



European Regional Development Fund

## **Research in General Public, Farmers and Industry Project «Best Water Use»**

### *Research results & Conclusions*

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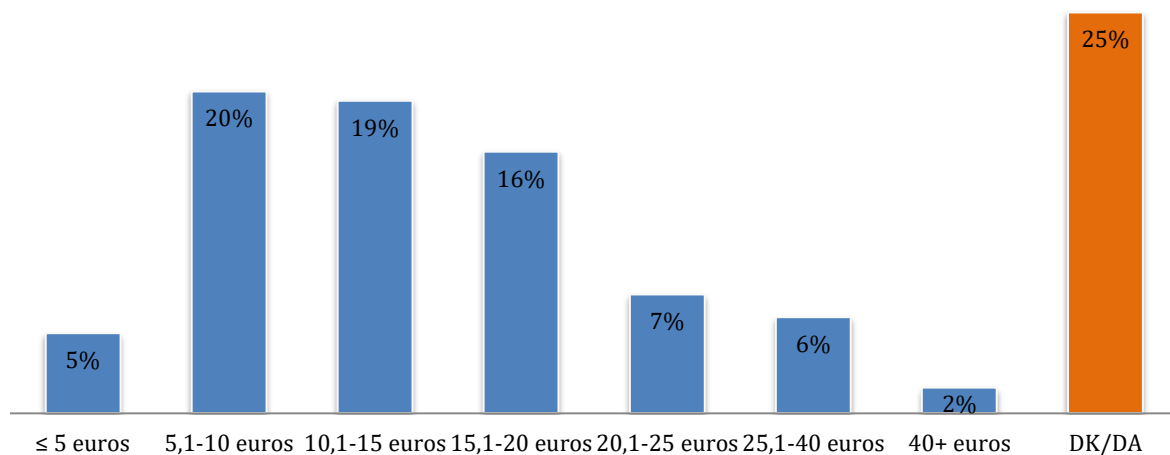
## 1. Results and Main Findings of the Survey in General Public

The survey in general public was conducted on a sample of 1722 households in Thessaloniki Regional Unit. Domestic water use varies among urban and peri-urban areas, thus the population of the research is located in 2 urban and 3 peri-urban municipalities (Thermi, Thermaikos, Thessaloniki, Kalamaria and Pylaia-Chortiatis). The survey was conducted with telephone interviews, using a CATI system (Computer Assisted Telephone Interviewing). The households of the above municipalities constitute the survey's sample basis whereas the method followed is the random stratified sampling based on the selected area's population, as recorded by Hellenic Statistical Authority (2011).

According to Eurostat guidelines, survey's population is people aged 16 to 74 who live in private households in Greece. So, regarding households, the survey's sampling unit is the private household and a randomly selected member 16 to 74. The wide subject of this survey required the participation of respondents over the age of 16, of each gender, age, educational level, employment status and specific characteristics. Quotas were used based on the selected municipalities' population while the results were weighted on the basis of gender and age distribution in the permanent population of the selected municipalities according to Hellenic Statistical Authority data. The proposed sample size ensures high accuracy of research results, with a margin of error  $\pm 2.4\%$ , under confidence level of 95%. The proposed sample size ensures the minimum required number of 60 respondents per demographic subgroups, the basis for statistically valid analysis. The distribution of the sample is as follows:

SURVEY IN GENERAL PUBLIC	Permanent Population	%	Sample
Total permanent population	590.275	100%	1.700
<b>Gender</b>			
Male	276.849	47%	797
Female	313.426	53%	903
<b>Age</b>			
16-29	102.331	21%	351
30-39	87.997	18%	302
40-59	162.151	33%	557
60+	142.681	29%	490
<b>Municipality</b>			
Thessaloniki	325.182	55%	937
Kalamaria	91.518	9%	145
Thermi	53.201	9%	153
Thermaikos	50.264	16%	264
Pylaia- Chortiatis	70.110	12%	202

