

Public Attitudes towards Socio-Cultural Aspects of Water Supply and Sanitation Services: Palestine as a Case Study

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Abstract

Identifying and considering public attitudes towards various aspects of water supply and sanitation services by planners and decision makers represent an important developmental element relating to the quality, efficiency, and performance of those services. A sample of 1000 Palestinian adults completed a questionnaire assessing attitudes towards socio-cultural and institutional aspects of water supply and sanitation services. The Palestinian public was found to be an important forward planner, aware of the various problems facing the sector, willing to cooperate and support, critical of current governmental practices and performances in the sector, and highly attached to its religious and ethical values. The study revealed the need of the Palestinian Authority to reset its water supply and sanitation priorities and upgrade and develop not only the water system but also the way of knowing and disseminating knowledge related to water supply and sanitation.

Résumé

Que les planificateurs et les décideurs identifient les attitudes du public face aux différents aspects de l'alimentation en eau et des services sanitaires et qu'ils en tiennent compte, représente un important élément de développement relié à la qualité, à l'efficacité et à la performance de ces services. Un échantillon de 1000 adultes palestiniens a complété un questionnaire évaluant les attitudes face aux aspects socio-culturels et institutionnels de l'alimentation en eau et des services sanitaires. Le public palestinien s'est trouvé être un important planificateur avec une vision, au courant des différents problèmes rencontrés dans le secteur, disposé à coopérer et à appuyer. Il est aussi un critique des pratiques gouvernementales actuelles et des performances du secteur et est très attaché à ses valeurs religieuses et à son éthique. L'étude a révélé le besoin pour l'Autorité palestinienne de rétablir ses priorités en alimentation en eau et en hygiène, de moderniser et de développer non seulement le circuit d'alimentation en eau mais aussi la façon de connaître et de transmettre le savoir en distribution d'eau et en salubrité.

Palestine as presented in this paper consists of the West Bank and the Gaza Strip. The West Bank and the Gaza Strip are those parts of historic Palestine which were occupied by the Israeli army during the 1967 war between Israel and Egypt, Syria, and Jordan (see Figure 1).

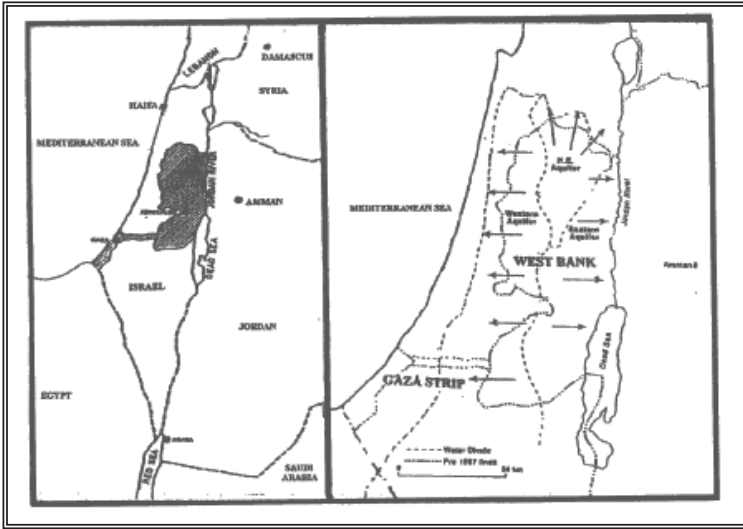


Figure 1. General Location Map. (Abdel-Salam, 1990. p. 115)

The current state of underdevelopment in Palestine is due to the stagnation of legal and physical infrastructure during the past decades. Current Palestinian water supply and sanitation services are unacceptable due to many constraining and limiting factors that have significant influence on the quality, efficiency, and performance of those services. These factors include institutional deficiencies, lack of reliable infrastructure, and unavailability of capable and qualified human resources, insufficient investment and insufficient funding. Since water supply and sanitation services are deficient, irregular, and unsafe, the related aspects including environmental quality standing, lifestyle, and public health will also be bad.

