



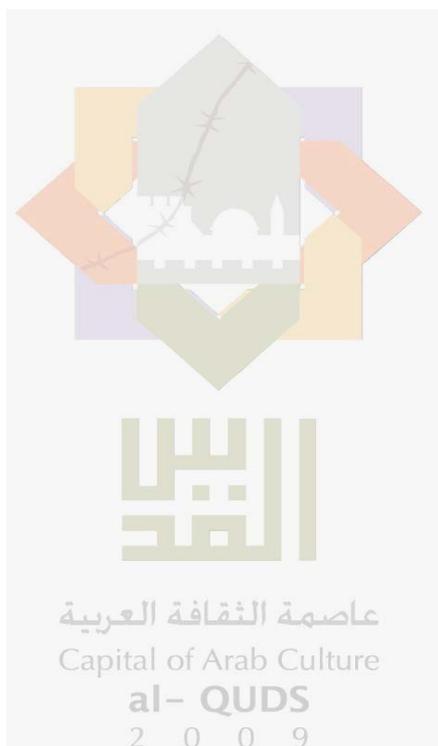
**Palestinian National Authority
Palestinian Central Bureau of Statistics**

**Household Environmental Survey 2009
Main Findings**

December, 2009

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Preface

We are pleased to publish this specialized statistical report on the environmental household sector in the Palestinian Territory. The report includes the main finding of the households environment survey 2009. This survey is part of our official effort for creating and establishing the National Statistical System and providing the necessary statistics to the Palestinian policy-planners and decision-makers in water, environment and natural resources sectors.

The world attention has increased to provide environmental statistical data on the household sector. Providing such data participates in policy making and legislation that reduces the pressure on the environment. As in the rest of the world, the attention has greatly been increased in Palestine to provide such data after many years of environment negligence and the absence of standards and rules during the period of the Israeli occupation.

This report is one of a series of expected reports to be published by the PCBS on the environment according to the plan for the Environment Statistical Department, as a tool for describing the status of environment in the Palestinian Territory.

The main objective of this survey is to provide reliable data on environmental reality about the household sector in the Palestinian Territory, including the methods used to handle the solid waste and wastewater. It includes also the role of the local authority in providing the suitable environment that will reduce the negative effect of the different types of pollution on the household sector.

This report presents statistical data on water consumption for the household sector by the water source, the methods of solid waste disposal and their main components, the disposal of wastewater, existence of cesspits and water wells. In addition to exposure to noise and air pollution by the source and time.

PCBS hopes that the main findings of this survey will contribute to improving the environmental status and minimizing the random depletion of natural resources, in addition to providing reliable and useful statistics for Palestinian planners and decision-makers.

December, 2009

**Ola Awad
Acting President**

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Executive Summary

This survey is a household sample survey, which was conducted during the period from 23/08/2009 until 01/10/2009. The main objective of this survey is to provide reliable data on environmental reality about the household sector in the Palestinian Territory, including the methods used to handle the solid waste and wastewater. This report presents statistical data on water consumption for the household sector by the water source, the methods of solid waste disposal and their main components, the disposal of wastewater, existence of cesspits and water wells. In addition to exposure to noise and air pollution by the source and time.

The 2009 survey results showed that 88.4% of the households in the Palestinian Territory live in housing units connected to water network, this indicate that the percentage of the households in the Palestinian Territory live in housing units connected to water network are increased comparing with 84.8% in 1999.

Data of the 2009 survey revealed that 48.1% of the households in the Palestinian Territory consider the water quality as good, and this percentage increase in the West Bank to reach 72.2% while in Gaza Strip 6.8%. comparing with the year 1999 the results indicates that the percentage of the households in the Palestinian Territory consider the water quality as good are decreased with 67.5% in 1999.

The local authorities collected solid waste for 71.8% of households in the Palestinian Territory in 2009, while the percentage was 61.6% in 2008, and UNRWA collected for 8.2% of households in Palestinian Territory in 2009, while it was 10.6% in 2008.

Data of 2009 revealed that throwing waste in the nearest container and burned are the most important disposal method for 73.0% and 21.3% of households in the Palestinian Territory respectively.

Results showed that the approximate quantity of household waste produced daily is less than 4.0 kg for 77.9% of households in Palestinian Territory in 2009, while it is estimated more than 7.0 kg for 6.0% of them.

