



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

Environmental Economic Survey, 2008

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Introduction

This report provides statistical data on the main environmental indicators for the economic establishments in the Palestinian Territory, based on the Environmental Economic survey which was implemented during the period 20/04/2008 to 03/08/2008. The main objective of the survey is to provide reliable data of environmental reality on the economic establishments 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 economic sector.

This report presents the main findings of the Environmental Economic Survey. It is one of a series of expected reports to be published by PCBS on the environment and natural resources in Palestine according to the plan for the Environment Statistical Department, as a tool for describing the status of environment in the Palestinian Territory.

This report presents statistical data of water consumption in the economic establishments by water source, the methods of solid waste disposal and their main components, and the disposal of wastewater.

Concepts and Definitions

Wastewater Network

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

Solid Waste Disposal

Ultimate deposition or placement of refuse that is not salvaged or recycled.

Wastewater

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

Dumping Site

Site used to dispose of solid wastes without environmental control.

Solid Waste

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

Pharmaceutical Waste

This includes pharmaceutical products, drugs and chemicals, which have been returned from wards, have been spilled or soiled, are out of date or contaminated, or are to be discarded for any reason.

Waste Collection

Collection or transport of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or governmental and non-governmental 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.

Open Burning

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

Cesspit

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

Establishment

An enterprise or part of an enterprise in which one group of goods and services is produced (with the possibility of having secondary activities).

Public Water Network

Is a network of main sub-assembly pipes expanded in the locality for the purpose of population distribution and delivery of potable water.

Wastewater Treatment

Process to render wastewater fit to meet environmental standards or other quality norms. Three broad types of treatment may be distinguished: mechanical, biological, and advanced.

Survey Questionnaire

The environmental questionnaire was designed according to international standards and recommendations for the most important indicators, taking into account the special situation of Palestine. Many visits for economical establishments were made in order to improve the survey tools and to test the questionnaire before implementing the survey; consequently some modifications were made on the questionnaire and on the instructions following the visits.

Stages of designing and checking the questionnaire:

The questionnaire design passed the following steps:

- It was referred to the UN recommendations
- It was referred to PCBS questionnaires in this field such as household environmental survey, industrial environmental survey and. economical environmental survey.
- A draft questionnaire was suggested.
- Finally, a filling questionnaire and editing instructions was prepared.

Data Set Linkage

File Name	Content	Key variable
Main File	Main file data	SEQNO: Establishment Number
Separated Solid Waste	Separated solid waste data	SEQNO: Establishment Number

Target Population

All the Palestinian economic establishments, which included in the Economic Series Survey sample in the Palestinian Territory.

Sample and Frame

Sample Design

The sample is a single-stage stratified cluster random sample. It was 3,458 Palestinian economic establishments distributed according to the economic activities and governorates.

Sample Frame

The sampling frame was based on the Establishments' Census-2007 conducted by PCBS.

Stratification

Three levels of stratification were followed in designing the sample of the economic Survey including:

1. Stratification by Region: the establishments were classified to regions: the West Bank and Gaza Strip
2. Stratification by economic activity.
3. Stratification by employers group.

Estimations Procedure

It is necessary, when calculating the estimations of the survey indicators, to calculate the weights of the establishments. The weight of an establishment is the mathematical inverse of choosing it.

Calculation of Variances

Variance is change from a variable to another, it depends on:

1. The sample size
2. The actual variance for all the population units
3. the sample design

The variance for a number of variables was calculated using CENVAR

The variables that calculated are:

1. standard error
2. Coefficient of variance = $\text{standard error} \times 100\% / \text{estimation}$
3. Effect of sample design
4. 95% confidence interval

Reference Period

Field operations started on 20/04/2008 and lasted until 03/08/2008, the reference period during the data collection process was the last week of the fieldworker existence in the establishment.

Data Collection

Training Fieldworkers

The field workers were trained on the main skills before the start of data collection. The interviewers were trained on the environmental survey by implementing training courses in three locations in the West Bank and one location in Gaza Strip. Instructions for filling the questionnaire were made available for the interviewers. The trainers provided the participants with aims and definitions of the different indicators of the survey and how to fill in the questionnaire.

Data Collection

Field operations started on 20/04/2008 and lasted until 03/08/2008. The fieldwork team consisted of a coordinator and the directors of the fieldwork offices and field workers, and each team consisted of supervisors and five field workers.