The Palestinian public was not involved and/or did not participate in any of the management stages of water supply and sanitation services. In addition, over the last 38 years (with partial-small changes during the period 1995-2000 when the *Oslo Accord* between the Palestinian National Authority and Israel was in effect) there was an Israeli military ban on:

- distributing any information on Palestinian water resources and uses to Palestinians; and
- involving Palestinians in decision making of their water supply and sanitation services (Haddad, 1994).

Present and past management practices of water supply and sanitation services in Palestine has largely centered on the engineering-technical and economic aspects of water supply and sanitation services. Serious neglect and grave omission has occurred in the other aspects and values related to those services including:

- socio-cultural and institutional-administrative aspects; and
- consideration of public perceptions, feelings, and thoughts of these aspects and values.

There is a particular history, culture, and social identity attached to water supply and sanitation services which are naturally dynamic, and continuously changing due to people's needs and socio-economic growth. Though, it has widely been acknowledged and made clear that although water supply and sanitation services affect people's lives, people in turn rework and produce an effect upon the level and status of those services and their development. One important way of directing and positively influencing public attitude is by enhancing the level of public education, awareness, and knowledge of these services.

Attitudes can be described as postures or positions adopted, or expressions of views or thoughts that have an effect on behaviour, ideas, or emotions (Johnston, 1997). Public behaviour towards water supply and sanitation services in terms of support, participation, cooperation (positively or negatively) is directly related to public feeling and thinking of the above variables within the cultural and religious setting of the target community.

Yacoob, Braddy, and Edwards (1992) found that community participation, data collection, and the necessity of providing health and hygiene education are essential elements in all water and sanitation projects. Sierra (1999) demonstrated that among the important factors affecting public beliefs, socialization, and values is access to environmental, social, and cultural resources as well as public education and training. The Foundation for Water Research (2000) claims that education represents one of the important ways in which communities can change their practices and behaviour as far as health and hygiene related to water and sanitation are concerned. Kumaram and Hyma (2001) argue that prior to initiating public-based development plans and projects related to water supply and sanitation there was a high need to conduct further research relating efficiency and sustainability of services to socio-cultural norms and public perceptions.

Therefore, it is important for planners and policy decision-makers in Palestine that:

- neglecting public involvement and participation in public services sector including water supply and sanitation be stopped, and the Palestinian public be heard and their perception toward basic services provided and their development be known and taken into consideration; and
- public attitudes towards these services be measured and known in order not only to optimize sector efficiency and performance but also to illuminate possible future developments.

The importance of these initiatives is significant at this point of Palestinian Authority development, where much reconstruction, upgrading, and development in the public utilities and services sector is expected in the near future as a viable Palestinian State is foreseen.

The objectives of this study were to discuss, assess, and evaluate public attitudes towards socio-cultural aspects of water and sanitation services in Palestine. The evaluation is made based on a detailed field survey covering the Palestinian population in the West Bank. The field survey examines a range of socio-economic characteristics and specific answers to a group of questions, arguments, and variables on socio-cultural aspects of water supply and sanitation services.

Background

Study Area

The West Bank is part of the Palestinian territory under the administrative control of Israel. The land area of the West Bank is estimated at 5572 km² extending for about 155 km in length and about 60 km in width (see Figure 1). The West Bank may geographically be divided into four regions: the semi coastal plains, the central upland, the eastern slopes, and the Jordan valley. Rainfall in the West Bank ranges from 30 mm/year in the southern part to 700-1100 mm/year in the northern part. Average annual rainfall in the West Bank is 409 mm/year (Abdel Salam, 1990).

Palestinian population projections reveal that mid-year population in 2003 totaled 3,634,495 persons, of whom 2,304,825 live in the West Bank and 1,329,670 live in the Gaza Strip (Palestinian Central Bureau of Statistics, 2003). According to the Palestinian Central Bureau of Statistics (2003), Palestinian refugees constitute approximately one third of the West Bank population and over 60% of the population in the Gaza Strip. The number of refugees residing in camps is estimated at approximately half a million of which about 130,000 live in 19 refugee camps in the West Bank, and about 370,000 reside in 8 refugee camps in the Gaza Strip.