The quantitative survey carried out on a sample of 1722 households in the Thessaloniki Regional Unit reflects the attitudes and perceptions of the general public on using, saving and conserving water resources, highlighting the need for raising awareness on rational water resources management. Almost 9 out of 10 respondents are unaware of / not reporting their monthly household water consumption, whereas 1 out of 4 is unaware of / not reporting the corresponding consumption costs. On average, the monthly water consumption among the surveyed households is 13 cubic meters and the corresponding average monthly cost is recorded as 16.6 euros. Particularly, 25% of the participants spend monthly 0-10 euros, 25% 10-20 euros and 25% 20-40 euros.



#### Monthly cost of households' water consumption

The highest percentage of water usage regards to bathing/ personal hygiene needs, while the lowest percentage to car wash. In particular, 92% of the respondents use water for bathing / personal hygiene needs daily or 3-5 times a week, while almost 9 out of 10 mentioned that they do not use water for car washing. Regarding the demographics, the categories recording more frequent domestic water use are households in apartments and age groups of 40-49 & 50-59 years.

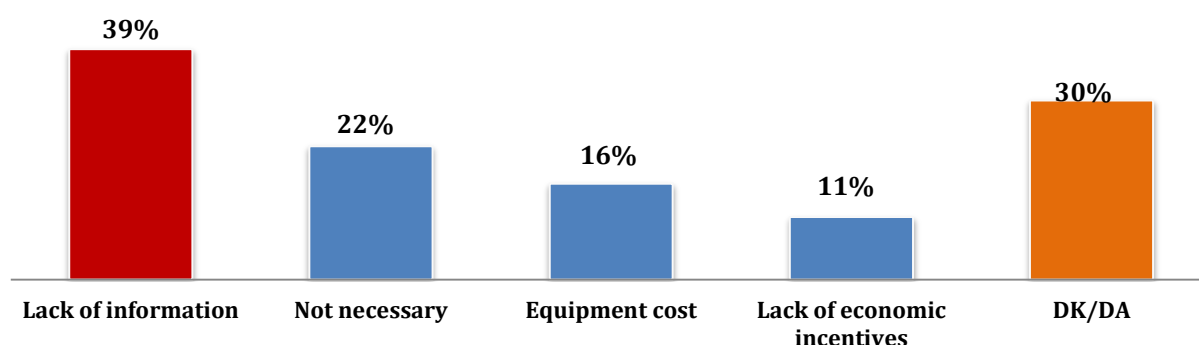
Regarding rational water management methods known to the participants (spontaneous choice), the predominant answers comprise closing tap during tooth brushing (33%), tap closing during dishwashing (29%) and minimizing water flow during bathing. Only 5% of the respondents reported water recycling as a means of rational water use.

Participants aged 16-29, are more aware of rational domestic water management, in contrast to the respondents over the age of 60. Significant differences are also detected in the analysis per education level,

where high school graduates report that they do not apply (12%) or do not know any water saving methods (45%).

The vast majority of the respondents (84%) stated that apply water saving methods. The lowest rates are observed in the age group of 60+ (77%) and primary school graduates (65%). The most frequent water saving methods, among those using water saving measures, are tap closing during tooth brushing (89%), tap closing during dishwashing (81%) and minimizing water flow during bathing (76%). On the other hand, only 1 out of 5 states that recycles water for various household usages.

One of the most important research findings of this report is the analysis of the deterring factors towards the adoption of water saving methods. In particular, almost 4 out of 10 state that they are poorly informed about rational water management methods, while 22% do not consider it necessary to apply such measures. Significant lack of information is also reported with regard to the water quality and water management issues in the respondents' residence, as 2 out of 3 report that they are not well informed. The respondents in the Municipality of Thessaloniki reported greater lack of information on the local water quality (68%), while the corresponding percentage in the Municipality of Thermaikos stands at 59%.



