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(972-2) 240 6343 :
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(972-2) 240 6340 :
diwan@pcbs.pna.org :

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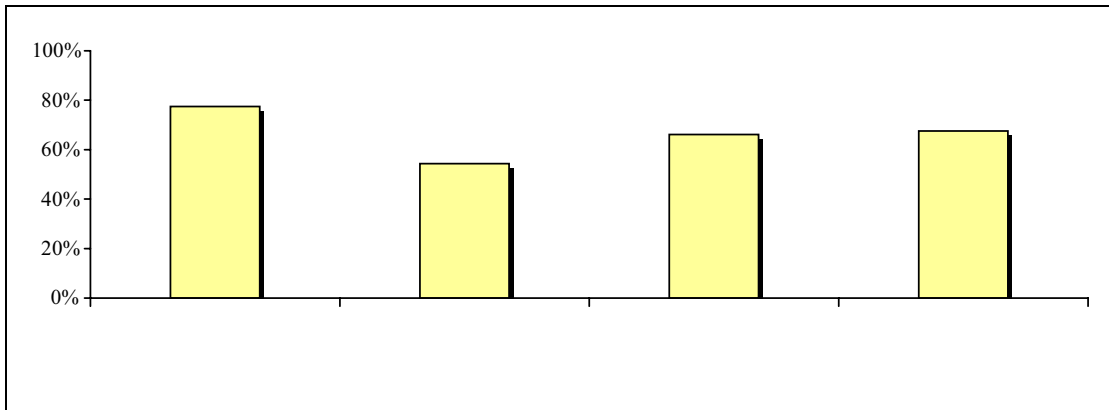
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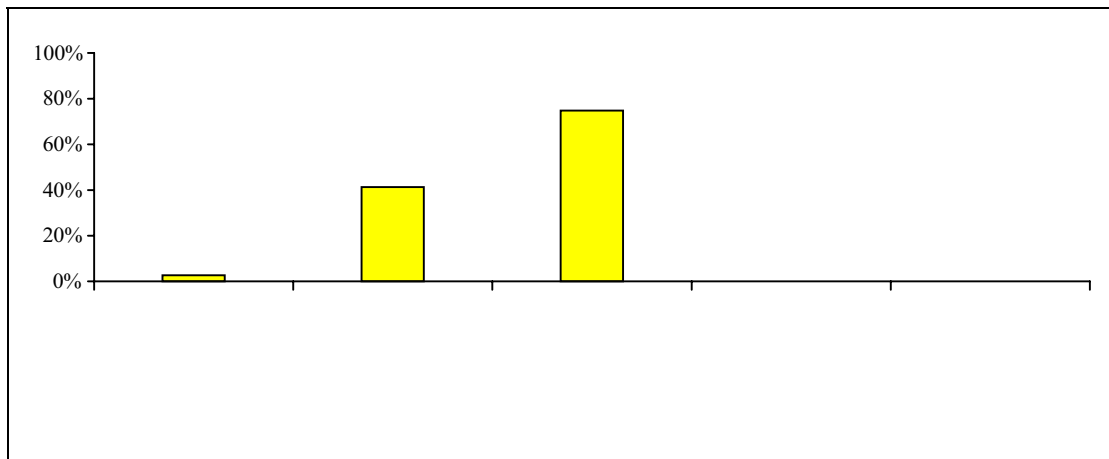
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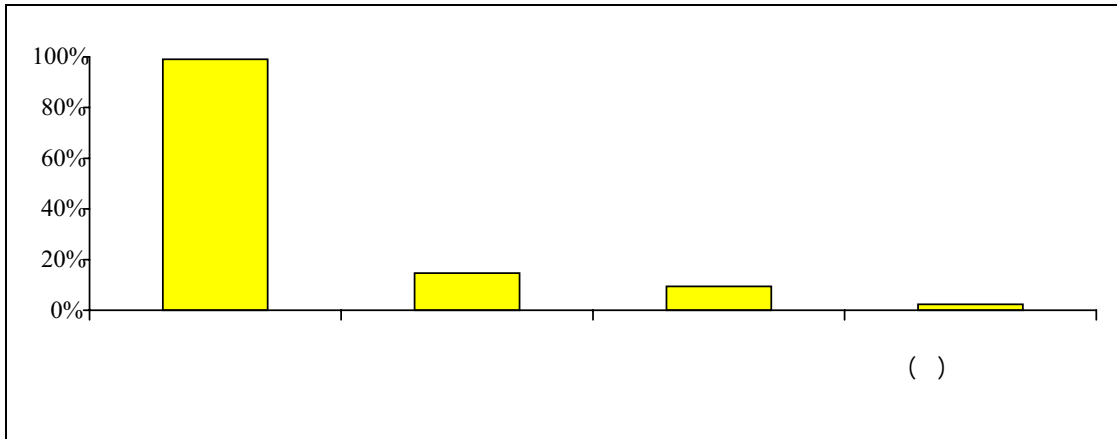
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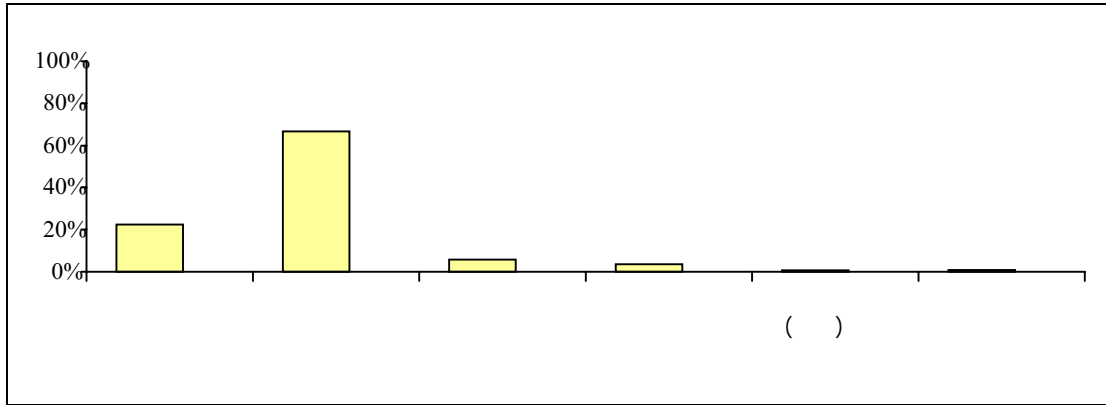
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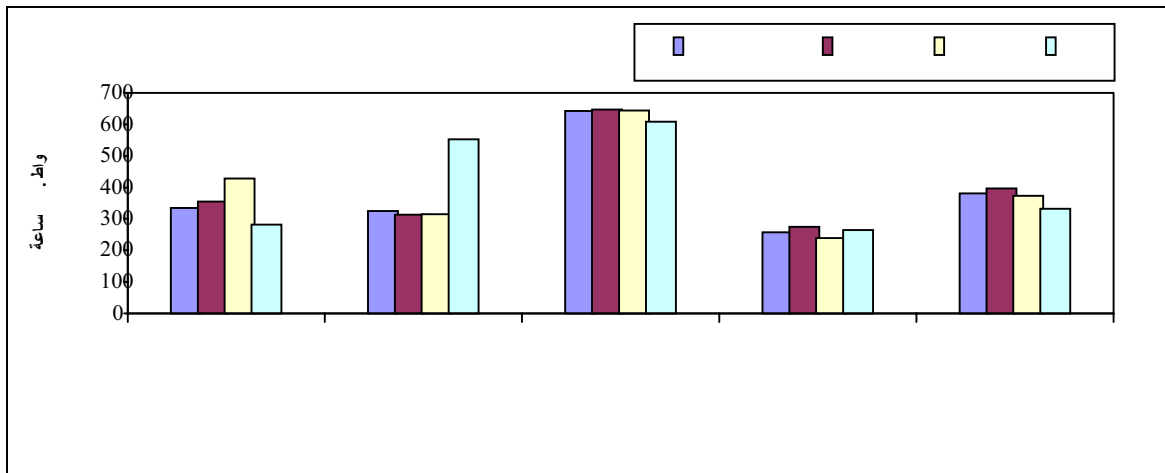
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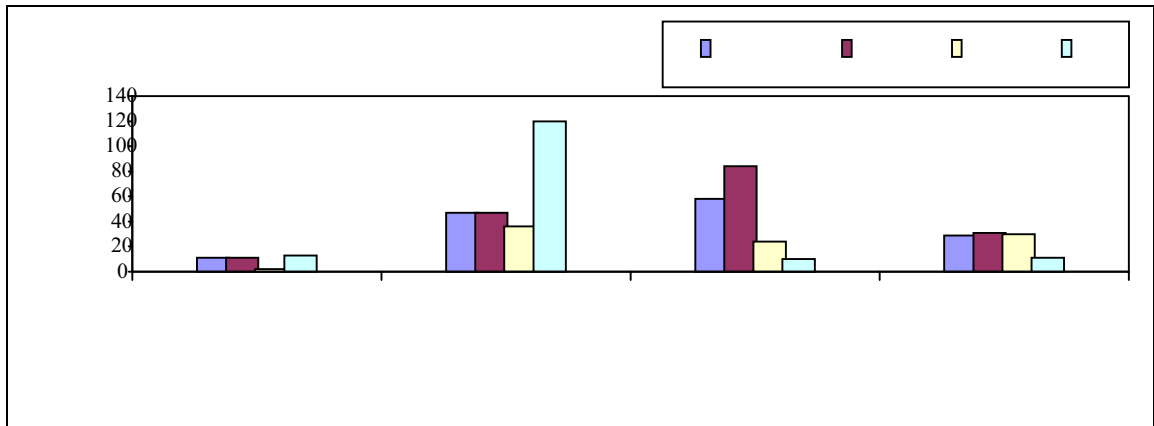
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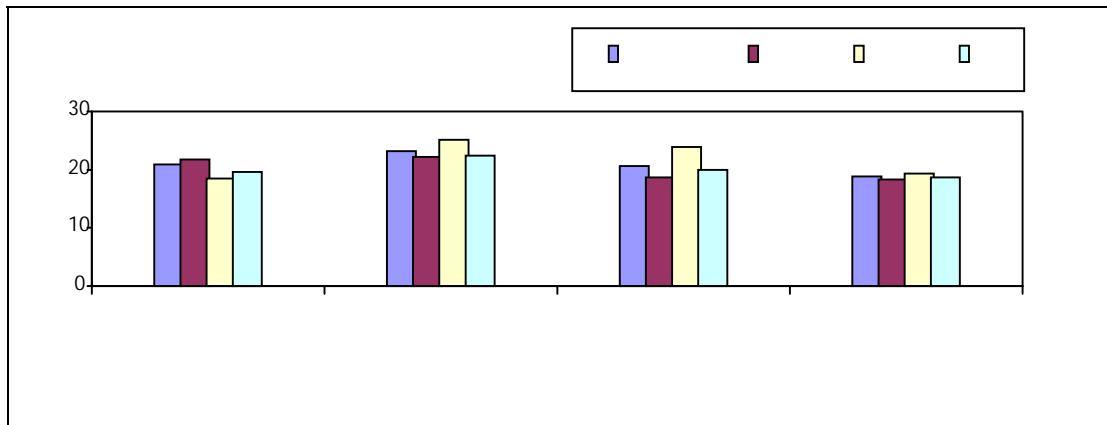