Water Supply

The estimated average annual ground water recharge in Palestine is 698 to 708 million cubic meters per year (mcm/yr) (648 mcm/yr in the West Bank and 50-60 mcm/yr in the Gaza Strip). The only surface water source in the West Bank is the Jordan River and its tributaries. In the Johnston Jordan River water allocation informal plan, the Palestinian share in the Jordan River of 241 mcm/yr was considered part of the Jordanian share of 720 mcm/yr as, until 1967, the West Bank was under the Jordanian rule (Libiszewski, 1995). Since the 1967 war and until the present, the West Bank has been under full

Israeli military occupation and Palestinians have been prohibited by the Israeli army from using the Jordan River water, and their lands and farms located along the western side of the river were confiscated and the area was declared a restricted military security zone (Haddad, 1998).

The total domestic water supply allowed to Palestinians in the West Bank by the Israeli authorities was estimated at 53 mcm/yr (Palestinian Water Authority, 2003). The average rate of unaccounted for water in urban areas was estimated at 42 % of total water supply. Therefore, the average consumed per capita domestic water consumption in these areas was 36.5 l/d (or as surveyed, 55 l/d as average consumed since not all unaccounted for water is lost in the ground [Haddad, 2005]), which is much below the Israeli domestic water use of 217 l/c-d (Palestinian Water Authority, 2003).

Palestinian Water Authority reported that 256 rural communities in the West Bank with a population more than 200,000 are still without access to public water supply (2003). The people in these communities depend on local springs and harvesting cisterns to get water for all purposes and the water used is usually not suitable for drinking.

Sanitation

Most of the urban wastewater collection systems are combined sewers, i. e., serve for collecting domestic wastewater and rain water at the same time. Since 1991, municipalities began a plan which intends, when completed, to separate storm water from domestic waste water.

In urban areas of the West Bank, domestic wastewater is collected in pipes within residential areas and then is left to flow out in open channels. The extent of collection varies from one area to another and the services cover from 20 % to 75 % of the service area. In the remaining 25 % to 80 % of the urban wastewater and most of the village or rural areas, wastewater is disposed using septic tanks, subsurface drainage systems, percolation pits, latrines, or let to flow out of houses in open channels. Only a few villages have wastewater collection services in the West Bank (Haddad, 1998).

The collection and treatment of urban wastewater as well as the operation and maintenance of the sewerage systems in the West bank are the responsibility of each local municipality, village council, or other local representative organisation. There are little available data concerning wastewater characteristics, extent of wastewater reuse, and effects of current practice on human health and the environment. Few of the urban areas have wastewater treatment and disposal or reuse systems. Some municipalities in the West Bank (e.g. Tulkarm, Jenin, and Hebron) constructed primary settling tanks or basins for the collected wastewater before letting it flow in open channels outside the municipality's limits. The only complete wastewater treatment plant in the West Bank is that in Ramallah.

Public Attitudes, Knowledge, and Behaviour

Water supply and sanitation issues and problems are long-term in nature and high in capital and operation and maintenance costs. As the population increases, these problems will become much more severe and will require more creative solutions based on in-depth knowledge of the issues and coherent relationships between public and decision makers.

Foucault (1980) found that there is a reciprocal, mutually reinforcing relation between the circulation of knowledge and subsequently the control of conduct. An important part of Foucault's concept of knowledge is the belief that those who are in power have specialist knowledge. Allen (1999), in criticizing Foucault's concept, stated that power is not possible without the knowledge but there must be a real difference between the "manufactured" knowledge and a "traditional" perceptual epistemology (Allen, 1999).

One of the current critical problems is that the media has been mostly confiscated by large corporate interests or the government who use it predominantly to promote one view. Another problem of concern is that the media, and consequently directed knowledge and awareness of existing water supply and sanitation issues, is not strong among all levels of the public except in a special one—a small portion of the public including those highly educated, older, and well-established residents (Rea & Parker, 2004). Accordingly, public fundamental understanding, and critical analysis, of water supply and sanitation issues and utility/institution's work should come from daily lived reality and experiences and not only through directed one-sided media.

Public behaviour towards water supply and sanitation issues and services in term of support, participation, and cooperation (positively or negatively) is directly related to feeling and thinking of the above variables and aspects, i.e., economic and political, knowledge, environmental quality, and others. Wallace and Laird (2002) presented a strong behavioural link between the agent's knowledge and the agent's mind (feeling and thinking).