Response Rates

The results of responding were divided into the following:

Interview result	Frequency	Percent, %
Completed questionnaires	2,891	83.6
Completely closed	125	3.6
Temporarily closed	24	0.7
Not found unit	25	0.7
Did not practice any activity during the reference period	57	1.6
Refusal	167	4.8
Repeated	12	0.3
Israeli ownership	2	0.1
Others	155	4.5
Total	3,458	100.0

Data Processing

The data processing stage contain of the following operations:

1. Editing before data entry: all questionnaires were edited again in the office using the same instructions adopted for editing in the fields.
2. Data entry: In this stage data were entered into the computer, using Access database. The data entry 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.
 - Maintaining a minimum of digital data entry and fieldwork errors.
 - User-Friendly handling.
 - Possibility of transferring data into another format to be used and analyzed using other statistical analytical systems such as SAS and SPSS.

Data Quality

The concept of data quality consists of many aspects starting from the planning to the survey and on to the publishing method and data analysis. The main principles of statistical quality are accuracy, comparability, and data quality assurance procedures.

Accuracy

It includes many aspects of the survey, mainly 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:

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, and therefore differences appear compared with the actual values that could be obtained through a census. For this survey, variance calculations were made for amounts of water consumed in the economic establishments by region and activity, and the main source of obtaining water in the economic establishments by region and activity.

Table of Variance for Environmental Economic Survey 2008

Variable	Estimate		Standard Error	C.V %	%95 Confidence Interval	
	Unit	Value				
Main source of water in the north of West Bank– Public Water Network	%	72.3	2.3	0.031	67.7	76.5
Consumed water - in the north of West Bank	M ³	1,498,406	354,077	0.236	804,130	2,192,683
Main source of water in the Industrial activities – Public Water Network	%	72.1	1.87	0.026	68.2	75.6
Consumed water in the industrial activities	M ³	1,183,009	234,335	0.198	723,523	1,642,497

Non Sampling Errors

Several measures were adopted to minimize the effects of these errors. The interviewers, editors and coders underwent intensive training and were provided with fieldwork manuals to consult when facing any problem.

The data entry program was designed in a way that allows error detection and correction. This applies particularly to logical errors that might not be discovered before data entry operations. A consistency check was also performed to assure accuracy after data entry.

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; (b) diversity of sources (e.g. the interviewers, respondent, editors, coders, data entry operator, etc).

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 quantities of water consumed and solid waste produced, when the interviewer who answers for the main survey questionnaire is different from the one who answers the re-interview questionnaire.

$$\begin{aligned}\text{None response rate} &= \frac{\text{Sum of none response cases}}{\text{Net sample}} \times 100\% \\ &= \frac{567}{3,458} \times 100\% = 16.4\%\end{aligned}$$

$$\begin{aligned}\text{Response rate} &= 100\% - \text{none response rate} \\ &= 100\% - 16.4\% = 83.6\%\end{aligned}$$

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

$$\begin{aligned}\sum_{ng} wi &\text{ Total weights in g group} \\ \sum_{o.c.g} wi &\text{ Total weights over coverage} \\ \sum_{rg} wi &\text{ Total weights responding in the survey}\end{aligned}$$

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

$$w'gi = wi * fgi$$

Comparability

The data of the environmental economic survey is comparable geographically and against time; the results when comparing the data between different geographical areas and when

comparing the data of this survey with the data of previous rounds were typical and there were no significant differences.

Data Quality Assurance Procedures

Several measures were made to ensure quality control in the survey, such as the training of the fieldworkers on main 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 the establishments. Audit of questionnaires was carried out before data entry, and then a program was used that does not allow any mistakes during the process of data entry. Data was examined to ensure that they were free from errors not previously discovered. After the receipt of the raw data file, cleaning and inspection of the anomalous values was made, and also inspection of the consistency between the different questions on the questionnaire.

Special Technical Notes

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

- Data from the Gaza Strip should be handled carefully because of the economic situation which was dominant there during the implementation of the survey.
- Tables of water quantities (tables 1 and 2), and tables of solid waste quantities (tables 8, 9 and 11) were based on the estimations by respondents.
- The table of solid waste treatment (table 26) was published on the level of the Palestinian Territory because the number of observations was not sufficient for publishing on a level less than the Palestinian Territory level.
- Tables of container volumes (tables 31 and 32), and tables of distance between the establishment and solid waste disposal place (tables 33 and 34) were also based on the respondent estimation.
- In table 36, the category “other” in the Middle of West Bank is slightly high, because the Jerusalem municipality is involved in serving economic establishments in disposing of solid waste in the governorate.