Results indicated that 23.4% of households in the Palestinian Territory in 2009 are exposed to noise very often, the percentage of households that are exposed to noise very often increased to 22.9% in compared with the year 2008.

Results appeared that 15.3% of households in the Palestinian Territory are exposed very often to smell, where as 76.4% of households reported that they are seldomly or not exposed to smell.

Results indicated that 12.7% of households in the Palestinian Territory are very often exposed to dust, and 80.7% of households reported that they are seldomly or not exposed to dust.

Chapter One

Introduction

1.1 Introduction

Environmental statistics in the household sector are an important instrument for making decisions, planning, and drawing up strategies for the environment. Due to the lack of data about this subject in the Palestinian Territory, the Palestinian Central Bureau of Statistics (PCBS) is building and developing a database about the environment in the household sector.

This survey is based on a household sample survey, which was conducted during the period from 23/08/2009 to 01/10/2009. It provides for basic statistics on various aspects of environment, including water, solid waste, wastewater, noise, and air pollution. A special questionnaire was designed in accordance with United Nations standards and recommendations in the field of environment statistics adapted to Palestinian conditions. The questionnaire covered the following items:

1.2 Survey Objectives

This survey presents data on various environmental household indicators in the Palestinian Territory, and presents statistical data on water consumption for the household sector by water source, the methods of solid waste disposal and their main components, the disposal of wastewater, and existence of cesspits and water wells, in addition to exposure to noise and air pollution by source and time.

The questionnaire covered the following items:

1. Sources of water supply in houses.
2. Household solid waste disposal, its components, and its approximate quantity.
3. Wastewater disposal and the existence and use of cesspits in houses.
4. Air pollution in the area of the house by smell, dust and smoke.
5. Exposure to noise.

1.3 Report Structure

This report consists of five chapters: the first chapter presents the survey objectives and the report structure, the second chapter describes the definitions and concepts, the third chapter briefly describes the main findings, while the fourth chapter presents the methodology used in the survey, consisting of the questionnaire design, sampling design, fieldwork operations and data processing, and the last chapter includes an assessment of data quality and technical notes.

Chapter Two

Concepts and Definitions

Household

One person or a group of persons with or without a household relationship, who live in the same housing unit, share meals and make joint provision of food and other essentials of living.

Households Without Solid Waste Collection Service

The households that are not receiving the solid waste collection service from any of the parts, the local authority or UNRWA or the private contractor and dispose of waste by themselves, or by themselves beside another part, these households are considered non-served households.

Environment

The totality of all the external conditions affecting the life, development and survival of an organism.

Cesspit

A well or a pit in which night soil and other refuse is stored, constructed with either tight or porous walls.

Dump

Site used to dispose solid waste without environmental control.

Dust

Particles light enough to be suspended in the air.

Air Pollution

The presence of contaminants or pollutant substances in the air that do not disperse properly and that interfere with human health or welfare.

Exposure To Noise And Air Pollution

The respondent is considered to be exposed to noise, dust, smell or smoke if he considers it a real problem.

Household Waste

Waste material usually generated in the residential environment. Waste with similar characteristics may be generated in other economic activities and can thus be treated and disposed together with household waste.

Agriculture Waste

Waste produced as a result of various agricultural operations. It includes manure and other waste from farms, poultry houses and slaughterhouses; harvest waste; fertilizer run-off from fields; pesticides that enter into water, air or soil; and salt and silt drained from fields.

Local Authority

It is a government authorized by one of the ministries to have competence for providing public services, and handling the community affairs.

Noise

Audible sound from traffic, construction, and so on that may generate unpleasant and harmful effects (hearing loss). It is measured in decibels.

Open Burning

Out door burning of waste such as lumber, scrapped cars, textiles, and so forth.

Public Water Network

A net of pipes for the purpose of providing clean water to households. It normally belongs to a municipality, the council or to a private company.

Sewage Network

System of collectors, pipelines, conduits and pumps to evacuate wastewater (rainwater, domestic and other wastewater) from any of the location places of generation either to municipal sewage treatment plant or to a location place where wastewater is discharged.

Smoke

Particles suspended in air after incomplete combustion of materials.

Solid Waste

Useless and sometimes hazardous material with low liquid content, solid waste include municipal garbage, industrial and commercial waste, sewage sludge, waste resulting from agricultural and animal husbandry operations and other connected activities, demolition waste and mining residues

Waste Collection

Collection or transport of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or private corporations, specialized enterprises or general government. Collection of municipal waste may be selective, that's to say carried out for a specific type of product, or undifferentiated, in other words, covering all kinds of waste at the same time.