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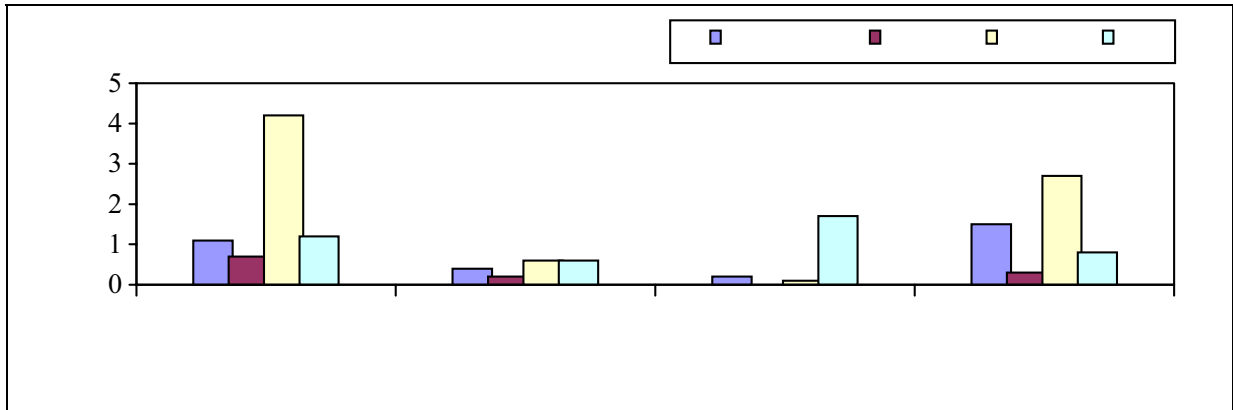


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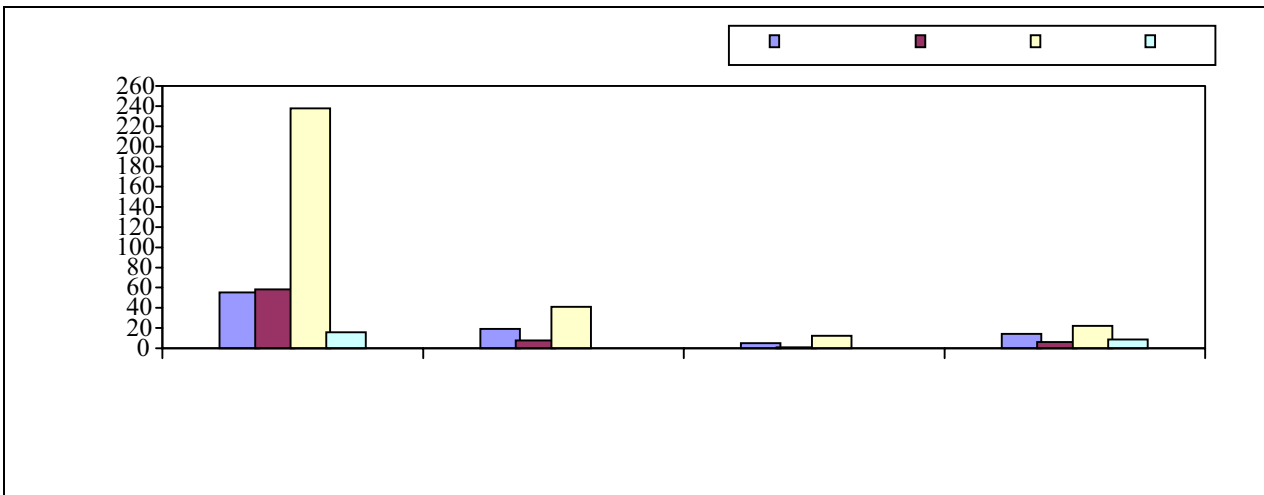
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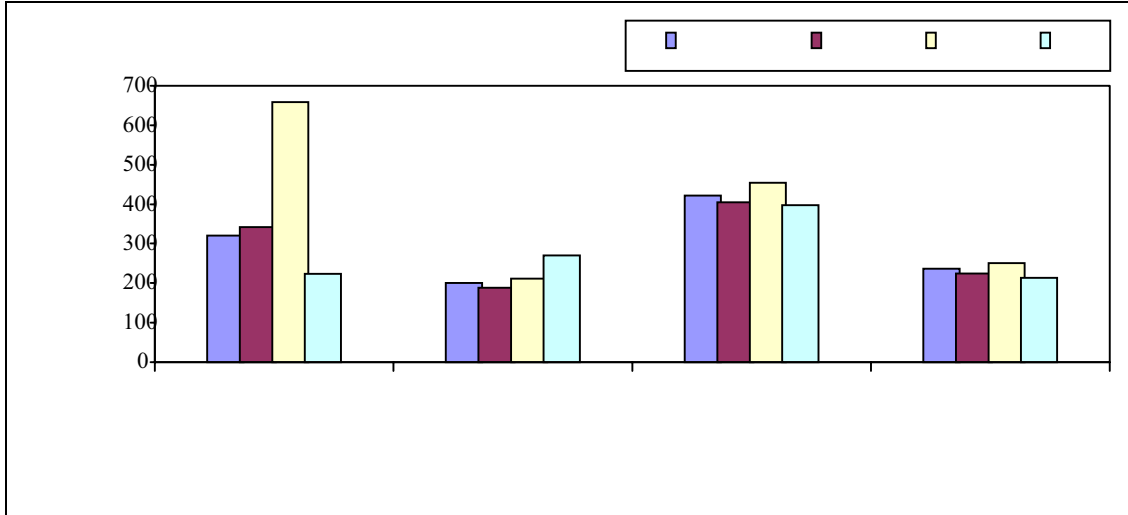
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(y/x)