Data indicated that a good knowledge of environmental concepts is not sufficient; in-depth knowledge of environmental issues, issue skill analysis, and attitudes and values related to taking action are also necessary for the individual to take action and to act responsibly (Lori & Brehm, 2003).

Attitude studies concentrate on evaluating people's attitude/knowledge/behaviour and how these should be changed, modified, and upgraded to fit the policies set by decision makers. It is strongly believed that in-depth knowledge is vital to both governments as well as ordinary people and should be acquired mainly through factual life experiences and practices.

Methods

A field survey in the form of a detailed questionnaire was conducted. The questionnaire design, including questionnaire structure, target group, and

implementation procedure, and sample size and distribution, are described below.

Questionnaire Design, Structure, and Size

A questionnaire was developed and distributed among various public groups all over the West Bank covering urban centers, rural villages, and refugee camps. The field application of the study started in September 2000, and ended in January 2001. The West Bank also was divided into three main geographic centers: southern districts, central locations, and northern districts (see Figure 2).

The questionnaire structure consists of three parts. The first part asks for biographic and socioeconomic data about the respondents. The second part poses 41 questions in five groups. The first group sought to test public attitudes and perceptions about water supply and sanitation services (12 questions). The second group was directed towards people's perception about existing public health and environmental quality (six questions). The third group dealt with religious and cultural aspects (nine questions). The fourth group was related to knowledge presented to the public (seven questions). The fifth group was on public perception towards financial and economic aspects (seven questions). The third part assesses perceptions towards institutional aspects of water supply and sanitation services. Due to the amount of data and discussion, the third part will not be discussed within this paper.

The response to questions was scaled according to a Likert scale of responses (Likert, 1932). Seven categories or intensities of responses were set: Strongly Agree, Agree, Satisfied, and Not Determined, Not in Favour, Disagree, and Strongly Disagree.

In determining the number of people to be surveyed, Cohen (1988) effect-size statistics were used. One thousand copies of the questionnaire were distributed all over the area of the West Bank (northern, central, and southern) covering urban centers, rural villages, and refugee camps. The number of questionnaires for each location was estimated according to the population weight of the sub-group to the total population (see Figure 2).

Survey Procedure and Response

The designed questionnaires were distributed to target groups directly by field assistants. The field research assistants were oriented and trained prior to start of questionnaire distribution on how to explain the purpose, structure, and completion of the questionnaire and how to deal with various public groups. During the first two weeks of the study, a pilot was conducted by research assistants to check the questionnaire-survey procedure, to refine the questionnaire before actual distribution among the target groups, to determine the time needed for a respondent to complete the questionnaire and to allow the research assistant to be acquainted with the survey procedures.

About 76% of the distributed questionnaires were returned completed. However, 59.2% of the distributed questionnaires were completely and properly completed. Approved, properly completed, questionnaires were sorted in tables. Data were entered into the computer as Excel files.

Results and Discussion

Sample Characteristics

General characteristics of the sample surveyed including the biographic and socioeconomic data of the respondents are presented and discussed briefly in the following paragraphs.

Although the estimated and distributed numbers of questionnaires were set according to the weight of each population center by its population weight to the total and all population centers in the West Bank that were covered by the survey (see Figure 2), the respondents were mostly young (65% of the sample less than 40 yrs. old), male (70%), and married (72%). The respondents were highly educated: one half had a first or higher college degree while the other half mainly had high school degrees. The respondent type and sector of work was highly diversified covering and representing a wide public scan. Two thirds of the respondents were living in houses mostly without gardens or rain-fed cisterns, typically built of stone or reinforced concrete and owned by respondents.

Most of the respondents (73% of total) were getting their water supply through municipal water networks. The remaining portion were relying on either rain-fed cisterns or water from local springs, or through purchased water from tanks mounted on trucks or tractors. The per capita water supply estimated from the survey was ranging between 18 and 24 m³/yr (or between 48 and 66 l/c-d). A result consistent with previous published records (Haddad, 2005; Public Water Authority, 2003)

Sanitation services were mostly (63.1% of total) provided through municipal wastewater-sanitation systems. The rest were using either septic/cesspit, dry pits, or other means for wastewater disposal. Most respondents were served by a municipal solid waste system (71.9% of total) while a small portion were disposing their solid waste next to their residence or using village tractor, or other means.