Wastewater

Used water, typically discharged into the sewage system. It contains matter and bacteria in solution or suspension.

Water Quality

The water without color, taste, smell or precipitates is considered as good water, the water with some color or taste or smell or precipitates but still acceptable from the respondent's point of view is considered to be fairly good water, and the water with some color or taste or smell or precipitates to an extent that is not acceptable from the respondent's point of view is considered to be bad water.

Main Findings

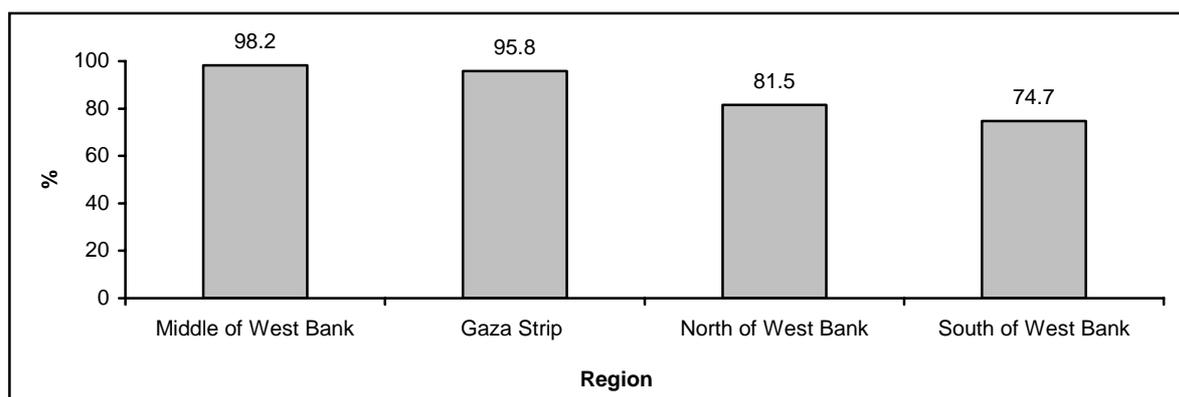
This chapter presents the main findings of the household environmental survey, 2009. Statistical results are classified according to the main components of environmental elements, including water, solid waste, wastewater, exposures to noise and air pollution.

3.1 Water

Water Sources

The 2009 survey results showed that 88.4% of the households in the Palestinian Territory live in housing units connected to a water network. This indicates that the percentage of households in the Palestinian Territory living in housing units connected to the water network increased from 84.8% in 1999. This percentage is distributed into 84.5% of households in the West Bank, and 95.8% of households in Gaza Strip. During 2009 there were 5.7% of households in the Palestinian Territory depending on household water wells as a main water source.

Figure 1: Percentage of Households in the Palestinian Territory whom Living in Housing Units Connected to the Public Water Network and Region, 2009



Household Water Quality

Data of the 2009 survey revealed that 48.1% of the households in the Palestinian Territory consider the water quality as good; this percentage increased in the West Bank to reach 72.2% while in Gaza Strip it was 6.8%. The results indicate that the percentage of households in the Palestinian Territory who consider the water quality as good decreased from 1999 when 67.5% considered it good in 1999.