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$$\hat{Y} = \frac{y}{x} X$$

: A Y

(1).A..... $\hat{Y}_A = \sum \sum \sum W_{hij} Y_{hij}$

: (i) W

(1).B..... $\hat{Y}_A = \sum \sum W_{hi} Y_{hi}$

.A Y = \hat{Y}_A

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(A)

.h (i) j "y" = Y_{hij}

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h" i A y = Y_{Ahi}

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(2)..... $R_A = \frac{\hat{Y}_A}{\hat{X}_A}$

.A X/Y = R_A

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$$\text{(1)}_B \quad A \quad X \quad = \hat{X}_A$$

$$\text{(1)}_B \quad A \quad Y \quad = \hat{Y}_A$$

(Ratios)

(Proportions)

$$\begin{array}{ccc} & 1 & X \\ 1 & & \\ & 1 & 0 \end{array} \quad \begin{array}{ccc} & & Y \\ & & \end{array}$$

: **3.6.4**

(Ultimate Clusters)

$$\begin{array}{ccc} & Y & A \\ & & \\ & & \end{array} \quad ()$$

$$(3) \quad V\left(\hat{Y}_A\right) = \sum_h \left[\frac{n_h}{n_h - 1} \sum_{i=1}^{n_h} \left(\hat{Y}_{Ahi} - \frac{\hat{Y}_{Ah}}{n_h} \right)^2 \right]$$

$$(4) \quad \hat{Y}_{Ahi} = \sum_{j \in A} W_{hij} Y_{hij}$$

$$(5) \quad \hat{Y}_{Ah} = \sum_i \sum_{j \in A} W_{hij} Y_{hij}$$

(3)

$$(6) \quad V\left(\hat{R}_A\right) = \frac{1}{\hat{X}_A^2} \left[V\left(\hat{Y}_A\right) + \hat{R}_A^2 V\left(\hat{X}_A\right) - 2 \hat{R}_A \text{COV}\left(\hat{X}_A, \hat{Y}_A\right) \right]$$

$$\text{COV}\left(\hat{X}_A, \hat{Y}_A\right) = \sum_h \frac{n_h}{n_h - 1} \sum_{i=1}^{n_h} \left(\hat{X}_{Ahi} - \frac{\hat{X}_{Ah}}{n_h} \right) \left(\hat{Y}_{Ahi} - \frac{\hat{Y}_{Ah}}{n_h} \right)$$

$$\begin{aligned}
 & \hat{V}(Y_A) - \hat{V}(X_A) \\
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Tables

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Table 1: Percent Distribution of Households by Region and the Main Electricity Source, July 1999

Region	Main Electricity Source in the Household				
	Total	Others	No Electricity	Private Generation	Public Network
West Bank - North	100	0.1	2.0	1.1	96.8
West Bank - Middle	100	0.0	0.5	0.6	98.9
West Bank - South	100	0.2	0.5	0.1	99.2
Total West Bank	100	0.1	1.1	0.7	98.1
Total Gaza Strip	100	0.7	3.7	0.2	95.4
Palestinian Territory	100	0.3	2.0	0.5	97.2

1999

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Table 2: Percent Distribution of Households by Region and Number of Hours of Electricity Service, July 1999

Region	Number of Hours Electricity Service						
	Total	Electricity Service is Not Available	24 Hours	17-23 Hours	8-16 Hours	Less Than 8 Hours	
West Bank - North	100	0.0	78.9	8.0	8.3	4.8	
West Bank - Middle	100	0.0	99.9	0.0	0.0	0.1	
West Bank - South	100	0.0	98.3	0.2	1.3	0.2	
Total West Bank	100	0.0	91.0	3.3	3.7	2.0	
Total Gaza Strip	100	0.0	97.6	2.3	0.0	0.1	
Palestinian Territory	100	0.0	93.1	3.0	2.5	1.4	

1999

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Table 3: Percent Distribution of Households Using Solar Heater by Region, July 1999

Region	Total	Not Used	Used	
West Bank - North	100	32.4	67.6	
West Bank - Middle	100	33.9	66.1	
West Bank - South	100	45.6	54.4	
Total West Bank	100	36.4	63.6	
Total Gaza Strip	100	22.6	77.4	
Palestinian Territory	100	32.0	68.0	

1999

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Table 4: Percentage of Households Using Space Conditioning Facilities by Conditioning Facility and Region, July 1999

Region	Space Conditioning Facility				
	No Conditioning	Others	Mobile Fan	Fixed Fan	Electrical Conditioner
West Bank - North	0.0	0.0	75.4	42.7	1.6
West Bank - Middle	0.0	0.0	81.4	26.6	8.6
West Bank - South	0.0	0.0	86.0	22.5	0.5
Total West Bank	0.0	0.0	80.1	32.1	3.6
Total Gaza Strip	0.0	0.1	64.9	58.5	1.0
Palestinian Territory	0.0	0.0	74.8	41.3	2.7

1999

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Table 5: Percentage of Households Using Cooking Facilities by Cooking Facility and Region, July 1999

Region	Cooking Facility			
	Wood Burner	Kerosene Burner	Gas Burner	Electrical Oven
West Bank - North	9.3	1.4	98.7	12.3
West Bank - Middle	5.3	0.4	99.4	4.5
West Bank - South	8.0	2.1	99.8	23.5
Total West Bank	7.7	1.3	99.2	12.8
Total Gaza Strip	29.7	4.5	98.7	2.1
Palestinian Territory	14.7	2.3	99.1	9.4

1999

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Table 6: Percent Distribution of Household by the Main Fuel Used for Cooking and Region, July 1999

Region	Main Fuel Used for Cooking							
	Total	Not Available	Others	Wood	Kerosene	LPG	Electricity	
West Bank - North	100	0.2	0.0	0.8	0.4	98.0	0.6	
West Bank - Middle	100	0.1	0.0	0.1	0.0	99.3	0.5	
West Bank - South	100	0.0	0.0	0.5	0.2	99.0	0.3	
Total West Bank	100	0.0	0.1	0.5	0.2	98.7	0.5	
Total Gaza Strip	100	0.1	0.2	3.7	0.3	95.6	0.1	
Palestinian Territory	100	0.1	0.1	1.5	0.2	97.7	0.4	

1999

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Table 7: Percent Distribution of Households by the Auxiliary Fuel Used for Cooking and Region, July 1999

Region	Auxiliary Fuel Used for Cooking						
	Total	Others	No Auxiliary Fuel	Wood	Kerosene	LPG	Electricity
West Bank - North	100	1.5	77.1	9.3	0.6	0.7	10.8
West Bank - Middle	100	1.2	88.7	5.0	0.4	0.2	4.5
West Bank - South	100	9.4	72.1	6.1	0.8	0.5	11.1
Total West Bank	100	3.4	79.5	7.1	0.6	0.5	8.9
Total Gaza Strip	100	0.0	65.5	25.0	2.3	3.3	3.9
Palestinian Territory	100	2.4	75.0	12.7	1.2	1.4	7.3

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Table 8: Percent Distribution of Households by the Main Fuel Used for Water Heating and Region, July 1999

Region	Main Fuel Used for Water Heating						
	Total	Others	Wood	Kerosene	Solar Energy	LPG	Electricity
West Bank - North	100	1.3	3.2	0.7	67.1	22.1	5.6
West Bank - Middle	100	2.1	1.1	0.9	64.8	15.3	15.8
West Bank - South	100	0.2	4.0	0.6	51.9	42.1	1.2
Total West Bank	100	1.2	2.7	0.7	62.4	25.3	7.7
Total Gaza Strip	100	0.3	5.4	0.5	76.3	16.0	1.5
Palestinian Territory	100	0.9	3.6	0.6	66.8	22.4	5.7

1999

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Table 9: Percent Distribution of Households by the Auxiliary Fuel Used for Water Heating and Region, July 1999