Respondents having health insurance were 61.3% of total. However, 45% of those who responded positively claimed that the insurance policy they use has many deficiencies and/or is inappropriate. Only 34.2% of those who responded positively claimed that the insurance policy they use is appropriate and sufficient. Still, there are 227 respondents or 38.7% of the sample population without any health insurance.

The distribution of the total monthly income of respondents was much diversified ranging from 1.7% with income less than 200 US\$ to 0.3% with

income over 2000 US\$. However, over 99 % of all the respondents were with monthly income less than 1300 US\$, and about half of them with income of 600-800 US\$. These records are consistent with previously published figures by the Palestinian Central Bureau of Statistics (2003) and the World Bank (2003).

About half of the respondents rated local television stations and one third rated satellite TV networks as their most popular media and entertainment source, respectively. Less than 10 % of the respondents rated local and foreign radio channels and a similar portion rated journals and newspapers for the same purpose.

Comparison of the socio-economic records reported by the Palestinian Central Bureau of Statistics (2003), the Islamic Development Bank (*Arabnews*, 2003), and the World Bank (2003) with those obtained from respondents in this study indicates that the survey sample represents the middle social class among the Palestinian population, a class that has significant weight in the Palestinian public opinion.

Attitudes towards Specific Research Questions

The attitude of respondents to each of the specific groups of research questions and argument statements raised and tested in the survey will be presented and discussed separately. For concise discussion, the average responses, from strongly agree to satisfied (as the total positive response), were summed for each question under consideration and listed in summary Figures 3-7.

Attitudes towards Water Supply and Sanitation Aspects (Figure 3). Very high attitudes were observed towards the impact of water shortages on respondent's health and productivity. Positive respondent reply was obtained towards the need for developing and replacing water supply networks and systems. Responses were found to be consistent in all tested areas from north to south and within urban, rural, and refugees communities.

Despite the acute existing water supply and quotas imposed by Israeli military authorities, respondents in stating their reaction to possible drought occurrence expressed high attitude towards:

- willingness to conserve substantially in their water use during drought;
- the need for not altering domestic water supply during droughts; and
- any water reductions due to drought should be made in other sectors such as agriculture.

Respondent's attitude towards the role of the Palistinian Water Authority in developing and upgrading Palestinian water resources and water supply and sanitation services was undecided to negative. This perception is an indication of public dissatisfaction with Palistinian Water Authority performance and efficiency.

The response to the question that wastewater (treated or not treated) is dirty and cannot be reused was moderately rejected or negative especially from urban areas. This meant that the public does not agree with eliminating the reuse of wastewater. This attitude was ascertained by:

- respondent's highly positive answer to the question concerning possible reuse of wastewater in agriculture after its treatment to acceptable levels; and
- respondent's highly positive answer to the question considering treated wastewater as a supplementary water source.

Both answers reflect the good perception, awareness, and understanding of the public towards wastewater reuse.

A very high public attitude was observed towards the negative impacts of the continuation of:

- Israeli military control of Palestinian water and quotas imposed; and
- the political situation in the area.

This attitude was higher in refugee camps and southern districts which can be explained by the sharper shortages in water supply in those parts relative to others.

A negative public attitude was observed towards sufficiency and availability of water in the future (65% of all respondents disagree that water will be sufficiently available in the future).

Public perception of equity being applied by Palestinian Water Authority in providing water supply and sanitation services was very moderate. This response indicates doubts about PWA responsibilities and is consistent with previous attitudes towards the impact of Israeli control of Palestinian water resources.

Attitudes towards Public Health and Environmental Quality Aspects (Figure 4). The surveyed sample expressed good satisfaction with the quality of health conditions in neighbourhoods. The response from refugee camps was moderate reflecting the existing poor quality of health conditions and services they face.

Moderate public satisfaction was observed for the capacity of the health personal working in Palestine. This response was maintained by moderate attitude towards seeking health treatment outside the country.

