

DOC n°2 – WP 4.1.2

First draft on: 12th June 2014

Report on settlements adaptation to SWMED solutions

The case of Palestine



SOCIO-ECONOMIC SURVEY ON MED SETTLEMENTS IN URBAN AND RURAL AREAS IN WEST BANK

1. Research Objectives and strategy

In the West Bank, during summer-autumn 2013, the SWMED project staff research carried on a survey with the intent of accounting for the water supply and sanitation conditions in some communities of the area. Starting from the investigations developed there in recent years, up to date information has been gathered in order to assess the compliance of the socio-economic feasibility of the project activities to the local conditions and needs. The entire research has been strongly required by the PWA as necessary to verify the compliance of the territory to the use of certain tools for sustainable water management. In the recent past, these tools have not always produced the expected results because, often, the transfer of good practice born in Europe or in the Western world are not suitable for other situations or contexts in which there is a greater social and economic vulnerability (they can be only “cathedrals in the desert”). Instead, studying the real needs of local populations certainly allows to make more “anatomical” the solutions to be experimented.

PHG and PWA identified three target areas (Bani Zaid, Tubas, Jenin) and in these locations they used a semi-standard and structured questionnaire, to collect data from resident population¹. The selected criteria to identify different typologies of settlements aimed to highlight differences about water supply and wastewater management system, treatment and wastewater disposal (sewer network, wastewater treatment system, drains).

The approach adopted follows the lines of quantitative research, and the empirical basis has been designed and built according to sampling criteria coherent with the exploratory objectives of the study. In fact, as the survey did not seek to reach statistical conclusions, but it aimed to point out water and sanitation problems in some areas and communities (in function of the wider objectives of the SWMED project), a non-probability sampling strategy was more suitable.

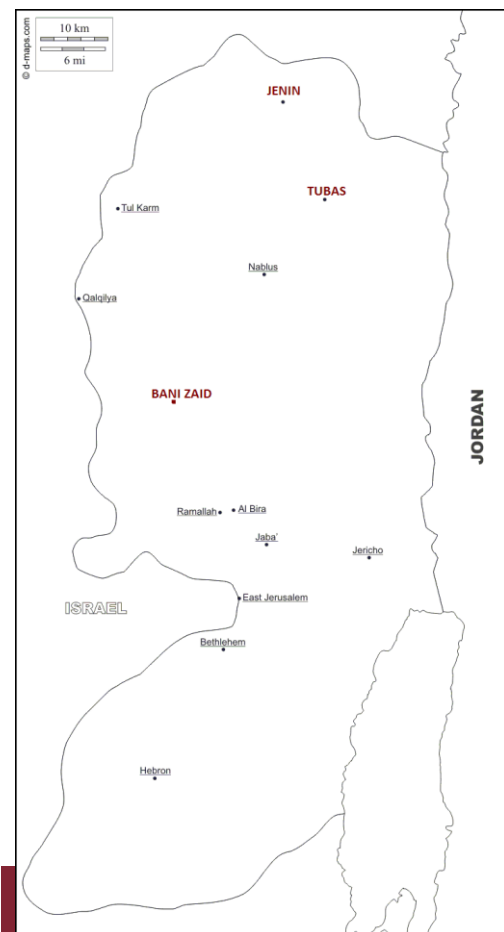
¹ A copy of the questionnaire in Arab and English language is present as Appendix.

In the light of these premises, the research staff opted for a purposive sampling procedure, in accordance with a number of factors such as the type of community (small municipality with partial existent facilities; refugee camp; rural region with diffused villages) and the quality of connection to the water network. In the presence of interviewers, the questionnaires were distributed to and filled by 132 households, who are the most appropriate referents to show the needs and problems experienced by the entire family within each community. The final outcome regarded 40 households in Bani Zaid, 43 in Tubas and 49 in Jenin (Fig. 1).

The questionnaire is composed of 49 questions referred to seven sections as follows:

- A. General information about the interviewed
- B. Demographic status, social and economic situation of the house
- C. Income
- D. Water information and conditions
- E. Culture and values associated with water
- F. Interests and environmental awareness
- G. Political Concerns

Fig. 1. Survey areas in West Bank and Selection criteria adopted



Survey Areas

- **Bani Zaid** (rural area)
- **Tubas** (urban & refugee area)
- **Jenin** (joint Service Council area)

Selection criteria:

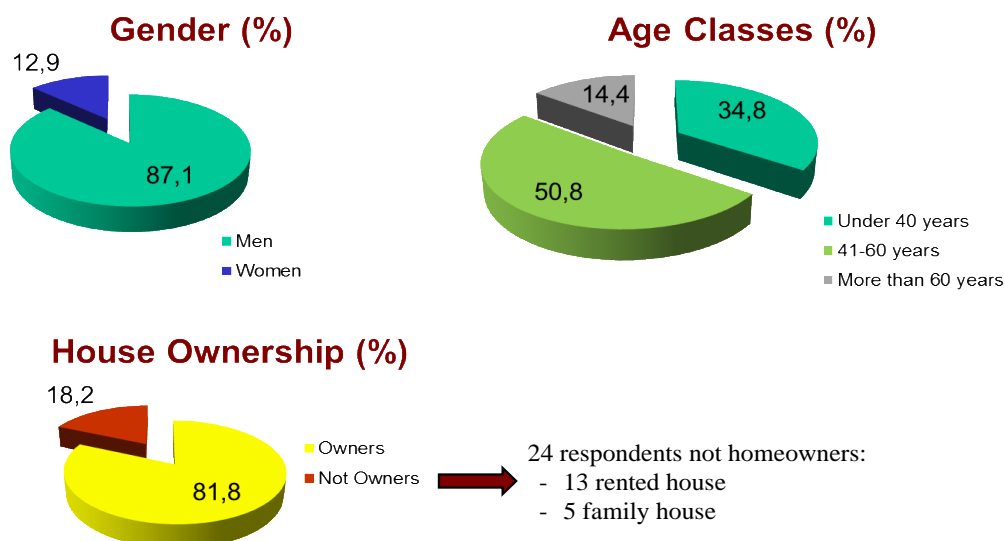
- ✓ National strategy for sanitation and water supply for rural area due to water shortage
- ✓ Urban and rural communities with water network and with partially WWTP in the targeted municipalities
- ✓ Local initiatives for sanitations

2. Identikit of respondents and socio-economic status of the families

The sample is mainly composed of men (87,1%), coherently with the choice of interviewing chiefly the households, who are the most appropriate referents to gather data on the needs and problems experienced by the families. Consequently, 51,8% of respondents are in the 41-60 years class, while 34,8% are under 40-years and also 14,4% are composed of people with more than 60 years. It's important to remark, furthermore, that 81,8% of sampled own the house where the family lives (Fig. 2).

Fig. 2. Identikit of respondents: gender, age and house ownership.

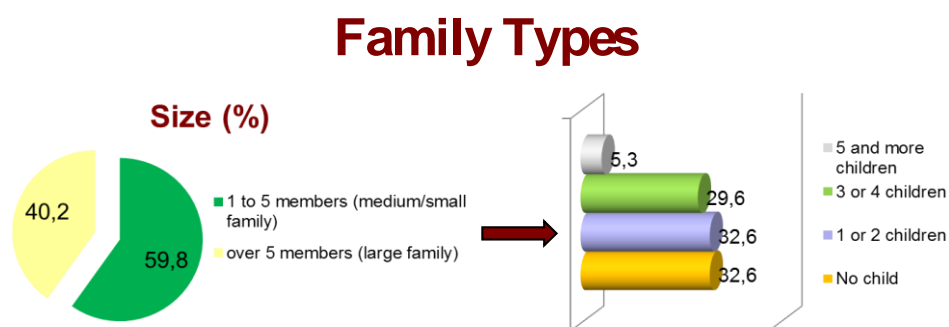
Identikit of respondents



Nearly 60% of families involved in the research are of small/medium size (1-5 members), while the rest of them are composed of more than 5 persons (Fig. 3). This aspect is particularly relevant as directly linked to water consumptions and family needs. Specifically 32,6% of families are without children and the same percentage have 1 or 2 children, while 29,6% are 3-4 children (families with 5 children or more are only 5,3%). As for education level, while men are generally distributed through the classes (only 5,4% are uneducated and nearly 30% are graduated or more), women follow a dichotomous pattern, with highest rates of uneducated (13%) and of graduated or more (38,6%). Fig. 4 shows that socio-economic status of families trends to low/medium level. In fact, most of them (86,4%) are composed of 1 or 2 employed

(only 8,3% are composed of unemployed people), nearly half of the families have a monthly income between 1200 and 2000 shekels, and almost the same percentage own a private car.