Region	Auxiliary Fuel Used for Water Heating							
	Total	Others	No Auxiliary Fuel	Wood	Kerosene	Solar Energy	LPG	Electricity
West Bank - North	100	0.0	92.5	1.4	0.5	0.6	3.0	2.0
West Bank - Middle	100	0.0	95.1	0.3	0.3	1.4	0.7	2.2
West Bank - South	100	0.0	88.5	3.2	0.9	1.3	4.3	1.8
Total West Bank	100	0.0	92.2	1.5	0.5	1.2	2.6	2.0
Total Gaza Strip	100	0.2	68.2	5.9	0.8	0.3	23.6	1.0
Palestinian Territory	100	0.0	84.5	3.0	0.6	0.8	9.4	1.7

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Table 10: Percent Distribution of Households by the Main Fuel Used for Lighting and Region, July 1999

Region	Main Fuel Used for Lighting				
	Total	Others	Kerosene	LPG	Electricity
West Bank - North	100	0.8	1.5	0.9	96.8
West Bank - Middle	100	0.2	0.0	0.4	99.4
West Bank - South	100	0.3	0.2	0.3	99.2
Total West Bank	100	0.5	0.6	0.6	98.3
Total Gaza Strip	100	0.2	3.4	0.3	96.1
Palestinian Territory	100	0.4	1.5	0.5	97.6

1999

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Table 11: Percent Distribution of Households by the Auxiliary Fuel Used for Lighting and Region, July 1999

Region	Auxiliary Fuel Used for Lighting				
	Total	Others	No Auxiliary Fuel	Kerosene	LPG
West Bank - North	100	2.3	89.1	8.1	0.5
West Bank - Middle	100	7.1	92.0	0.6	0.3
West Bank - South	100	0.2	98.6	0.5	0.7
Total West Bank	100	3.2	92.6	3.7	0.5
Total Gaza Strip	100	60.5	22.4	13.8	3.3
Palestinian Territory	100	21.5	70.2	6.9	1.4

1999

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Table 12: Household Average Electricity Consumption by Region and Type of Locality, July 1999

Region and Type of Locality	(.) Average Household Electricity Consumption (kWh)	
West Bank-North	257.4	
Urban	275.3	
Rural	239.5	
Refugee Camps	264.2	
West Bank-Middle	643.1	
Urban	647.0	
Rural	644.0	
Refugee Camps	609.0	
West Bank-South	325.1	
Urban	313.8	
Rural	315.1	
Refugee Camps*	/	*
Gaza Strip	334.8	
Urban	355.7	
Rural	428.4	
Refugee Camps	282.5	
Palestinian Territory	380.1	
Urban	396.0	
Rural	374.1	
Refugee Camps	332.3	

* : Number of observation is small

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Table 13: Average Electricity Consumption Per Capita in Household Sector by Region and Type of Locality, July 1999

Region and Type of Locality	(.) Average Electricity Consumption Per Capita (kWh)	
West Bank-North	43	
Urban	46	
Rural	40	
Refugee Camps	44	
West Bank-Middle	105	
Urban	106	
Rural	105	
Refugee Camps	99	
West Bank-South	49	
Urban	47	
Rural	47	
Refugee Camps*	/	*
Gaza Strip	49	
Urban	52	
Rural	63	
Refugee Camps	41	
Palestinian Territory	59	
Urban	62	
Rural	58	
Refugee Camps	52	

*: Number of observation is small

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Table 14: Household Average Consumption of Petroleum Products and Wood by Region and Type of Locality, July 1999

Region and Type of Locality	Average Consumption Per Capita of Petroleum Products and Wood			
	Wood	LPG	Kerosene	Gasoline
West Bank-North	14.2	18.8	1.5	29.0
Urban	6.1	18.3	0.3	31.0
Rural	22.2	19.3	2.7	30.0
Refugee Camps	8.6	18.7	0.8	11.0
West Bank-Middle	4.8	20.6	0.2	58.0
Urban	1.0	18.7	0.0	84.0
Rural	12.2	23.9	0.1	24.0
Refugee Camps	0.0	20.0	1.7	10.0
West Bank-South	19.1	23.2	0.4	47.0
Urban	7.6	22.2	0.2	47.0
Rural	40.9	25.1	0.6	36.0
Refugee Camps	/	/	/	/
Gaza Strip	55.1	20.9	1.1	11.0
Urban	58.4	21.8	0.7	11.0
Rural	237.8	18.5	4.2	2.0
Refugee Camps	15.7	19.6	1.2	13.0
Palestinian Territory	26.0	21.0	1.0	32.0
Urban	24.0	20.0	0.0	39.0
Rural	37.0	22.0	2.0	28.0
Refugee Camps	12.0	20.0	1.0	18.0

* : Number of observation is small

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All quantities in liters except LPG and wood in Kg

Table 15: Average Consumption Per Capita of Petroleum Products and Wood in Household Sector by Region and Type of Locality, July 1999

Region and Type of Locality	Average Consumption Per Capita of Petroleum Products and Wood				
	Wood	LPG	Kerosene	Gasoline	
West Bank-North	2.3	3.2	0.2	5.0	
Urban	1.0	3.0	0.0	5.1	
Rural	3.7	3.2	0.5	5.0	
Refugee Camps	1.5	3.2	0.2	1.8	
West Bank-Middle	0.8	3.4	0.0	9.4	
Urban	0.2	3.1	0.0	13.7	
Rural	2.0	3.9	0.0	3.9	
Refugee Camps	0.0	3.3	0.3	1.6	
West Bank-South	2.8	3.4	0.0	7.0	
Urban	1.2	3.3	0.0	7.1	
Rural	6.1	3.7	0.1	5.4	
Refugee Camps*	/	/	/	/	*
Gaza Strip	8.1	3.1	0.1	1.6	
Urban	8.5	3.2	0.1	1.6	
Rural	34.9	2.6	0.5	0.3	
Refugee Camps	2.3	2.9	0.1	1.9	
Palestinian Territory	4.1	3.3	0.2	5.1	
Urban	3.7	3.1	0.0	6.1	
Rural	5.8	3.4	0.3	4.3	
Refugee Camps	1.9	3.1	0.2	2.9	

* : Number of observation is small

All quantities in liters except LPG and wood in Kg

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Table 16: Average Household Expenditure on Energy Types by Region and Type of Locality, July 1999

Region and Type of Locality	() Average Household Expenditure on Energy Types (NIS)				
	Total Average Expenditure	LPG	Kerosene	Wood	Electricity
West Bank-North	237	37	2	25	173
Urban	225	36	0	12	177
Rural	251	38	4	39	170
Refugee Camps	213	36	1	6	170
West Bank-Middle	422	45	0	10	367
Urban	405	44	0	4	357
Rural	454	48	0	20	386
Refugee Camps	398	42	2	0	354
West Bank-South	200	45	1	12	142
Urban	188	43	0	6	139
Rural	211	49	1	23	138
Refugee Camps*	/	/	/	/	/
Gaza Strip	321	43	2	86	190
Urban	342	40	1	91	210
Rural	659	35	6	331	287
Refugee Camps	224	52	2	30	140
Palestinian Territory	298	42	1	39	216
Urban	301	40	1	38	222
Rural	320	42	3	49	226
Refugee Camps	245	48	2	22	173

* : Number of observation is small

.*

All quantities in liters except LPG and wood in Kg



Palestinian Central Bureau of Statistics

Household Energy Survey: Main Results (July – September 1999) Round

January, 2001

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Preface

Most countries pay special attention for providing statistics on energy due to the important role of energy in reflecting the situation of the infrastructure, economic situation and the level of living standards of a society. In Palestine, additional special attention is given due to the shortage of natural resources, the high cost of energy and the high population density. All these factors create a need for comprehensive and high quality statistics on this field of study.

In spite of the attention for providing statistical data on household activities which were found to be the highest energy consuming sector, PCBS decided to cover all these needs by conducting a special household energy survey that provides high quality data about energy consumption, cost and behavior of this important sector.

PCBS is very pleased to introduce This survey which was conducted in parallel to the Labor Force Survey during the period from 24/8/1999 to 7/10/1999.

This report is one of the energy statistical reports that PCBS plans to publish. This report covers all data available from the households about consumption of energy types, energy cost, energy consumption appliances and the final use of the different types of energy during July 1999.

PCBS hopes that the results of this report will contribute to provide necessary data needed for developing energy situation in households and raising the consumption efficiency. Also, PCBS hopes that this report will contribute to bridge the data gap of energy statistics and to provide useful data for the main data users.

April, 2001

**Hasan Abu-Libdeh, Ph.D.
President**

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Executive Summary

1. Introduction

Energy is considered of a great importance due to its role in reflecting the country's economy, the people's welfare and their living standards. Also, energy data reflects the infrastructure situation.