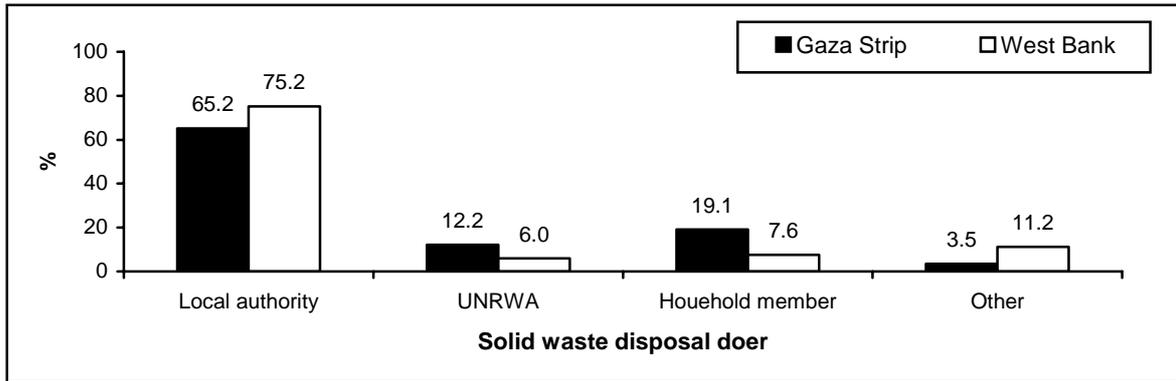
3.2 Solid Waste

Disposal of Solid Waste

The local authorities collected solid waste for 71.8% of households in the Palestinian Territory in 2009, while the percentage was 61.6% in 2008; UNRWA collected for 8.2% of households in Palestinian Territory in 2009, while it was 10.6% in 2008.

Data of 2009 revealed that throwing waste in the nearest container and burned are the most important disposal method for 73.0% and 21.3% of households in the Palestinian Territory respectively.

Figure 2: Percentage Distribution of Households in the Palestinian Territory by the Solid Waste Disposal Doer and Region, 2009



Quantity of Solid Waste Produced Daily

Results showed that the approximate quantity of household waste produced daily is less than 4.0 kg for 77.9% of households in the Palestinian Territory in 2009, while it is estimated more than 7.0 kg for 6.0% of them.

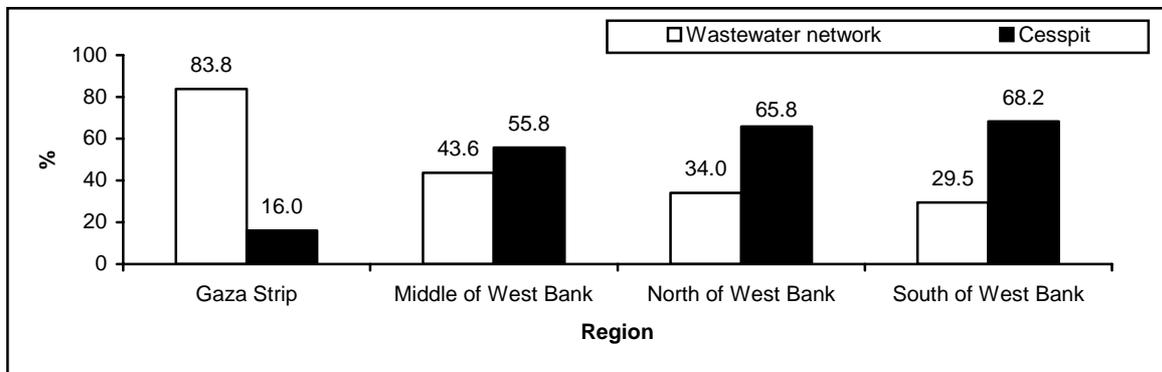
The average household daily production of household waste in Palestinian Territory in 2009 was estimated to be 3.5 kg; it approaches 3.9 kg in the West Bank and 2.7 kg in Gaza Strip. The quantity of solid waste produced daily reached 2,321.2 tons in the Palestinian Territory in 2009, (distributed as 1,709.8 tons in the West Bank, and 611.4 tons in Gaza Strip), comparing with 2,861.5 tons in 2008.

3.3 Wastewater

Wastewater Disposal Methods

During 2009 data indicated that wastewater network was used by 52.1% of households in the Palestinian Territory to dispose of their wastewater. Pours cesspits were used by 45.5% of households in the Palestinian Territory in 2009. When comparing the results of the year 2009 with the year 1999, we note that the percentage of households in the Palestinian Territory that used wastewater network increased since 1999 from 39.3%.

Figure 3: Percentage of Households in the Palestinian Territory by Wastewater Disposal Method and Region, 2009



3.4 Exposure to Noise

Results indicated that 23.4% of households in the Palestinian Territory in 2009 are exposed to noise very often; the percentage of households that are exposed to noise very often increased from 22.9% in the year 2008.

Results showed that traffic is the most important source of noise for 68.1% of households exposed to noise sometimes or very often in the Palestinian Territory, while construction is the most important source of noise for 7.2% of households.

3.5 Air pollution

Exposure to Smells

Results showed that 15.3% of households in the Palestinian Territory are exposed very often to smell, where as 76.4% of households reported that they are seldom or not exposed to smell.

Results showed that wastewater is the most important source of smell for 37.7% of households exposed to smell sometimes or very often in the Palestinian Territory, while dumping sites are the most important source of smell for 30.3% of households.