Fig. 3. Family types: size, husband/wife education level



	Husband Education level (%)	Wife Education level (%)
Uneducated	5,4	12,9
School	14,6	23,5
High School	31,5	14,4
Diploma	16,9	10,6
BSc, BA	25,4	38,6
MSc, MA	6,2	0

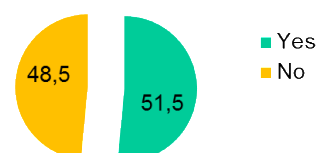
Fig. 4. Socio-economic status of families

Economic conditions of families

Workers/House	% Cases
0	8,3
1 or 2	86,4
3 and more	5,3

Monthly family income	% Cases
Less than 1200 ILS	28
1200-2000 ILS	50,8
2000-3200 ILS	21,2

Private car (%)



3. Characteristic of the house and water conditions

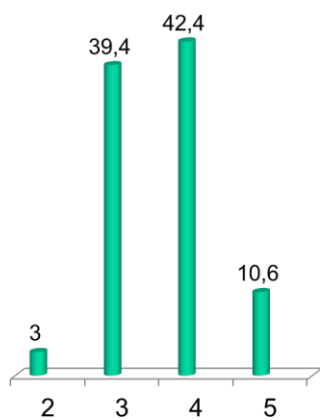
Regarding to the houses characteristics and conditions (Fig. 5), it is important to underline that most of them have a medium size, with 2 or 3 rooms (82%). The kitchens are connected to a water service in all cases; 96,3% of families have an automatic or semi-automatic washing machine, while quite all are without dish washer machine (89,4%).

More than half of families can use only one bathroom (54,5%) and 42,4% of them have two (Fig. 6.). Specifically, the toilets are almost equally distributed between WC (57,3% of families) and squat or similar (41,7%), and 96,2% of toilets have flush system available.

Fig. 5. House characteristics: rooms, kitchen connection to waternet, appliances

House: Characteristics and Conditions (1)

Number of rooms (%)



➤ 100% of kitchens connected to waternet

	% Cases
Automatic washing machine	65,2
Semi Automatic washing machine	31,1
Hand washing machine	3,7

Dish washer available (%)

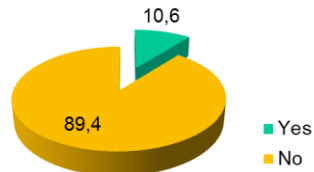
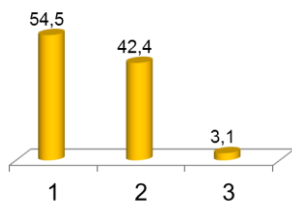


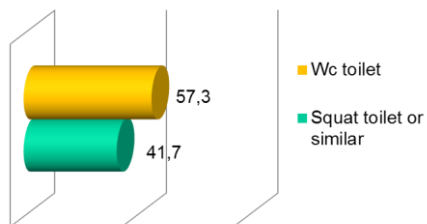
Fig. 6. House characteristics: bathrooms and toilets

House: Characteristics and Conditions (2)

Number of bathrooms (%)



Kind of toilets (%)



96,2% of toilet flush available

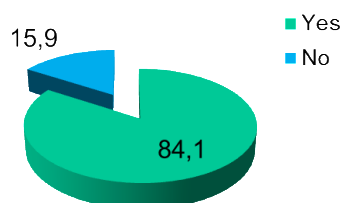
The respondents are quite satisfied about the water service (Fig. 7): the majority of the houses have a h24-water supply (84,1%) and the interviewed have demonstrated a good evaluation about water quality (87,9%) and pressure (93,2%).

Regarding to the payment, more than 90% of sample retain that it is fair to pay for water, and they are actually paying the supply every month (Fig. 8). Moreover, 68,9% of respondents think that the water price is appropriate; nevertheless 83,3% don't know how the water bill is calculated. Specifically, 42,5% of families pay less than 60 shekels, while 22,7% more than 100 shekels. In this respect, it is not surprising that people who believe that it is important to receive more information about a good water use (48,5%), tend to declare that the most important information to receive is the price of water from the source and how the rates are calculated.

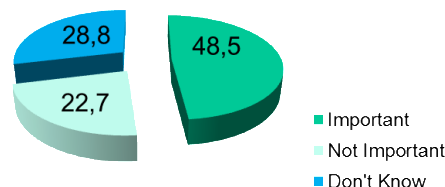
Fig. 7. House water conditions

House: Water Conditions

Water supply h24 (%)



Receiving information on Water use (%)