In 1996, PCBS established an energy statistics program in order to develop a national plan for energy statistics and to provide data about energy in the Palestinian Territory. Taking into consideration the international recommendations of the United Nations in the field of energy and the special situation of the Palestinian Territory, energy indicators were formulated through a user-producer dialogue workshop held in March 1998. In December 1999, a publication concerned with energy consumption in Palestinian territory for 1996 was prepared.

Because of the importance of the household sector and due to its large contribution to energy consumption in the Palestinian Territory, PCBS decided to conduct a special household energy survey to cover energy indicators in the household sector. To achieve this, a questionnaire was attached to the Labor Force Survey.

This survey aimed to Provide data on energy consumption in the household sector and to Provide data on energy consumption behavior in the society by type of energy, as well as data on household expenditure on energy.

2. Concepts and Definitions

This chapter presents the main concepts and definitions used to derive the main indicators of energy consumption from different sources. These concepts and definitions are based on international recommendations in the field of energy statistics.

The main concepts and expressions mentioned in this report were as follows:

Household	One or group of persons living together who make common provision for food or essentials for living. Household members may be related, unrelated or a combination of both.
Fuel:	Any matter used for producing energy via thermal, chemical or nuclear interaction.
Crude Petroleum:	Mineral oil comprising a mixture of carbohydrates with a changing density and qualitative gravity.

Petroleum Products:	Involves liquid oil, lubrication oil, solid and semisolid products obtained via filtration or fracture of crude petroleum or rocky oil.
Gasoline:	Gasoline is a hydrocarbon fuel used mainly in internal- combustion engines. This fuel is obtained via filtration of crude oil. The quality of this type of fuel is measured by the octane number (from 0 to 100), which points to its resistance of early burning. This number is obtained by comparing the performance of its resistance of early burning with a mixture of C^7H^{16} and C^8H^{18} . For instance, the performance of “Gasoline 95” equals the performance of a mixture of 95% C^8H^{18} and 5% C^7H^{16} .
Diesel:	Diesel is a hydrocarbon fuel mainly used in several types of internal- combustion engines and furnaces. This fuel is obtained via filtration of crude oil.
Liquefied Petroleum Gas (LPG):	It is mainly used in heating as well as a fuel in some types of engines and as a raw material for chemical industries. Usually it is marketed in cylinder metallic packages. This gas is comprised of a mixture of gases, e.g. C^3H^8 and C^4H^{10} . It is obtained from natural gas or by fracture of crude petroleum.
Kerosene:	Kerosene is a hydrocarbon fuel used mainly as a heating fuel and in planes internal- combustion engines. It is also used as a dissolvent and thinner. This fuel is obtained by partial filtration of crude oil.
Wood:	Refers to all wood used in rough used for fuel purposes.
Household Consumption	Consumption by Households in the different activities within Households (Heating, Cooking, Lighting, Water Heating and other activities)
Electric Energy:	Work done to move an electric charge in a conductor. It is measured in kilowatt-hour. Electric Energy = Power (kW) X Time (Hours).
International System of Units:	The International System of Units involves seven basic units, each of which has specific definition. It is possible to derive all remaining units from these basic seven units. It is common to use prefixes to indicate related representations and parts of the system. The following table presents the basic units of the International System of Units.

The Basic Units of the International System of Unit:

Quantity	Name	Symbol
Length	Meter	m
Mass	Kilogram	kg
Time	Second	S
Electric Current	Ampere	A
Thermodynamic Degree	Kelvin	K
Lighting Density	Candela	cd
Quantity of Matter	Mole	Mole

Standard Units in the Field of Energy:

Standard Barrel of Petroleum Unit: Volume Unit. 1 barrel = 6.29/1 m³

Joule Unit: Energy unit, it is defined as the energy resulting from the movement of a one-Newton body to a distance of one meter. 1 Joule = 1 Newton. m.

British Thermal Unit: Energy unit, 1 British Thermal Unit = 1055 Joules.

Watt Unit: Capacitance unit, a Watt is defined as the average exerted power per second.

$$1 \text{ Watt} = 1 \text{ Joule} / \text{second}$$

Horsepower Unit: Capacitance unit, 1Horsepoer = 744.44 Watts.

Calorie Unit: Energy unit, a calorie is defined as the power resulting from rising the temperature of 1 gm by 1 C°. 1 Calorie = 4.1868 Joules.

Kilo Watt-Hour: Energy unit, a 1 kWh-H = 1000 × 3600 Second
= 3.6 × 10⁶ Watt-second
= 3.6 Megawatt

Other prefixes are used for referring to this unit, e.g. Giga, which equals 10⁹.

Metric Ton Unit:	Mass unit, a Metric ton = 1000 kg.
Newton Unit:	Capacitance (weighing) unit, a Newton is defined as the power gained from the acceleration of a mass weighing 1-kg for 1 meter per second.
Equivalent Metric Ton of Petroleum:	Energy unit, an Equivalent Metric Ton of Petroleum is defined as the energy resulting from burning one ton of petroleum. Due to having many types of petroleum, it was fixed on a certain value. A Metric Ton of Petroleum = 41.9 Giga Joule = 10 Giga Calorie = 1.43 metric ton of coal = 1200 m ³ metric ton of natural gas = 7 barrels of petroleum = 39.68 Mega of British Thermal Unit
Energy Conversion Factors:	For energy calculations, it is useful to convert quantities from original units into a common unit for the purpose of aggregating diverse energy sources. The coefficient used for this conversion is called a conversion factor.

3. Main Findings

This chapter presents the main findings of the household energy survey. These results were divided into five sections. The first section introduces the results related to energy sources in the domestic sector during July 1999 while the second introduces the results related to the facilities used in space heating and cooking.

The third section presents the use purposes of energy types in the different activities in the households. The fourth presents the household and per capita consumption of the different energy types while the fifth presents the household expenditure on energy types during July 1999.

3.1 Energy Sources

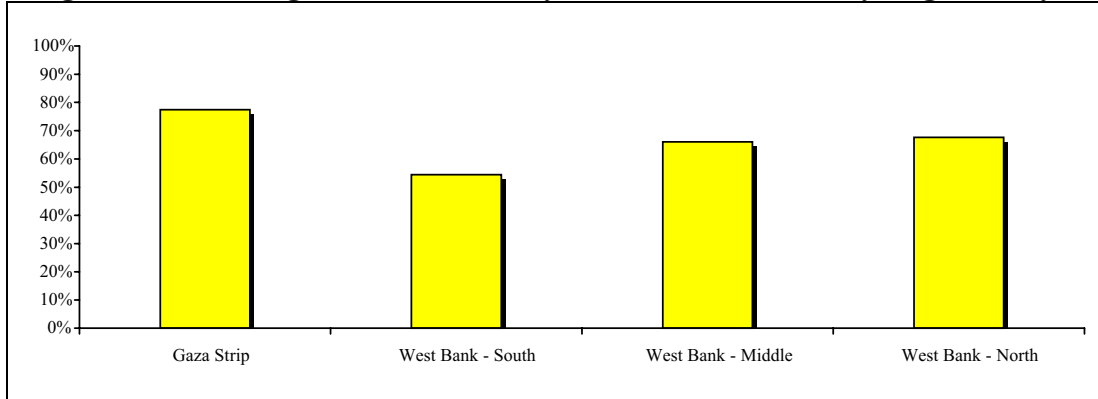
3.1.1 Electricity

The main results of the survey indicate that 97.2% of the Palestinian households are connected to the public electricity network while 2.0% have no electricity services while 0.5% of the Palestinian households depend on private generation to cover electricity needs. From the results, it is noted that Gaza Strip region has the lowest percentage of households connected to an electricity network 95.4% and the highest percentage of no electricity services 3.7%. The situation is different in West Bank-South which has 99.2% of the households connected to an electricity network and 0.5% having no electricity services. (*See Table 1*)

3.1.2 Solar Energy

The main results of the survey indicate that 68.0% of the Palestinian households are utilizing solar energy by using solar energy heaters. It is noted that this percentage differs within the Palestinian regions. It was about 77.4% in Gaza Strip and 54.4% in West Bank –South. (Table 3 and Figure 1)