Exposure to Dust

Results indicated that 12.7% of households in the Palestinian Territory are very often exposed to dust, and 80.7% of households reported that they are seldom or not exposed to dust.

Unpaved roads are considered the most important source of dust for 70.1% of households that are exposed to dust sometimes or very often in the Palestinian Territory.

Exposure to Smoke

Results showed that 7.7% of households in the Palestinian Territory only are sometimes exposed to smoke, and 89.0% of households in the Palestinian Territory are seldom or not exposed to smoke.

Waste burning is considered the most important source of smoke for 55.9% of households that are exposed to smoke sometimes or very often in the Palestinian Territory.

Chapter Four

Methodology

This chapter presents documentation of the methodology used in preparing this report.

4.1 Questionnaire

The environmental questionnaire was designed in accordance with similar country experiments and with international standards and recommendations for the most important indicators, taking into account the special situation of the Palestinian Territory.

4.2 Sample and Frame

The sample is a two-stage stratified cluster random sample.

Target Population

All Palestinians households living in the Palestinian Territory.

Sample Frame

The sampling frame is a master sample from the overall sample that was updated in 2003 for the households that were visited a third or fourth time, while the households to be visited for the first and second time were chosen from the general frame of Population, Housing and Establishment Census 2007. It consists of a list of enumeration areas used as PSU's in the first stage of selection, and the household frame was used in the enumerator areas to choose households in the second level. The frame of the households has been updated in the enumerator areas for the new general sample at the end of year 2003.

Sample Size

The sample size is 3,234 Palestinian households in the Palestinian Territory, where this sample has been distributed according to the Labor Force Sample Survey.

Sample Design

The sample of this survey is a sub-sample of the Labor Force Survey (LFS) sample. The sample of the household environment Survey occupies six weeks of the third quarter of 2009 of the LFS.

Stratification

In designing the sample of LFS three levels of stratification were made:

1. Stratification by district.
2. Stratification by the locality type which comprises:
(a) Urban (b) Rural (c) Camps
3. Stratification by locality size (no of households in the locality).

Sampling Unit

First stage sampling units are the enumeration in the master sample. The second stage sampling units are households.

Target Cluster Size

The "target cluster size" or "sample-take" is around 16 households per PSU.

4.3 Fieldwork

Training Fieldworkers

Fieldworkers were trained on the main skills before the start of data collection. The interviewers were trained on the Household Environment Survey by implementing the training course in Ramallah and Nablus for the West Bank trainees and in Gaza for Gaza Strip trainees. Instructions for filling the questionnaire were made available for the interviewers. The training provides the participant with aims and definitions of the different indicators and expressions of the survey and how to fill in the questionnaire.

Data Collection

Fieldwork started on 23/08/2009 and lasted until 01/10/2009. Fieldwork teams were distributed to all districts proportional to the sample size of each governorate. The fieldwork team consisted of 24 members, including one fieldwork coordinator, 4 supervisors, 4 editors and 15 interviewers.

During fieldwork 3,234 households were visited in the Palestinian Territory. The end results for the interview were the following:

(2,846)	Complete questionnaire
(43)	Traveling households
(19)	Housing unit not existed
(92)	Cases no body in the house
(45)	Refused cases
(130)	Housing unit abandoned
(32)	Household can't give data
(27)	Other cases

4.4 Reference Period

The reference period was July 2009.

4.5 Data Processing

The data processing stage consisted of the following operations:

Preparation of data entry program

In this stage data were entered into the computer, using Access Program. This program was prepared to satisfy a number of requirements such as:

- Duplication of the questionnaire on the computer screen.
- Logical and consistency check of data entered.
- Possibility for internal editing of questions answers.
- User-Friendly handling.
- Possibility of transferring data into another format to be used and analyzed using other statistical analytical systems such as SPSS.

Weighing Calculation

Since the sampling weight is counteractive with the percentage sample from the frame, and as this ratio is different from the percentage sample for the society in the reference period, therefore the weight was adjusted to show number of population in the middle of 2009. And the weight was adjusted to make the distribution of people in the sample by region, sort, and structure age become identical to this distribution in the census 2007. Finally, weight was adjusted to compensate for incomplete cases that occur during data collecting.

Data Quality

The concept of data quality is constructed of many aspects starting from the planning to the survey up to publishing method and analysis of the data. The main principles of the statistical quality are Accuracy, Comparability, and Data Quality Assurance Procedures.