	Water Quality	Water Pressure
Good	87,9	93,2
Bad	4,5	6,1
Don' t Know	7,6	0,7



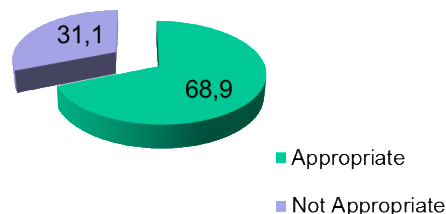
Fig. 8. Water payment

Water payment

- ✓ 90,2% of respondents retains fair to pay for water
- ✓ 99,2% of respondents is actually paying for water supply
- ✓ 95,5% of respondents pays monthly for water supply
- ✓ 83,3% of respondents doesn't know how the water bill is calculated

Price/Month	% Cases
1 to 59 ILS	42,5
60 to 99 ILS	34,8
Over 100 ILS	22,7

Water Price Opinion (%)



4. Water conservation and sewage: problems and attitude

Although the West Bank area has been experiencing water scarcity, 61,4% of respondents are not perceiving very urgent problems about water (Fig. 9). Anyway, who perceives problems in terms of water scarcity or bad quality ascribes them to the Israeli control on the sources or to the imposed restrictions, thus complaining issues of sovereignty or access. Thus, not so many respondents spot problems in their own houses, but they understand that the question is attributable to a political dimension or a national level.

However, in this scenario, a significant percentage of respondents (62,9%) say to give importance to the water conservation; but, concretely, not all (43,9% of sample) are aware about the existence of water conservation devices, only 37,9% intend to install them and even less (34,1% of respondents) would be willing to contribute financially. This reluctance to adopt

water-saving solutions in the house normally is due to the lack of awareness on the usefulness and real costs of these devices, and to the poor economic conditions of the families.

Fig. 9. Water conservation: problems and attitude

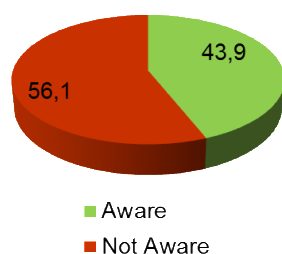
Water and Conservation Problems

✓ 61,4% of respondents is not perceiving urgent water problems

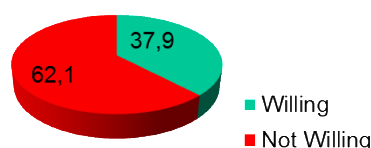
BUT

✓ 62,9% of respondents gives importance to water conservation

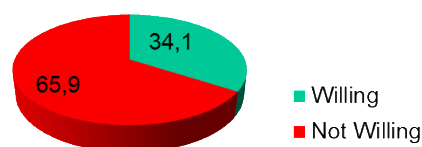
Water Conservation Device Existence (%)



Install Water Conservation Devices (%)



Contribute Financially Install W.C.D. (%)

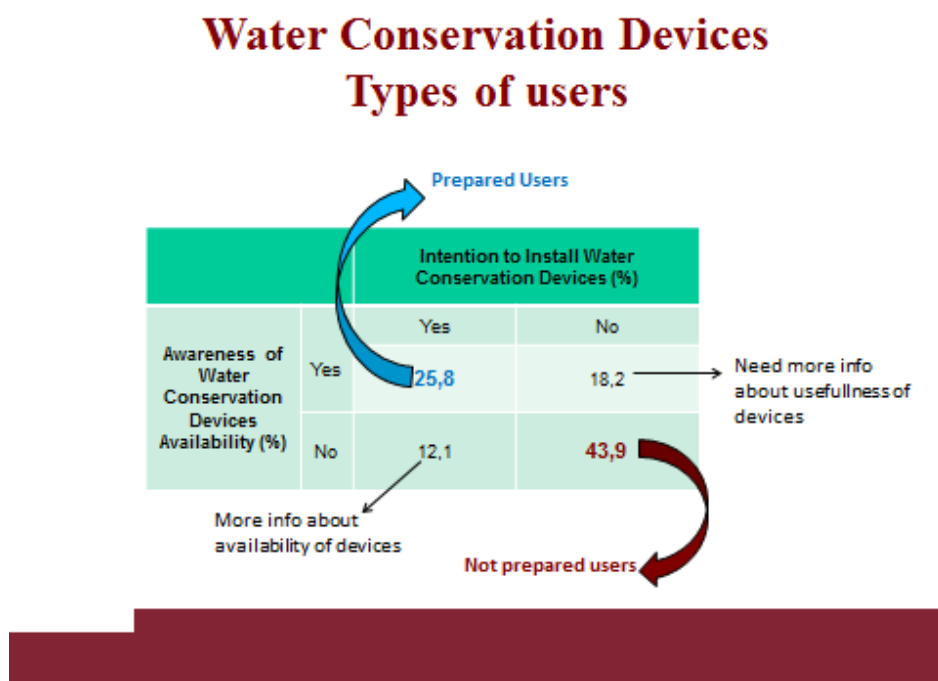


In consideration of these empirical evidences, it was worth to build a typology of users (Fig. 10), crossing the awareness of water conservation devices availability and the willingness to install them, in order to classify the respondents looking at their preparedness and aptitude towards these tools. The majority is composed of not prepared users (43,9%) and only 25,8% of them are prepared. Moreover, it is quite evident that not a few people need more information about usefulness (18,2%) or availability (12,1%) of these devices.