The urban and central district population expressed moderate willingness to migrate from their residence area if health conditions worsen or if bad health services take place over a long period. The refugee camp population was negative. This attitude is expected because of the differences in political and social positions and feelings in those areas.

Another doubt about Palestinian Authority's function was observed from respondent's moderate valuation of the level of priority given by the Palestinian Authority to public health, water, and sanitation services. Interestingly, the satisfaction observed was higher in refugee camps and southern districts. This observation along with previous contradictions that can not be explained may indicate some triviality in completing questionnaires in southern districts.

Attitudes towards Religious and Cultural Aspects (Figure 5). Extremely high public attitudes were obtained towards the role of Islamic teaching in:

- improving personal hygiene, health, and the local environment; and
- affecting qualitative and quantitative aspects of water conservation.

This attitude reflects the high position and respect given to Islamic teachings and their role in maintaining environmental qualities by Palestinian public.

The public highly believes that family ethics and conduct constitute the basis for better public health and environmental quality. However, respondents moderately believe that a high level of ethics prevails and prevented public from conducting male practices towards water system. This attitude indicates that the good quality of ethics known about Palestinian public is altered. Such alteration is happening due to the high unemployment rates and poverty levels prevailing in the Palestinian territories.

Positive public attitudes were obtained against Palistinian Water Authority negligence of the poor either in:

- providing water supply and sanitation services;
- maintaining, improving, and developing those services and systems; and
- tariffs and cost setting.

Also, positive public attitude was observed towards:

- willingness to pay to subsidize the water bill for the poor; and
- sharing responsibility for social, poverty, problems.

Attitudes towards Knowledge-Educational Aspects (Figure 6). A highly positive attitude was obtained towards the impact of various local media sources on public behaviour concerning the qualitative and quantitative aspects of water supply and sanitation.

Public perception was uncertain, undecided, and sometimes negative over the quality of information and knowledge presented to them by various local media and information sources. The attitude was uncertain and undecided for local newspaper, local TV stations, and local radio stations. Public perception of the quality of information offered to them by various governmental

sources was negative and the lowest in rating among all other sources. Accordingly, there is a high need for improving, upgrading, and developing the quality and quantity of local media, information, and knowledge sources and materials presented to various public levels regarding the various aspects of water supply and sanitation services.

It is also noticeable that rural communities responded in higher rates on valuing the quality of all information and knowledge sources presented to them compared to urban and refugee camps. This reflects the nature of the rural environment and its status as being less exposed to modern knowledge and information sources.

A moderate public attitude was observed towards:

- the quality and sufficiency of existing curricula used in schools regarding public health and water supply and sanitation conditions and services; and
- the space, and weight given in those curriculums of environmental problems.

This reflects the high need to upgrade current curricula to improve their qualities and to sufficiently cover the environmental issues and problems of concern.

Attitudes towards Financial-Economic Aspects (Figure 7). Attitudes obtained towards the level of burden the water bill constitutes to public were indistinct. Responses indicate that the water bill did not cause a big burden for public living in urban areas and northern parts but it clearly represent a burden for those living in the refugee camps. The higher rate in refugee camp response was expected due to lower personal and family income. However, public highly believed that there is no need to borrow money to cover the water and sanitation bill. These attitudes indicate that, although the water bill might cause a burden for some social groups it is not high enough to cause them to borrow to pay it.

A high public attitude was obtained towards public willingness to pay additional costs to cover either water supply or sanitation services. Though, a positive public attitude was obtained towards the necessity of the Palistinian Water Authority to subsidize the water bill. The last attitude is connected with public willingness to pay for better services but dissatisfaction with Palistinian Water Authority performances.

The public gave a moderate attitude towards the possible increase in water consumption as a result of reducing the water tariff. This indicates a higher public awareness and understanding of the water scarcity situation and the efficiency of water use.

Questionnaires Collected, and Properly Completed	Questionnaires Distributed By Region	Population By District x1000	Total Population x1000 (%)	District	Location
260 (65%)	400	268 208 58 137 75 50	776 (40%)	Nablus Jerin, Toubas, Tulkarem, Qalqilia, Salfit	Northern
160 (53%)	300	543 221 54	598 (31%)	East Jerusalem Ramallah & Al-Bireh Jericho	Central
172 (57%)	300	418 141	559 (29%)	Hebron Bethlehem	Southern
592	1000	1,932	1,932 (100%)		Total

Figure 2. Distribution of Field Survey Questionnaires by Locations.