5.1 Accuracy

It includes many aspects of the survey, mainly the statistical errors due to the sample, and also non statistical errors refers to the workers and survey tools, and includes also the response rates in this survey and their effect on the assumptions. This section includes:

1. Sampling Errors

These types of errors evolved as a result of studying a part of the society and not all of it, and because this survey is sample-based, the data of this survey will be affected by sampling errors due to using a sample and not the whole frame of the society. Therefore differences appear compared with the actual values that could be obtained through census. For this survey, variance calculations were made for an average of household waste production, and disposal method of wastewater, and means of obtaining water in the Palestinian Territory.

Variable	Estimate		Standard Error	C.V %	Confidence %95 Interval	
	Unit	Value			Lower	Upper
Disposal method of wastewater						
Sewage network	%	52.1	2.7	0.052	46.8	57.4
Porous cesspit	%	47.8	2.5	0.056	50.6	50.6
Tight cesspit	%	1.7	0.3	0.150	0.9	3.1
Others	%	0.4	0.2	0.502	0.4	1.3
Average household daily production	Kg	3.5	0.1	0.020	3.4	3.6

2. Non Sampling Errors

These errors are due to non-response cases as well as the implementation of surveys. In this survey, these errors emerged because of (a) the special situation of the questionnaire itself which depends on type of estimation, and (b) diversity of sources (e.g., the interviewers, respondent, editors, coders, data entry operator ...etc).

The sources of these errors can be summarized in:

1. Some of the households were not in their houses and the interviewers could not meet them.
2. Some of the households didn't show attention toward the questionnaire.
3. Some errors occurred due to the way the questions were asked by interviewers.
4. Misunderstanding of the questions by the respondents.
5. Answering the questions related to consumption by making estimations.

It is important to mention that 5% from the sample of this survey was re-interviewed and the results of this re-interview were reported by the supervisors. The re-interview shows the variance in estimation by interviewers for wood, charcoal and olive cake consumed when the

interviewer is different between the one who answers for the main survey questionnaire and the one who answers the re-interview questionnaire.

$$\text{None response rate} = \frac{\text{Sum of none response cases}}{\text{Net sample}} \times 100\%$$

$$= \frac{388}{3,234} \times 100\% = 12\%$$

$$\text{Response rate} = 100\% - \text{none response rate}$$

$$= 100\% - 12\% = 88\%$$

The none response cases were treated using adjustment groups (strata) and the following equation shows this:

$$fg = \frac{\sum_{ng} wi - \sum_{o.c} wi}{\sum_{rg} wi}$$

Where

$$\sum_{ng} wi \text{ Total weights in g group}$$

$$\sum_{o.cg} wi \text{ Total weights over coverage}$$

$$\sum_{rg} wi \text{ Total weights responding in the survey}$$

Each unit is given fg value for the interval lies in and finally we get $w'i$ using the following equation:

$$w'gi = wi * fgi$$

5.2 Comparability

The data of the environmental household survey is comparable geographically and across time. When comparing the data between different geographical areas and when comparing the data of this survey with the data of previous surveys and with the Population, Housing and Establishment Census 2007 the results were similar.

5.3 Data Quality Assurance Procedures

Several measures were made to ensure quality control in the survey, such as the training of the fieldworkers on basic skills before the start of data collection, and conducting field visits to field researchers to ensure the integrity of data collection, in addition to conducting a re-interview for 5% of households. The audit questionnaire was carried over before data entry, using a program that does not allow any mistakes during the process of data entry, and then the data were examined to ensure that they are free from errors not discovered earlier. After the receipt of the raw data file, cleaning and inspection of the anomalous values were made, and also inspection of the harmony between the different questions on the questionnaire.

5.4 Technical Notes

This part presents the important technical notes on the indicators presented in the results of the survey:

- Data presented in tables (3,10,11,17,18 and 19) are reported data.
- The definition of water network includes private contractor in which the owner of an artisan well is selling the water to some of the community inhabitant in correspondence to certain fee.
- The cesspit was considered to be evacuated if this was happened at least once during the residential period. The periodicity of evacuation the cesspit was determined by the length of the last period during which the cesspit was not evacuated.
- Data concerning noise, smell, dust and smoke indicators were according the respondent's evaluation, and depend on the season when the survey implemented.
- There is a variance for some indicators between West Bank and Gaza Strip, due to the Gaza Strip condition.

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