Starting from this typology, it is possible to identify four levels of water conservation aptitude:

- High aptitude: people aware about the availability of water conservation devices AND willing to install them.
- Medium aptitude: persons not aware about the availability of water conservation devices BUT willing to install them.
- Low aptitude: persons aware about the availability of water conservation devices BUT not willing to install them.
- Poor: people not aware about the availability of water conservation devices AND not willing to install them.

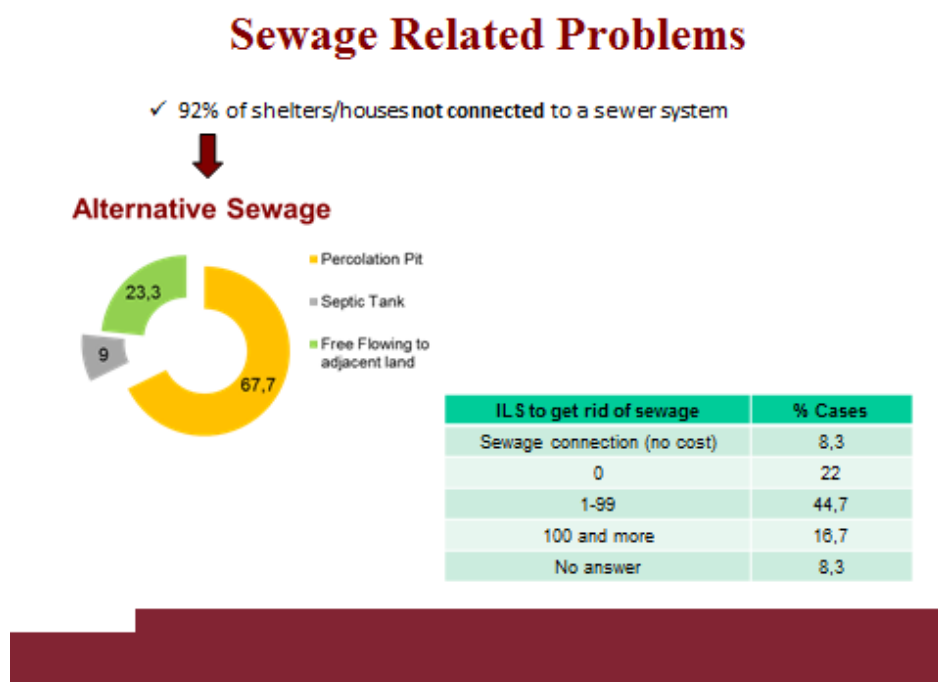
Fig. 10. Awareness and attitude towards water conservation devices: types of users



In addition to the problems concerning domestic water-saving, another related issue emerges clearly: the lack of adequate sewer system (Fig. 11). In fact, 92% of shelters or houses are not

connected to any sewer system: thus, 67,7% of them use percolation pits to dispose of sewage, 23,3% adopt free-flowing to the adjacent areas and only 8% use septic tanks. In these cases, the costs to get rid of sewage are normally less than 100 shekels (66,7% of respondents), but some families pay more (16,7%).

Fig. 11. Sewage related problems



5. Approach and consciousness to water saving

The approach of respondents towards the devices to save water through dry systems is quite ambivalent: the majority of sample (78%) is ready to avail the installation of dry sanitation systems in public buildings (as mosques, ministries, public offices, schools), but the approach change radically considering the installation of these tools in private houses. In fact only a third of the interviewed (35,6%) could tolerate to fit dry sanitation arrangements in their own bathrooms (Fig. 12), probably because a lot of persons are not fully aware on what these systems are and how they function.

There is a similar attitude towards greywater treatment systems, as not all respondents are aware of the advantages that this kind of devices can procure. In fact, a slight majority of the interviewed say to be willing to install the tools (51,5%) and, in this group, only a tiny percentage (4%) can avail an expense over the 20% of the installation costs for greywater systems (Fig. 13). The main reasons why people are quite skeptical towards this kind of devices is the scarce awareness to what the systems are and the poor economic situation of the families. Furthermore, some respondents believe that the greywater treatment might produce stink or that it can create pollution around the house.

