.025	bethlehem		Eastern
mitspe shalem	171	0.09	bethlehem		Eastern
neveh daniyyel	1760	0.085	bethlehem	El_Khadr,Irtas	Eastern
noqedim(el david)	828	0.081	bethlehem		Eastern
rosh tsorim	470	0.187	bethlehem	Al-jaba	Eastern
teqoa'	1455	0.07	bethlehem		Eastern
Enav	569	0.067	tulkarm		Western
evneh hefits	1328	0.13	tulkarm		Western
sal'it	474	0.055	tulkarm		Western
Arête			tubas	Tubas	
Bakoat	175	0.024	tubas	Tammun	Eastern
bitronot shella			tubas		
Hemdat			tubas		
Maskiot			tubas		Eastern

Mehola	357	0.036	tubas		
Pelas			tubas		
ro'e	126	0.018	tubas	Tammun	Eastern
Rotem			tubas		
shadmot mehola			tubas		
alfei menashe	6164	0.7	qalqilya	Qalqilya city ,Hableh	Western
ginnat shomron	5300	0.663	qalqilya	Wadi Qana	Western
immanu'el	2775	0.31	qalqilya	Wadi Qana	Western
kaddomim	3382	0.538	qalqilya	Jensafout,Deir Estyah,Kafr laqef	Western
kaddomim i'llit	3010	0.376	qalqilya		Western
ma'eleh shomron	577	0.062	qalqilya	Wadi Qana	Western
Nireet			qalqilya		Western
neve minahem	2000	0.25	qalqilya	Wadi Qana	Western
Oranit	5987	0.86	qalqilya	Ezbet salman,Beit Amin	Western
qarneh shomeron	6439	0.64	qalqilya	Wadi Qana	Western
sh'ar tiqva	3931	0.47	qalqilya	Beit Amin ,Azun Al'Atme	Western
Tsofim	1143	0.098	qalqilya	Jayyus	Western
Tsuregal			qalqilya	Qalqilya city	Western
Yirhav	5570	0.696	qalqilya		Western
allon mori	1322	0.14	nablus	Beit Foreek,Azmut,Salim,Deir Alhatab	North Eastern
barakha	1275	0.14	nablus	Borin	North Eastern
Eli	2625	0.243	nablus	Allebben	Eastern
Gittit	214	0.027	nablus		Eastern
ma'aleh levona	559	0.06	nablus		Eastern

Mekhora	112	0.013	nablus		Eastern
Migdalim	139	0.014	nablus	Qosra,Jurish	Eastern
mitspe shilo			nablus		Eastern
shave shameron	650	0.07	nablus	sabastia,Deir Sharaf	North Eastern
tal hayim/yitmar	750	0.1	nablus	ElLubban,As Sawiya,Qaryut,Awarta	North Eastern
yitshar	743	0.093	nablus		North Eastern
Aterete	438	0.048	ramallah		Western
Betarya	3606	0.451	ramallah	A'bud	Western
bet'el	5288	0.62	ramallah	Dora Al-Qarea' ,Ein Sinia , Atara	Eastern
Bethoron	979	0.106	ramallah	Beit Oor Al Foqa ,Bitonia ,Al-Tira	Western
Dolev	1154	0.12	ramallah		Western
Hallamish	956	0.105	ramallah	Al-Nabi Saleh , Beir Zeit	Western
hashmona'im	2506	0.277	ramallah		Western
Kefarrut			ramallah		Western
kokhav hashahar	1619	0.177	ramallah	Nearby Wadi(Al-Auja)	Eastern
kokhav ya'aqov	5627	0.703	ramallah		Western
ma'eleh khamaisha			ramallah	Qatanna	Western
ma'eleh mikhmas	1229	0.13	ramallah		Eastern
naha'ail	335	0.036	ramallah		Western
Makkabim			ramallah		Western
Menorah	2028	0.254	ramallah		Western
Mittiyahu	1371	0.142	ramallah		Western
Movohoron	1169	0.106	ramallah		Western
n'ali	710	0.089	ramallah		Western
Nili	912	0.114	ramallah	Shibteen,Deir Qedeas	Western