Question/Statement	Average Positive Responses, %						
	All Sample	Urban	Rural	Refugee Camps	Northern Parts	Central Parts	Southern Parts
Water supply shortages negatively affects my wellbeing consequently my I productivity and performance.	93.5	91.3	96.5	95.9	90.0	92.4	95.3
Palestinian water authority upgrade and develop Palestinian water resources and water supply and sanitation services comprehensively and in integrated manner.	49.9	48.8	56.3	42.9	39.2	52.5	64.0
Water supply and sanitation services in my area including networks and systems are bad and need maintenance development and replacement.	69.9	60.0	75.9	91.8	69.2	73.8	67.4
If drought occurs in my area I am ready to substantially conserve in my water use.	88.2	86.3	87.4	95.9	88.5	95.0	81.4
In case of drought, domestic water supply should not be altered, conservation should be in other sectors.	88.5	88.8	87.4	89.8	88.5	91.3	86.0
Domestic wastewater is dirty (from physical and religious point of view) and can not be reused either before or after treatment.	46.0	38.8	56.3	51.0	43.1	50.0	50.0
Domestic wastewater can be reused in agriculture after being treated according to acceptable standards.	77.2	78.1	77.0	73.5	80.8	75.0	70.9
Domestic wastewater represent one of the important future supplementary water resources that need not to be lost but treated and reused.	78.5	77.5	73.6	89.8	77.7	76.3	81.4
The continuation of water supply shortages due to Israeli military quotas and controls, sharp political. unrests will take place in Palestine.	87.0	85.0	86.2	93.9	80.0	78.8	93.0
Water supply shortages has nothing to do with the political situation in Palestine nor with the Israeli control over water resources.	21.3	20.0	25.3	18.4	22.3	26.3	26.7
Upon the information available to me, water availability in my area in the future is quite good and sufficient.	35.4	33.1	40.2	34.7	28.5	26.3	54.7
Equal levels of water supply and sanitation services being provided to all consumers.	59.2	59.4	60.9	55.1	60.8	58.8	57.0

Figure 3. Responses to Water Supply and Sanitation Related Questions.

Question/Statement	Average Positive Responses, %						
	All Sample	Urban	Rural	Refugee Camps	Northern Parts	Central Parts	Southern Parts
Health conditions in my neighborhood is good and I am satisfied with it.	71.6	73.1	78.2	55.1	64.6	76.3	83.7
Health personal of physicians and specialized MDs working in my neighborhood are highly qualified and trusted.	67.5	68.8	69.0	61.2	60.8	70.0	75.6
Shortages in water supply negatively affects the health of my family.	89.8	86.9	92.0	95.9	90.8	92.5	83.7
If any member of the family or relative face serious health sickness, I would recommend him to go outside the country for treatment.	66.5	65.0	71.3	63.3	65.4	65.0	69.8
If bad public health, water, and sanitation services in my area prevail for long time, I would migrate to another area where better and special services are provided.	55.3	60.6	52.9	42.9	56.2	61.3	50.0
From the level of services provided, I can feel that public health, water and sanitation services are among the first priorities of Palestinian Authority.	65.3	58.1	71.3	79.6	59.2	63.8	74.4

Figure 4. Responses to Public Health and Environmental Quality Questions.