Fig.12. Approach to dry sanitation systems at home and in public buildings

Approach to Dry Sanitation Systems (%)

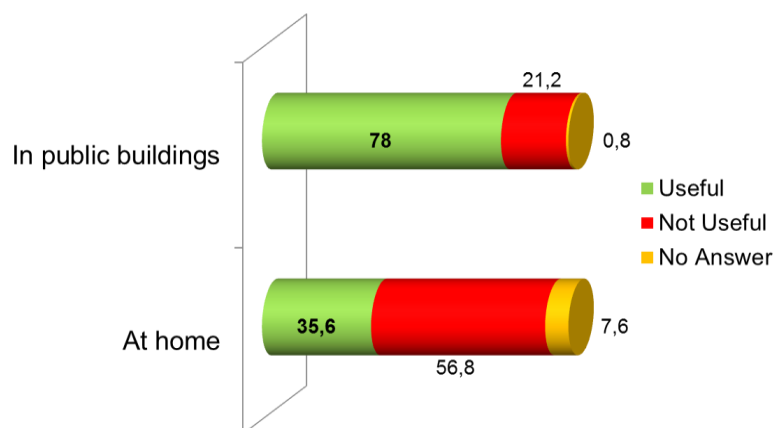
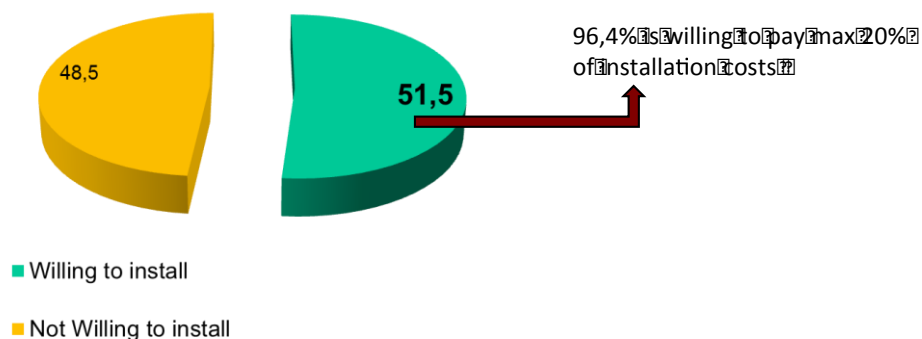


Fig.13. Willing to install greywater treatment kits and availability to pay installation costs

Approach to Greywater Treatment Systems (%)



However, it is worth to point out that all respondents show high consciousness regarding problems directly linked to water; in fact a great part of the sample (86,4%) would like to receive more training about water and environment, and almost all the respondents (98,5%) show high sense of responsibility for future generation on water protection and conservation, as they consider the resource as a basic need and a human right. Nevertheless, the issue of ensuring equal water accessibility is not attributed to the management nor to the (public or private) nature of the provider. In fact, the majority of respondents prefer a public/private partnership (49%) or a private provider (32%) for the water supply, and only 19% of sample wants to receive water from a public institution (Fig. 14). This apparent contradiction can be explained, however, in the light of the particular political and hydropolitical situation of the region: specifically, the lack of Palestinian water sovereignty. Thus, speaking about public sector probably means Israeli control for this population and it is not hard to imagine that Palestinian prefer to entrust the water system

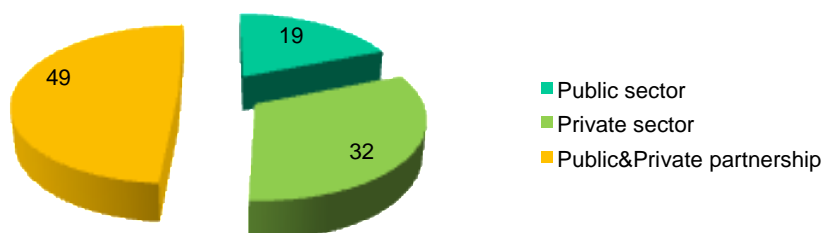
management to a private provider (though in conditions of natural monopoly that could threaten the equal accessibility to this fundamental and strategic resource).

Fig. 14. Consciousness about water and perception about water providers

Consciousness about Water

- ✓ 86,4% didn't receive any awareness training about water and environment
- ✓ 98,5% of respondents with high sense of responsibility for future generation on water protection and conservation

Opinion about better water supply (%)



6. Socio-economic feasibility and water scarcity perception: a cross study

In the last part of the report, it can be useful to cross some results of the “Feasibility study on tailor-made SWMED solutions for the project target areas in Palestine” (WP 4.2.2) with the survey on water scarcity perception.