Ofra	2664	0.286	ramallah		Eastern
Pesagot	1545	0.167	ramallah	Al bireh	Eastern
qiryat sefer	38047	4.756	ramallah		Western
Quany			ramallah	Ramallah,Kafr Malek	Western
Rimmonim	619	0.07	ramallah	Nearby Wadi(Al-Auja)	Western
Shillo	2171	0.247	ramallah		Western
Talmon	2135	0.267	ramallah		Western
Almoge	188	0.02	jericho		Eastern
alleisha'			jericho		Eastern
Arjman	170	0.021	jericho		Eastern
beit harva	102	0.073	jericho		Eastern
ferd yeriho	190	0.028	jericho	Aqbit Jabier	Eastern
Gilgal	148	0.019	jericho		Eastern
Hamra	119	0.015	jericho	Al Jiftlik	Eastern
ma'aleh efrayim	1377	0.172	jericho		Eastern
Mesowah	136	0.017	jericho		Eastern
mitspe yereho	1701	0.213	jericho		Eastern
Moulnevoh			jericho		Eastern
na'ama	128	0.015	jericho		Eastern
Tsuri			jericho		Eastern
netiv hagedud	114	0.01	jericho		Eastern
Niran	56	0.007	jericho		Eastern
petsa'el			jericho		Eastern
shelemtsyyon			jericho		Eastern
tomar	290	0.031	jericho		Eastern
Yafit	111	0.107	jericho		Eastern

Yitav	187	0.021	jericho		Eastern
ginnat			jenin		North Eastern
hermesh	201	0.021	jenin		North Eastern
Hinanit	811	0.07	jenin	Ya'bad	North Eastern
quarry			jenin		North Eastern
meerav			jenin	Jalbun	North Eastern
movo dotan	315	0.033	jenin	Araba	western
Rehan	158	0.016	jenin	Barta'a	western
shaqe'd	525	0.057	jenin		North Eastern
Adora	248	0.27	hebron		western
Adurim			hebron	Dura	western
al haram al ibrahimi	400	0.02	hebron		Eastern
Ashkelut	229	0.029	hebron		western
beit romano	150	0.16	hebron		Eastern
beit yattir	447	0.056	hebron		Eastern
bet'ein/tsoref	906	0.113	hebron	Jab'	Eastern
hadassa aldabboya			hebron		Eastern
Haggai	545	0.068	hebron	Karma	western
Harmnush			hebron		Eastern
karmeh tsur	729	0.06	hebron	Biet Umar	Eastern
Karmel	378	0.047	hebron	Yatta	Eastern
kiryat arb'	7039	0.88	hebron	Bani Na'im	Eastern
livah shani	417	0.052	hebron		western
ma'aleh hafar			hebron		Eastern
ma'on	381	0.048	hebron	Yatta	Eastern

miso'ot yitshak			hebron		Eastern
migdalo'z	332	0.042	hebron		Eastern
mitsad/asfar	263	0.033	hebron	Alrashayda	Eastern
Quany			hebron	Aldahiriya	Eastern
ramat mamre			hebron		Eastern
shim'a	370	0.046	hebron	Alsail area	western
shim'on			hebron		Eastern
Suseya	745	0.093	hebron	Al Samo'	western
tal alrumaydat			hebron		Eastern
telem	192	0.024	hebron		western
tene ofarim			hebron		western
Tsoret			hebron		western
yehoda negohot			hebron		Eastern
otni'el	763	0.095	hebron	Karma	western
ari'el	16613	1.83	salfit	Kefel Hares ,Salfit, Marda	Western
eli zahava	772	0.097	salfit	Kafr Al Deek, Deir Ballut	Western
Elkanah	3000	0.32	salfit	Wadi Qana	Western
ets efrayim	704	0.075	salfit	Wadi Qana	Western
kefar tappuah	798	0.1	salfit		Eastern
Nufim	406	0.042	salfit	Ezbit Salman ,Beit Amin	Western
peud'el	1168	0.124	salfit		Western
purqan	1267	0.137	salfit	Kafr Al Deek, Borquen, Hares	Western
qiryat netafim	479	0.06	salfit	Qarawet Bani Hassan	Western
Ravava	989	0.111	salfit	Wadi Qana	Western
Yakir			salfit	Wadi Qana	Western