Question/Statement	Average Positive Responses, %						
	All Sample	Urban	Rural	Refugee Camps	Northern Parts	Central Parts	Southern Parts
Compliance with and conducting Islamic teachings improve personal hygiene, health, and environment.	96.3	95.6	95.4	100.	96.2	100.	93.0
Compliance with and conducting Islamic teachings positively affects water conservation, qualitatively and quantitatively.	93.6	92.5	94.3	95.9	95.4	95.0	90.7
If you are asked to add a sum of money to your water to be used for covering of water bill for poor families.	83.8	78.1	92.0	87.8	86.2	81.3	82.6
Do you thing that there is high level of ethics that prevent individuals from conducting male practices such as steeling water and endangering public health.	56.7	52.5	62.1	61.2	52.3	53.8	70.9
Water allocation policies adopted by Palestinian water authority do not take in consideration the poor and low level income class specially when: a. providing water and sanitation services and maintenance operations; b. developing and improving water supply and sanitation systems; and c. setting water tariffs and costs.	72.4	64.4	81.6	81.6	69.2	76.3	73.3
	67.7	60.6	75.9	75.5	59.2	73.8	74.4
	69.4	61.9	77.0	75.5	61.5	77.5	73.3
I feel that I am sharing the responsibility of public health and poverty problems facing my society.	65.1	65.0	70.1	57.1	71.5	65.0	52.3
Family ethics and conduct represent an important basis for the conservation and improvement of public health, water, and sanitation services in my	89.0	90.6	87.4	85.7	92.3	77.5	86.0

Figure 5. Responses to Religious and Cultural Related Questions.

Question/Statement	Average Positive Responses, %						
	All Sample	Urban	Rural	Refugee Camps	Northern Parts	Central Parts	Southern Parts
Various media sources had positively affected on me relating to water and sanitation (qualitative and quantitative).	80.2	76.9	87.4	77.6	70.0	90.0	87.2
I feel that information presented and made available to me on public health water supply and sanitation are sufficient:							
a. through local newspaper	50.1	46.3	59.8	53.1	37.7	58.8	68.6
b. through local TV stations	49.9	43.8	60.9	51.0	35.4	52.5	67.4
c. through local radio stations.	50.9	43.8	60.9	57.1	38.5	52.5	68.6
d. through various governmental dept(s)	38.7	32.5	51.7	36.7	31.5	40.0	51.2
Present curriculums at schools are sufficient regarding knowledge of public health, water, and sanitation conditions and services.	58.2	54.4	69.0	51.0	53.8	68.8	61.6
Present curriculums in general do not tackle sufficiently various environmental problems facing the society.	58.9	58.1	60.9	57.1	50.0	65.0	65.1

Figure 6. Responses to Knowledge Related Questions.

Question/Statement	Average Positive Responses, %						
	All Sample	Urban	Rural	Refugee Camps	Northern Parts	Central Parts	Southern Parts
Water bill represent a big burden and substantial portion of my income.	51.1	41.9	56.3	71.4	41.5	63.8	52.3
If you are asked to pay more-additional money for improving and developing water supply networks.	76.1	77.5	75.9	71.4	79.2	76.3	75.6
If you are asked to pay more-additional money for improving and developing wastewater collection, treatment and reuse systems.	76.1	78.8	73.6	71.4	74.6	72.5	80.2
I borrow money (over my income) to cover and pay my water and sanitation services bills.	51.1	21.3	40.2	46.9	26.2	33.8	37.2
Palestinian water authority and municipalities should subsidize water supply cost to reduce water supply bills.	83.2	83.8	78.2	89.8	80.8	78.8	84.9
Developing and improving public health, water and sanitation services should be done using local funds and funding sources and not relate or depend on foreign and international funding sources.	76.8	76.3	71.3	87.8	79.2	67.5	79.1
If water tariff was reduced, this action will increase my water use.	50.9	43.8	56.3	65.3	35.4	53.8	72.1

Figure 7. Responses to Financial Economic Questions.

Conclusions

Based on the findings of this study, it was concluded that Palestinian public is:

- Well aware of the present and future water supply and sanitation services status and problems, being political, financial, religious, economic, or other;
- Willing to cooperate, conserve, and pay for upgrading and developing the sector;
- Dissatisfied with Palestinian Authority's performance and role in the sector including its way of setting priorities, allocation policies, and developing the sector;
- Considering properly treated wastewater as a supplementary resource and agreeing on its reuse in agriculture;

- Indicating insufficiency in information presented to them from the government on water supply and sanitation issues;
- Indicating the need for the Palestinian Authority to upgrade and develop current information and curriculum sources in regard to public services (including water supply and sanitation), health, and environmental quality; and
- Signifying the need for better compliance with Islamic teachings and family ethics as the basis for improving public health and environmental quality.

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