#### Deterring factors towards the adoption of water saving methods

Mass Media constitute the main source of information received by the respondents (42%), following by far social relationships (17%). It is noteworthy that municipalities, as well as EYATH, have low preference rates (12%), while the respective percentages for management authorities, NGOs and informative events do not exceed 2%.

The majority of the participants (60%) consider that the quantity of the available water resources in their area is affected mainly by domestic water use, following water use in agriculture (22%), in industry (15%) and in tourism sector (10%). It should be highlighted that the participants - residents of the peri-urban municipalities of Thermi and Thermaikos, report significantly different perceptions compared to the residents of the sample's urban municipalities.

Specifically, residents both in the Municipality of Thermaikos and the Municipality of Thermi, consider that water use mainly in agriculture affects the quantity of available water resources (45%). With regard to the municipalities of Thessaloniki, Kalamaria, and Pylaia- Chortiatis, the vast majority of the respondents indicate domestic water use as the main factor affecting regional water quantity.

Municipality	Thermi	Thessaloniki	Kalamaria	Pylaia- Chortiatis	Thermaikos
Domestic water use	48%	65%	79%	71%	30%
Agricultural water use	45%	15%	11%	15%	45%
Industrial water use	26%	19%	12%	6%	3%
Drilling overflow	20%	9%	8%	15%	9%
Water use in tourism industry	14%	9%	7%	5%	17%

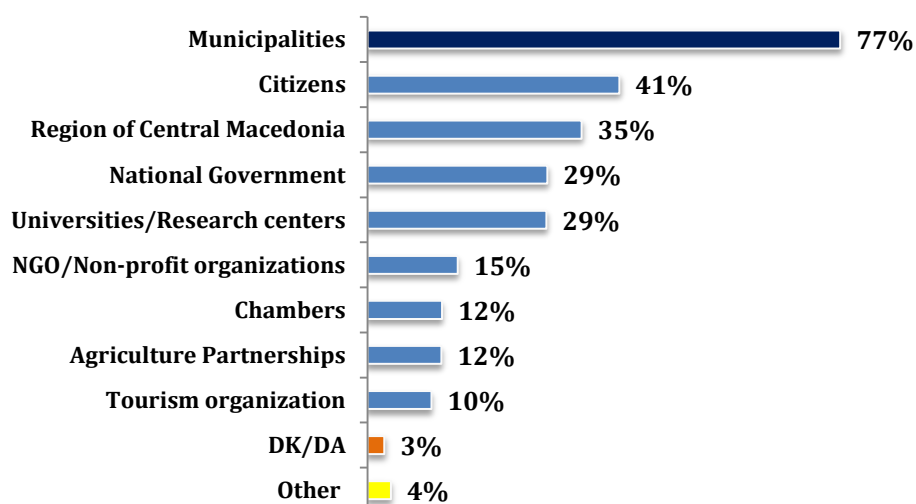
Almost 3 out of 4 of the respondents believe that water is a natural resource in adequacy, while the highest relevant percentages are concentrated in the age group of 60+ years (80%) and in primary school graduates (82%). At the same time, the overwhelming majority (89%) considers that water is social good and should not be governed by market laws.

Water pollution by fertilizers and/or insecticides is considered the main problem (49%) as far as water management in the Regional Unit of Thessaloniki is concerned. Other important issues concerning water management in the area are waste water pollution (19%), and shortage of drinking water (10%). The pollution of water by fertilizers and insecticides is recorded as a relatively more important water management issue for the participants of older age groups, while waste water pollution concerns mainly young people aged 16-29.

Age	16-29	30-39	40-49	50-59	60+
Water pollution by fertilizers/insecticides	35%	48%	51%	60%	52%
Waste water pollution	32%	18%	15%	14%	14%
Shortage of drinking water	20%	11%	9%	5%	6%
Lack of flood protection works	1%	2%	1%	1%	1%
Inadequate controls on underground water pumping	4%	7%	7%	5%	3%
Water pricing	1%	6%	5%	4%	4%

Conflicts over water use between different users	3%	2%	3%	2%	1%
DK/DA	3%	6%	5%	7%	15%
Other	0%	1%	3%	3%	4%

Municipalities are considered by the respondents as the most important bodies/organizations in the water management/saving decision making process (77%), followed by the citizens themselves (41%) and the administration of the Region of Central Macedonia (35%).