Tab.1 shows the level of water conservation aptitude in the three target areas. Data points out that conservation devices are more required in Tubas, probably because it is a troubled area with

less facilities than Bani Zaid or Jenin. This is confirmed by results in Tab. 2, that outline a significant problem of water supply during daytime, and Tab. 3, in which emerge a clear need by local inhabitants to be constantly informed about issues related to water (93% of respondents in Tubas area show this need).

Tab. 1. Water conservation aptitude in each target area

		TARGET AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
WATER CONSERVATION APTITUDE	POOR	27	4	27	58
		46,6%	6,9%	46,6%	100,0%
	LOW	8	3	13	24
		33,3%	12,5%	54,2%	100,0%
MEDIUM	0	14	2	16	
	,0%	87,5%	12,5%	100,0%	
HIGH	5	22	7	34	
	14,7%	64,7%	20,6%	100,0%	
TOTAL		40	43	49	132
		30,3%	32,6%	37,1%	100,0%

Tab. 2. Water supply H24 in each target area

		AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
WATER SUPPLY H 24	YES	38	27	46	111
		95,0%	62,8%	93,9%	84,1%
	NO	2	16	3	21
		5,0%	37,2%	6,1%	15,9%
TOTAL		40	43	49	132
		100,0%	100,0%	100,0%	100,0%

Tab. 3. Need of water information in each target area

		AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
RECEIVE INFO WATER	IMPORTANT	8 20,0%	40 93,0%	16 32,7%	64 48,5%
	NOT IMPORTANT	14 35,0%	3 7,0%	13 26,5%	30 22,7%
	DON'T KNOW	18 45,0%	0 ,0%	20 40,8%	38 28,8%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

Coherently with this scenario, people in Tubas area pay more attention to water saving systems. They are significantly more prepared to install devices than in Bani Zaid and Jenin (Tab.4: 84% vs. 12 and 18% respectively). Moreover, as shown in Tab. 5, people in Tubas are more inclined to give a financial contribution for installing water-saving kits (67% vs. 17% and 18% in Bani Zaid and Jenin respectively)

Tab. 4. Willingness to install water conservation devices in each target area

		AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
WILLINGNESS TO INSTALL WATER CONSERVATION DEVICES AT YOUR HOUSE	YES	5 12,5%	36 83,7%	9 18,4%	50 37,9%
	NO	35 87,5%	7 16,3%	40 81,6%	82 62,1%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

Tab. 5. Willingness to contribute financially to install kits in each target area

		AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
WILLINGNESS TO CONTRIBUTE FINANCIALLY FOR THE INSTALLATION	YES	7 17,5%	29 67,4%	9 18,4%	45 34,1%
	NO	33 82,5%	13 30,2%	40 81,6%	86 65,2%
	DON'T KNOW	0 ,0%	1 2,3%	0 ,0%	1 ,8%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

Another signal of the particular discomfort about water in Tubas emerges by the results shown in Tab. 6 and 7 in which data points out the need to adopt urgent antidotes to face water-saving that in other areas are less accepted. In fact, while in Bani Zaid and Jenin people prefer to install dry sanitation systems in public buildings, but they don't want similar kits in their own houses, residents in Tubas are ready to use this low-profile kit also as a domestic solution to save water, with percentage three times higher.

Tab. 6. Opinion on the usefulness of dry toilets at house in each target area

		AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
DO YOU THINK IT IS USEFUL TO INSTALL SEPARATE URINATES AND DRY TOILETS AT HOUSE?	YES	6 15,0%	31 72,1%	10 20,4%	47 35,6%
	NO	29 72,5%	11 25,6%	35 71,4%	75 56,8%
	DON'T KNOW	5 12,5%	1 2,3%	4 8,2%	10 7,6%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

Tab. 7. Opinion on the usefulness of dry toilets in public buildings in each target area

		AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
IS IT APPROPRIATE TO INSTALL DRY TOILETS IN PUBLIC INSTITUTIONS?	YES	36 90,0%	26 60,5%	41 83,7%	103 78,0%
	NO	4 10,0%	16 37,2%	8 16,3%	28 21,2%
	DON'T KNOW	0 ,0%	1 2,3%	0 ,0%	1 ,8%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

It's important to remark (tab. 8), that also for the installation of more sophisticated kits, as the greywater treatment ones, people in Tubas are more inclined to accept this kind of solution (60% vs. 47% in Bani Zaid and 45% in Jenin). The highest confidence in Tubas, regarding water conservation devices, is confirmed even by data in Tab. 9: 84% of respondents in Tubas think to solve water problems using those kits with superior rates respect to Bani Zaid (45%) and Jenin (59%).