Figure 1: Percentage of Households by Use of Solar Heater by Region, July 1999



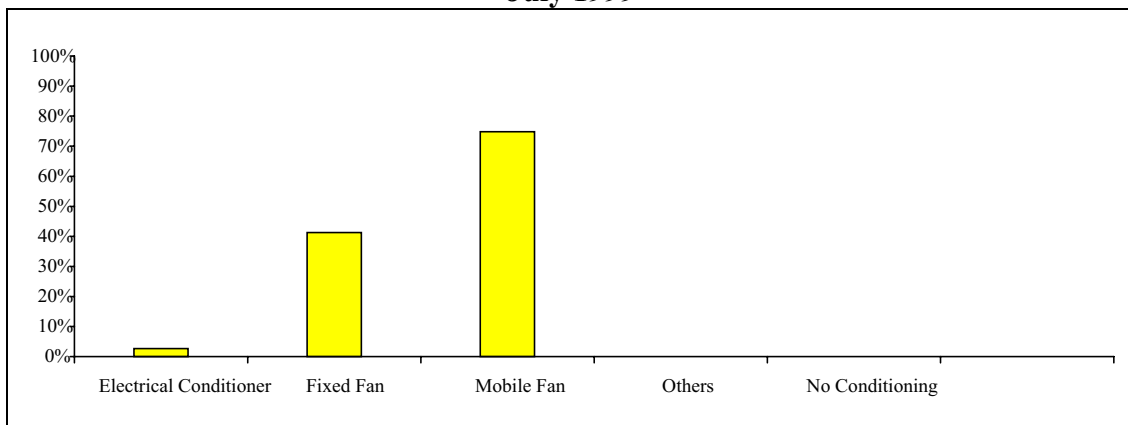
3.2 Energy Consumption Facilities

This section introduces the results on the use of space conditioning and cooking facilities inside the households.

3.2.1 Space Conditioning Facilities

The main results of the survey indicate that 2.7% of the Palestinian households have used electrical conditioner for the purpose of space conditioning, 41.3% of the households used fixed fan, 74.8% of the households used mobile fan, no households didn't use space conditioning facilities in Palestinian Territory. (Table 4 and Figure 2)

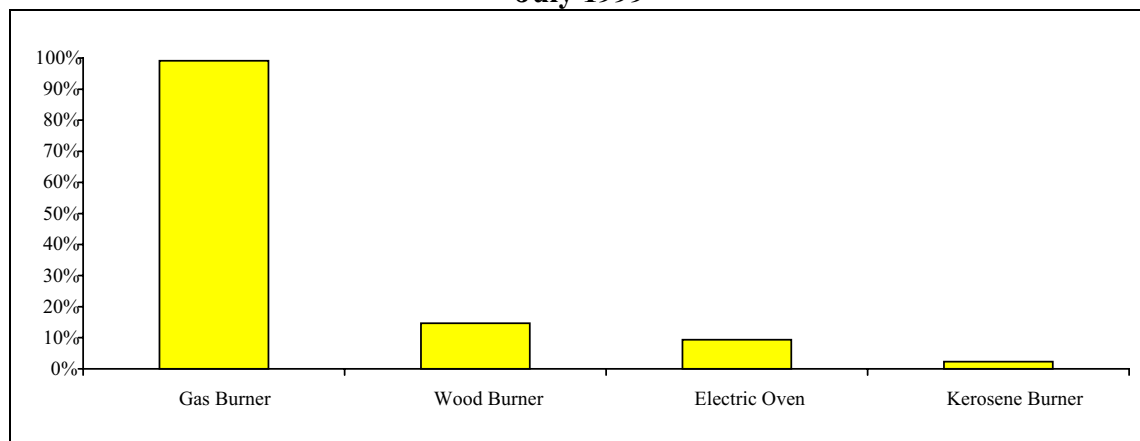
Figure 2: Percentage of Households by Use of Conditioning Facilities, July 1999



3.2.2 Cooking Facilities

The main results of the survey indicate that 99.1% of the Palestinian households have used gas burner for the purpose of preparing food (cooking), 14.7% of the households used wood burner, 9.4% of the households used electric oven while 2.3% used kerosene burner. (Table 5 and Figure 3)

Figure 3: Percentage of Households by Use of Cooking Facilities, July 1999



3.3 Energy Uses

This section presents the uses of energy types in different household activities during July 1999, also the main and secondary fuels used for the different energy activities in the households are mentioned.

3.3.1 Cooking

The main results of the survey indicate that 97.7% of the Palestinian households depend on petroleum gas as a main fuel for preparing food (cooking), 1.5% of the households depend on wood as a main fuel, 0.2% households depend on kerosene as a main fuel, 0.4% households depend on electricity as a main fuel, 0.1% others type of energy and 0.1% households didn't have main fuel. (Table 6)

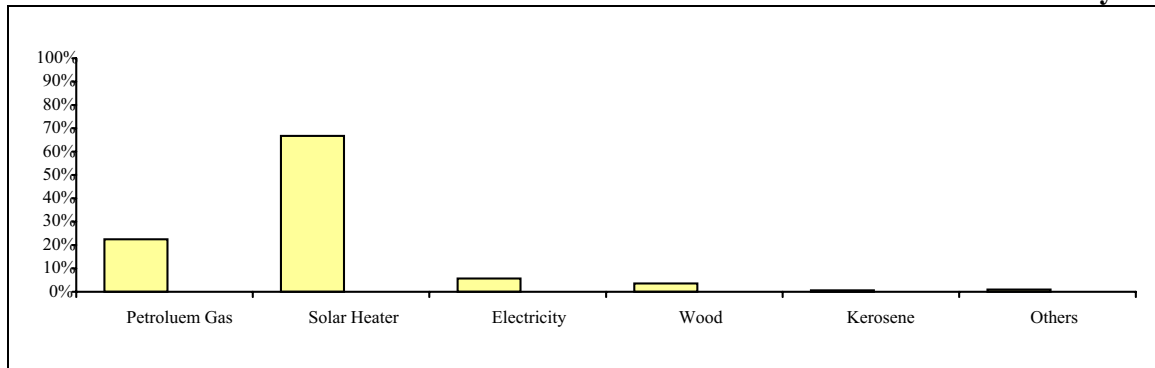
Also, the results indicate that 75.0% of the Palestinian households have no auxiliary fuel for preparing food (cooking), 12.7% of the households depend on wood as an auxiliary fuel, 7.3% households depend on electricity as an auxiliary source, 1.2% of households depend on kerosene, 1.4% depend on petroleum gas and 2.4% depends on other types of energy. (Table 7)

3.3.2 Water Heating

The main results of the survey indicate that 22.4% of the Palestinian households depend on petroleum gas as a main fuel for water heating, 66.8% % of the Palestinian households depend on solar heaters as a main source for water heating, 5.7% of the households depend on electricity as a main source, 3.6% of the households depend on wood as a main fuel, 0.6% of

the households depend on kerosene as a main fuel and 0.9% households depend on other types of fuels (Table 8 and Figure 4).

Figure 4: Percent Distribution of Households by Main Fuel Used in Water Heating: July 1999



Also, the results indicate that 84.5% of the Palestinian households have no auxiliary fuel for water heating, 9.4% of the households depend on petroleum gas as an auxiliary source, 0.8% of households depend on solar heaters wood as an auxiliary fuel, 3.0% households depend on wood as an auxiliary fuel, 1.7% of households depend on electricity, 0.6% depend on kerosene and there aren't depend on other types of fuels (Table 9).

3.3.3 Lighting

The main results of the survey indicate that 97.6% of the Palestinian households depend on electricity as a main source for lighting, 1.5% of the households depend on kerosene as a main source, 0.5% households depend on petroleum gas as a main source for lighting and 0.4% households depend on other types of fuels (Table 10).

Also, the results indicate that 70.2% of the Palestinian households have no auxiliary fuel for lighting, 6.9% of the households depend on kerosene as an auxiliary source, 1.4% households depend on petroleum gas as an auxiliary fuel and 21.5% of the households depend on other types of fuels (Table 11).