Allon			jerusalem		Eastern
Almon	854	0.093	jerusalem		Eastern
altaleh al faranciya			jerusalem		Eastern
	7000	0.875			
Ananut			jerusalem		Eastern
atarot	438	0.058	jerusalem	Beit Hanina,Qalandya,El Ram	Eastern
Qalya	274	0.034	jerusalem		Eastern
giv'at hadasha	7009	0.876	jerusalem		Eastern
giv'at Binyamin	3574	0.4	jerusalem		Eastern
giv'at ze'ev	10873	1.22	jerusalem		Eastern
giv'on	1192	0.044	jerusalem		Eastern
Haradar	2743	0.343	jerusalem		western
kefar adumim	2542	2.1	jerusalem		Eastern
ma'aleh adumim	33019	4.127	jerusalem	Al Tour , Al Eizarya	Eastern
mishor adumim			jerusalem		Eastern
neveh brat			jerusalem		Eastern
neveh ya'aqov	21404	2.676	jerusalem	Hizma	Eastern
pisgat ze'ev	40889	5.111	jerusalem		Eastern
Qedar	801	0.1	jerusalem		Eastern
Ramot	41215	5.152	jerusalem		Eastern
ramot Eshkol	6336	0.792	jerusalem		Eastern
rekhis			jerusalem		Eastern

shu'afat					
Telbyut	13309	1.664	jerusalem		Eastern
ramat shlomo	13553	1.694	jerusalem		Eastern
ma'a lot dafna	8416	1.052	jerusalem		Eastern
har homa(جبل ابو غنيم)	1189	0.149	jerusalem		Eastern

Appendix C: The Questionnaire

جامعة النجاح الوطنية

كلية الدراسات العليا

استبيان المواطنين

يقوم الباحث (ضرغام الشريم) بعمل رسالة ماجستير للحصول على شهادة الماجستير في هندسة المياه والبيئة من جامعة النجاح الوطنية وبالتعاون مع سلطة المياه الفلسطينية، حول (التاثيرات البيئية والاقتصادية للمستوطنات الاسرائيلية في الضفة الغربية) ، لذا نتمنى الإجابة عن جميع الأسئلة التي ستطرح في هذا الاستبيان بكل دقة ولكم جزيل الشكر.

مكان السكـن . .....

1. المحافظـــة .....
2. العمل الحالـي .....
3. المؤهل العلمي .....
4. الجنـــس ذكر أنثى
5. هل تعاني منطقتكم من مشكلة المياه العادمة القادمة من المستوطنات الإسرائيلية:
   لا اعلم نعم. لا.
6. اذا كانت الاجابة نعم ، ماهي هذه المستوطنات :

.....

.....

7. حسب رأيكم هل تشكل هذه المياه ضررا على البيئة:
   لا اعلم نعم. لا.

8. اذا كانت الإجابة نعم ما حجم الضرر على العناصر البيئية الاتية:

الرقم	العنصر البيئي	كبيرة جدا	كبيرة	متوسطة	قليلة	قليلة جدا
1	المياه الجوفية					
2	الهواء					
3	التربة					
4	النباتات					
5	الحيوانات					
6	المنظر الجمالي					

في ما يلي مجموعة من الفقرات التي تقيس الاثار السلبية للمستوطنات على البيئة الفلسطينية، يرجى ابداء الرأي وفق ما تراه مناسبا.

		درجة التاثير				
الرقم	الفقرات	كبيرة جدا	كبيرة	متوسطة	قليلة	قليلة جدا
1	الازعاج الناتج من هذه المستوطنات					
2	صدور روائح كريهة من المياه العادمة القادمة من المستوطنات					
3	زيادة انتشار الذباب والحشرات					
4	التخلص من المياه العادمة بالقرب من مناطق الرعي					
5	زيادة امراض الابقار والاغنام التي ترعى بالقرب من المياه العادمة					
6	تاثر المناطق الزراعية بهذه المياه العادمة					
7	تاثر نوعية مياه الابار القريبة من المياه العادمة					
8	انتشار الامراض مثل الاسهال والملاريا لدى السكان					
9	تلف المزروعات بسبب فيضان المياه العادمة					
10	خسائر مادية بسبب فيضان المياه العادمة					
11	التاثير على المنظر الجمالي للمنطقة					

9. من وجهة نظرك كيف تعرف ان مياه الشرب ملوثة بسبب المياه العادمة القادمة من المستوطنات:

.....

10. ما تقديرك للخسائر الناتجة من فيضان المياه العادمة:

.....