Tab. 8. Willingness to adopt greywater treatment in each target area

		AREAS			TOTAL
		BANI ZAID	TUBAS	JENIN	
ARE YOU WILLING TO INSTALL GREYWATER TREATMENT?	YES	19 47,5%	26 60,5%	22 44,9%	67 50,8%
	NO	21 52,5%	15 34,9%	27 55,1%	63 47,7%
	DON'T KNOW	0 ,0%	2 4,7%	0 ,0%	2 1,5%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

Tab. 9. Trust in water saving kits in each target area

		AREA			TOTAL
		BANI ZAID	TUBAS	JENIN	
DO YOU THINK WATER CONSERVATION WILL SOLVE THE PROBLEM?	YES	18 45,0%	36 83,7%	29 59,2%	83 62,9%
	NO	9 22,5%	5 11,6%	6 12,2%	20 15,2%
	DON'T KNOW	13 32,5%	2 4,7%	14 28,6%	29 22,0%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

Data in Tab. 10 show the different perception of water price adequacy in each area: in Bani Zaid and Jenin most of respondents show satisfaction for the sum they have to pay, while in Tubas the appreciation of more than half of interviewed is that tariffs are unfair.

Tab. 10. Opinion on the price adequacy

		AREA			TOTAL
		BANI ZAID	TUBAS	JENIN	
IS WATER PRICE ADEQUATE?	YES	33 82,5%	19 44,2%	38 77,6%	90 68,2%
	NO	7 17,5%	22 51,2%	11 22,4%	40 30,3%
	DON'T KNOW	0 ,0%	2 4,7%	0 ,0%	2 1,5%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

Finally, it can be useful to note how the respondents said to dispose the wastewater (Tab. 11). In Tubas area, most of sampled use percolation pits (79%), a percentage that decreases to 47%

in Bani Zaid and 59% in Jenin; in these last two areas are more diffused rudimentary methods to dispose wastewater (as free flowing to adjacent land).

Tab. 10. Alternative wastewater disposal

		AREA			TOTAL
		BANI ZAID	TUBAS	JENIN	
HOW YOU DISPOSE YOUR WASTEWATER?	PERCOLATION PIT	19 47,5%	34 79,1%	29 59,2%	82 62,1%
	SEPTIC TANK	2 5,0%	7 16,3%	2 4,1%	11 8,3%
	FREE FLOWING TO THE ADJACENT LAND	15 37,5%	0 ,0%	13 26,5%	28 21,2%
	MISSED	4 10,0%	2 4,7%	5 10,2%	11 8,3%
TOTAL		40 100,0%	43 100,0%	49 100,0%	132 100,0%

In conclusion, the analysis shows that the multilevel approach adopted in the feasibility study (WP 4.2.2) is specifically suited for a scenario with different needs and facilities. The strategy based on contemporary adoption of more devices, both simple and advanced (such as tools for regulating the water flow, shower diffusers, WC “Water Saving”, reuse of wastewater through roof rainwater harvesting, greywater treatment systems and so on) responds sufficiently to the multiplicity and diversity of needs highlighted by the survey.

Especially data in Tab. 10 show how can be important in Bani Zaid, as scheduled in the feasibility study, upgrade the connection to the existing treatment systems of an increasing number of households, through new sewage systems or refurbishing existing wetlands; in fact in this area is still frequent to dispose wastewater dumping it in the nearby land. A similar approach can be adopted also for Jenin area, even if the water consumption pro capite is low (43 l per capita x day), and simple methods to save water (tools for regulating the water flow, shower diffusers, WC “Water Saving”) can improve water availability. Instead, Tubas (with Faria

refugee camp) is particularly problematic and need to be dealt with urgently. This area has a good sewage system but no wastewater treatment plant; so the proposed WWTP in the feasibility study can take a number of advantages. Further, it can use the existing sewage system adopting low technology treatment system with reduced maintenance costs (and low impact on a population still worried for water tariffs). It's important to remark that greywater treatment systems are perceived by a part of the population as costly and polluting, underrating devices that can be really proficient in those areas. In the light of this trivial dominant opinion, that shows a low awareness about these devices, it could be useful to adopt a public awareness campaign to clarify to the people which are the profits about the use of this kind of water saving systems.