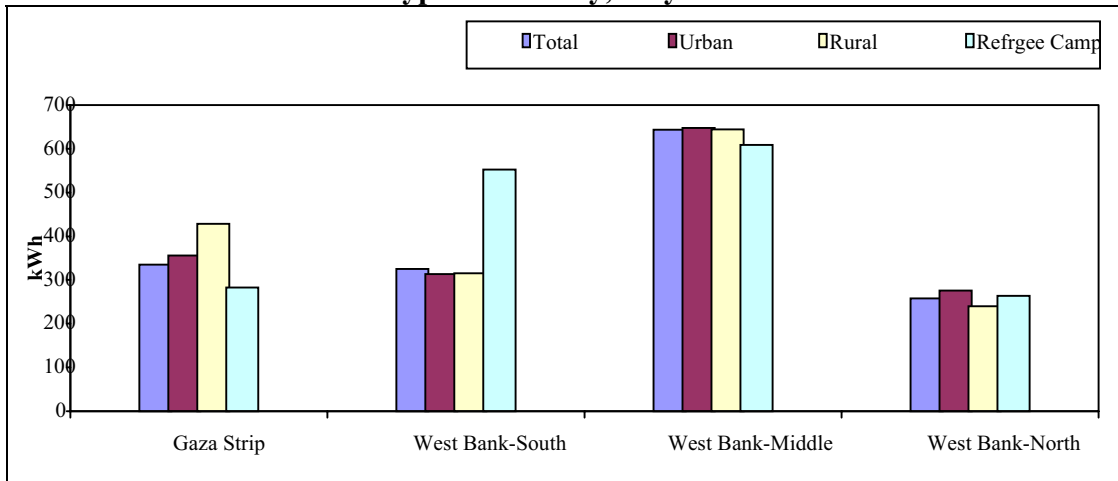
3.4 Energy Consumption

This section presents the main results related to household, per capita and total consumption of the different types of energy used in Palestinian Territory during July 1999.

3.4.1 Electrical Energy Consumption

The main findings of the survey indicate that the average household electricity consumption in the Palestinian Territory during July 1999 was 380.1 KWh. This average ranges by region and Type of Locality. It reached 643.1 kWh in West Bank-Middle and didn't extend 257.4 kWh in West Bank-North. This average was about 396.0 kWh in urban regions and 332.3 kWh in refugee camps (Table 12 and Figure 5).

Figure 5: Average Household Electricity Consumption by Region and Type of Locality, July 1999



Also, the main findings indicate that the average per capita electricity consumption in the Palestinian Territory during July 1999 was 59 kWh. It reached 105 kWh in West Bank-Middle and didn't extend 43 kWh in West Bank – North (Table 13).

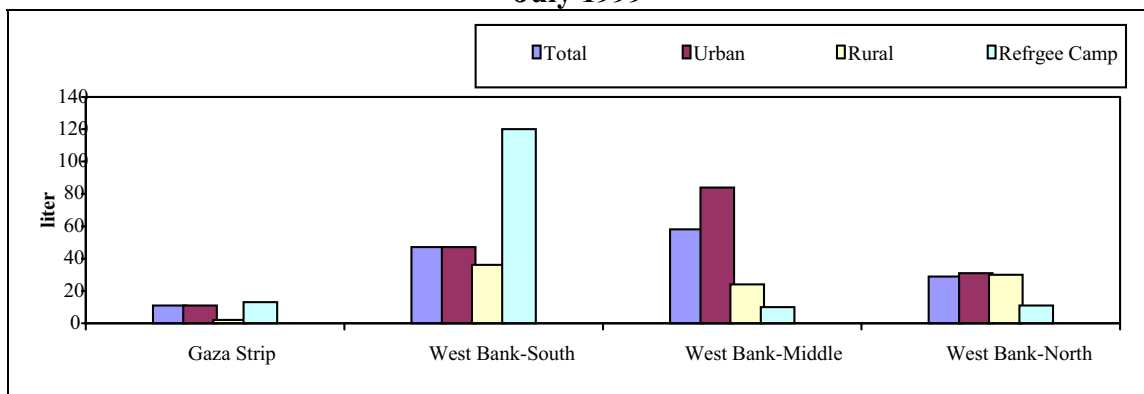
3.4.2 Petroleum Products and Wood Consumption

This part presents the main findings related to main petroleum products and wood consumption in households in the Palestinian Territory during July 1999.

Gasoline Consumption:

The main findings of the survey indicate that the average household gasoline consumption in the Palestinian Territory during July 1999 was 32 liters. This average ranged by region and Type of Locality. It reached 58 liters in West Bank-middle and didn't extend 11 liters in Gaza Strip. This average was about 39 liters in urban regions, 28 liters in rural regions and 18 liters in refugee camps

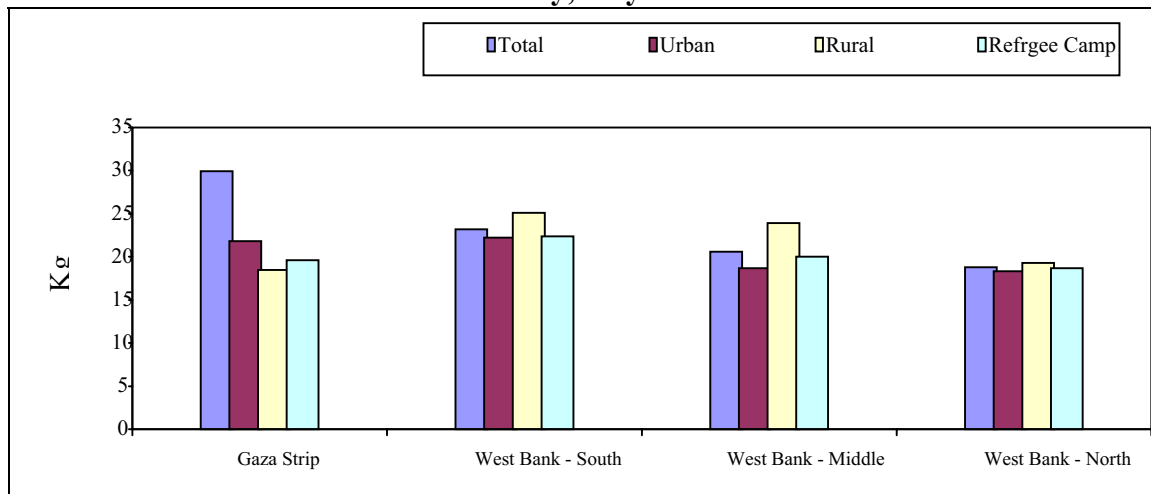
Figure 6: Average Household Gasoline Consumption by Region and Type of Locality, July 1999



Petroleum Gas Consumption:

The main findings of the survey indicate that the average household petroleum gas consumption in the Palestinian Territory during July 1999 was 21 kg. This average ranges by region and Type of Locality. It reached 23.2 kg in West Bank-South and didn't extend 18.8 kg in West Bank- North. This average was about 20 kg in urban regions, 22 kg in rural regions and 20 kg in refugee camps. (Table 14 and Figure 7)

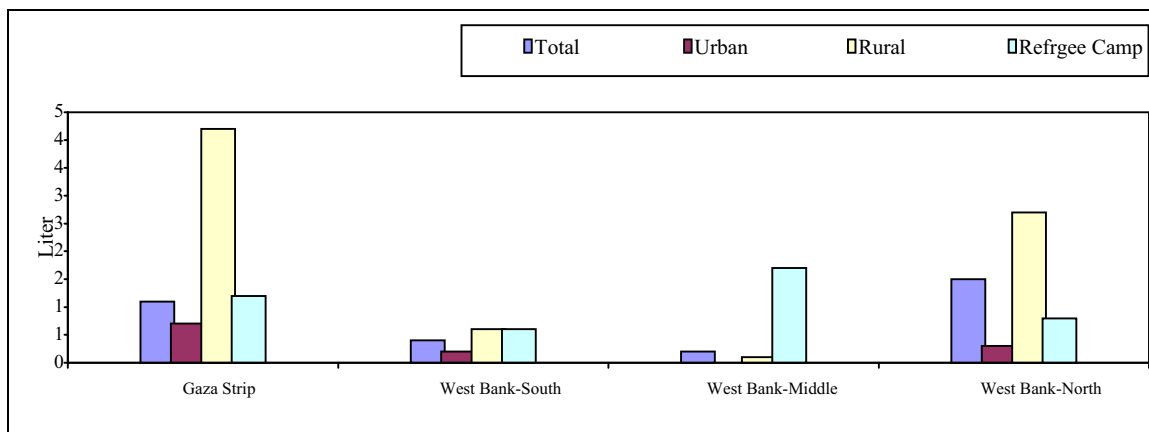
Figure 7: Average Household Petroleum Gas Consumption by Region and Type of Locality, July 1999



Kerosene Consumption:

The main findings of the survey indicate that the average household kerosene consumption in the Palestinian Territory during July 1999 was one liter. This average ranges by region and Type of Locality. It reached 1.5 liters in West Bank-North and didn't extend 0.2 liters in West Bank-Middle. This average was about 2.0 liters in rural region and no consumption in urban Regions (Table 14 and Figure 8).