ما اكثر الجهات اهتماما بمعالجة مشكلة المياه العادمة القادمة من المستوطنات

الرقم	الفقرات	كبيرة جدا	كبيرة	متوسطة	قليلة	قليلة جدا
1	اهتمام المؤسسات الحكومية بمشكلة المياه العادمة الخارجة من المستوطنات					
2	اهتمام المؤسسات غير الحكومية بمشكلة المياه العادمة الخارجة من المستوطنات					
3	اهتمام السكان المتواجدين بالمنطقة بمشكلة المياه العادمة الخارجة من المستوطنات					

11. اذا كان هناك اهتمام من قبل اي مؤسسة سواء اكانت حكومية ، ام غير حكومية ام اهلية ، فما هو طبيعة هذا الاهتمام حسب رايك ، وهل هو كافي.

.....

.....

12. هل تعتبر ان مشكلة المياه العادمة الخارجة من المستوطنات من اكثر المواضيع حساسية للمجتمع:
لا اعلم نعم. لا.

13. هل حضرت ندوات أو محاضرات عن المياه العادمة:
لا اعلم نعم. لا.

14. هل وصلتك اي نشرة او بوستر تتحدث عن مشاكل المياه العادمة الخارجة من المستوطنات:
لا اعلم نعم. لا.

15. أي ملاحظات اخرى:
.....

.....

.شاكرين لكم حسن تعاونكم

جامعة النجاح الوطنية
كلية الدراسات العليا

تقييم الأثار البيئية والاقتصادية للمياه العادمة الخارجة من المستوطنات الاسرائيلية في الضفة الغربية

إعداد

ضرغام عادل ابراهيم الشريم

إشراف

د. عنان فخري الجيوسي

قدمت هذه الاطروحة استكمالا لمتطلبات نيل درجة الماجستير في هندسة المياه والبيئة بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين.

2012

تقييم الأثار البيئية والاقتصادية للمياه العادمة الخارجة من المستوطنات الاسرائيلية في الضفة الغربية

إعداد

ضرغام عادل ابراهيم الشريم

إشراف

د.عنان فخري الجيوسي

الملخص

لقد ساهمت إسرائيل منذ احتلالها للاراضي الفلسطينية في الأضرا ر بالبيئة الفلسطينية عبر إهمالها شبكات الصرف الصحي في الأراضي الفلسطينية ووفق الشروط الصحية اللازمة إلا أن الأضرار بالبيئة الفلسطينية جار وبشكل مباشر عبر المستوطنات الإسرائيلية في الضفة الغربية حيث تقوم هذه المستوطنات بضخ ملايين الأمتار المكعبة من المياه العادمة في الأودية وفي الأراضي الفلسطينية.

ركز البحث على تحديد وتقييم الاثار البيئية للمياه العادمة الناتجة من المستوطنات الاسرائيلية في الضفة الغربية وذلك عن طريق جمع المعلومات المتوفرة لدى المؤسسات المختصة ودراستها وايضا عن طريق توزيع استبانة على بعض المناطق المتضررة من المستوطنات الاسرائيلية وتحليل هذه الاستبانة .

أكدت نتائج هذا البحث ان ما يقارب من 483 الف مستوطن يعيشون في الضفة الغربية المحتلة ينتجون ما يقارب من 60 مليون متر مكعب من المياه العادمة سنويا موزعة على الاحواض الجوفية 25 مليون على الحوض الغربي و 33 مليون على الحوض الشرقي و 2 مليون متر مكعب سنويا على الحوض الشمالي الشرقي. ان المياه العادمة الناتجة من هذه المستوطنات الاسرائيلية تؤثر سلبا على البيئة المحيطة عن طريق تلويث الهواء والتربة ثم

تلويث المياه الجوفية. كما وتؤثر هذه المياه العادمة سلبا على القيمة الاقتصادية للمنـــاطق الملوثة. كما واظهرت نتائج البحث ان الخسائر المادية الناتجة عن فيضان المياه العادمـــة في الاراضي الزراعية تتروح بين 700 الى 1000 شيكل للـــدونم الواحـــد فـــي الاراضـــي المزروعة باشجار الزيتون ومن 1000 -2000 في الاراضي المزروحة بالحبوب والبقوليات ومن 2000 - 3000 في الاراضي المزروعة باشجار العنب .