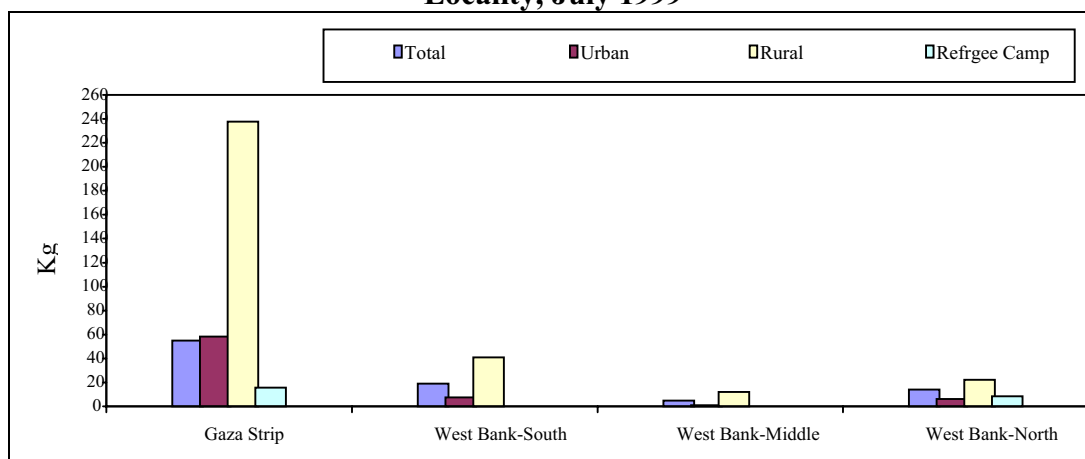
Figure 8: Average Household Kerosene Consumption by Region and Type of Locality, July 1999



Wood Consumption:

The main findings of the survey indicate that the average household wood consumption in the Palestinian Territory during July 1999 was 26 kg. This average varied depending on region and Type of Locality. It reached 55.1 kg in Gaza Strip and didn't extend 4.8 kg in West Bank-Middle. This average was about 24 kg in urban regions 37 kg in rural regions and 12 kg in refugee camps (Table 14 and Figure 9).

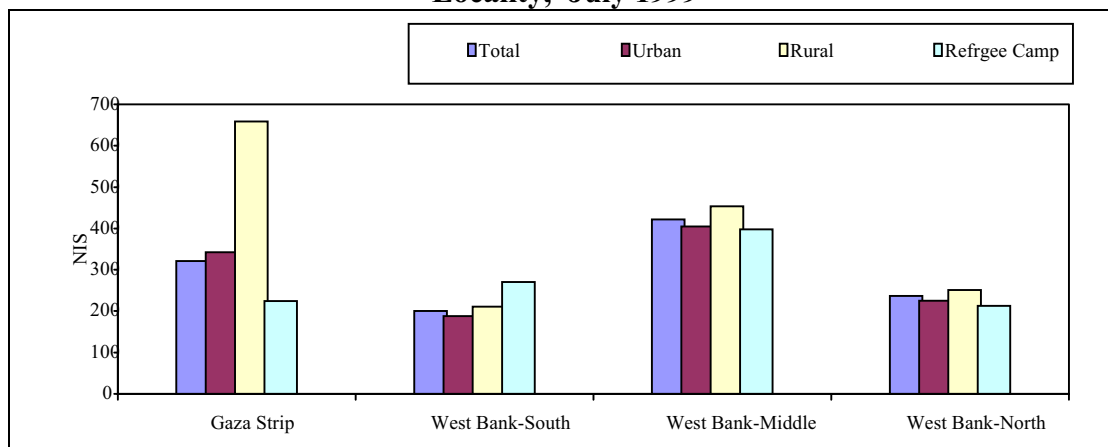
Figure 9: Average Household Wood Consumption by Region and Type of Locality, July 1999



3.5 Expenditure on Energy

The main findings of the survey indicate that the average household expenditure on energy types in the Palestinian Territory during July 1999 was 298 NIS. This expenditure was composed of 216 NIS for electricity, 39 NIS for Wood, 42 NIS on petroleum gas and 1 NIS for kerosene. This expenditure ranged by region, Type of Locality and household size. It reached 422 NIS in West Bank-Middle and didn't extend 237 NIS in West Bank-North. This expenditure was about 301 NIS in urban regions, 320 NIS in rural and 245 NIS in refugee camps (Table 16 and Figure 10).

Figure 10: Average Household Expenditure on Energy by Region and Type of Locality, July 1999



4. Methodology

This section presents a documentation of the main characteristics of the methodology used in preparing this report.

4.1 Questionnaire

The energy 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.

4.2.1 Target Population

All Palestinian households living within the Palestinian Territory.

4.2.2 Sampling Frame

Sampling frame is a master sample from the Population, Housing and Establishment Census 1997. It consists of a list of enumeration areas, which were used as PSU's in the first stage of selection.

4.2.3 Sampling Design

The sample of this survey is a sub-sample of the sample of the Labour Force Survey (LFS) that is conducted every 13 weeks. The total sample of LFS is about 7,500 households distributed over 13 weeks. The sample of the Household Energy Survey occupies six weeks of the twelfth round of LFS.

Stratification:

In designing the sample of LFS, four levels of stratification were made:

1. Stratification by governorate.
2. Stratification by place of residence which comprises:
(a) Urban (b) Rural (c) Refugee camps
3. Stratification by locality size.
4. Stratification by classifying localities, excluding governorate capitals, into three strata based on the ownership of households within these localities of durable goods.

Sample Unit:

In the first stage, the sampling units are the enumerator areas (clusters) in the master sample. In the second stage, the sampling units are households.

Analysis Unit:

Analysis units are composed of households.

Sample Size:

The sample size is of (4074) Palestinian households in West Bank and Gaza Strip, where this sample has been distributed according to the locality by (1906) households in urban areas, (1447) households in rural areas and (720) households in refugee camps.

4.3 The Pre-Test

Because of the privacy of the Household Energy Survey, and to test the questionnaire and the survey tools, a pre-test survey was conducted in West Bank. The sample size of this pre-test was 102 households (48 households in West Bank-North and 54 in west Bank-Middle). Data was collected by 9 fieldworkers after training them on the methodology of questionnaire collection. Pre-test results and fieldworkers notes were taken in consideration in designing the final questionnaire of the survey. Also, results indicated that the survey tools were appropriate except for ambiguity of the terms used. It was also found that the Palestinian households were cooperative with the fieldworkers.

4.4 Field work

4.4.1 Training Field Workers

Fieldworkers were trained on the main skills before the start of data collection. The interviewers were trained on the Household Energy Survey by implementing the training course in Ramallah for 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.

4.4.2 Data Collection

Field operations started on 24/8/1999 and lasted until 7/10/1999. 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.

4.5 Data Processing

The data processing stage consisted of the following operations:

- 1 Editing and coding before data entry: All questionnaires were edited and coded in the office using the same instructions adopted for editing in the field.
- 2 Data entry: At this stage, data was entered into the computer using a data entered template written in BLAISE. The data entry program was prepared to satisfy a number of requirements such as:
 - Duplication of the questionnaires on the computer screen.
 - Logical and consistency check of data entered.
 - Possibility for internal editing of question 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 analytic systems such as SAS and SPSS.

5. Data Quality

This section provides important notes concerning the statistical quality of the data. This includes data quality as compiled from different activities in this survey. Also, this section includes main technical notes for the main results of Household Energy Survey.

Sampling Errors:

These types of errors evolved as a result of studying a part of the society and not all of it. For this survey, variance calculations were made for average household consumption and total consumption for the different types of energy in the Palestinian Territory as shown in Table 23 and Table 24. After studying these results. It is important to note that the variance for wood and kerosene consumption is relatively high so all corresponding data must be treated carefully.

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 (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 couldn't meet them.
2. Some of the households may underestimate the questionnaire.
3. Some errors occurred due to the way the questions were asked by interviewers.
4. Misunderstood of the questions by the respondents.
5. Answering the questions related to consumption by making estimations.

Special Technical Notes:

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

- All energy types used in Palestinian households were covered except for diesel because number of observations for the use of diesel was very small.
- In all calculations related to Gasoline, we dealt with the average of all available types of Gasoline.

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