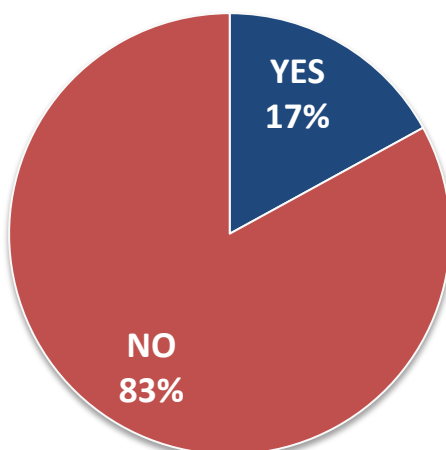
Bodies & organizations that should be involved in the water management/saving decision making process

## 2. Results and Main Findings of the Survey among Businesses

The survey was conducted among businesses in manufacturing and in the sector of tourism, located in the Regional Unit of Thessaloniki. The survey was conducted with telephone interviews with business owners or business executives/ key business managers, using a CATI system (Computer Assisted Telephone Interviewing). All respondents were selected with two important criteria in mind: they should have an overall view of their business and they should play an important role in the decision making process of their business. Interviews were conducted after an initial telephone approach was made in order to set an telephone appointment. Overall, 180 business executives participated in the survey, 141 from the manufacturing sector and 39 for the tourism industry.

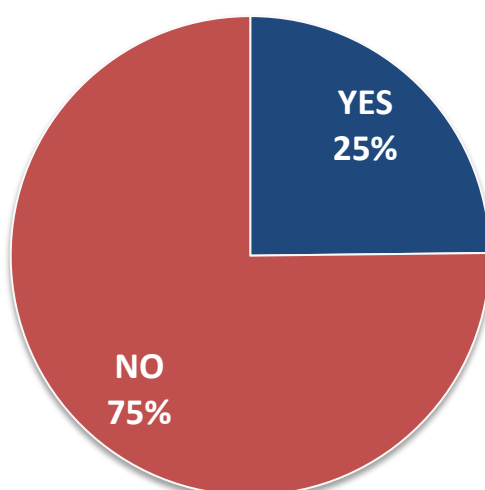
## 2.1 Water Use in Manufacturing

1 in 5 (17%) businesses in the manufacturing sector in the Regional Unit of Thessaloniki use water as raw material or as a critical element of their production process. Among these businesses, the vast majority use water as raw material (67%), 46% use water for machinery cleaning and just 3% use water for other purposes (recycling, cooling etc).



### Use of water as raw material and/or key element in the production process

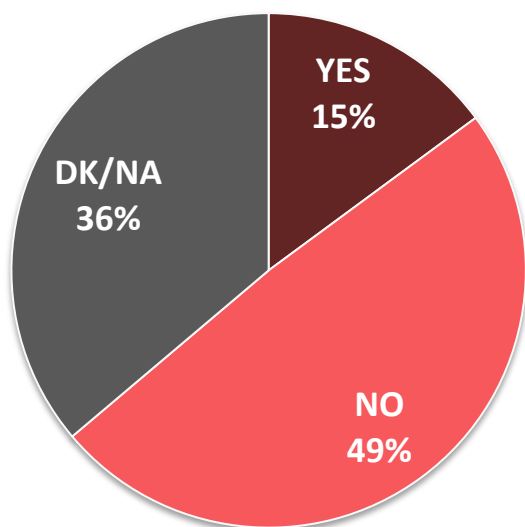
25% of manufacturing businesses consume water using alternative sources, other than the public water supply network, such as boreholes, wells etc. Moreover, just 11% of the respondents report constant water consumption during the year, with consumption boosted mainly during summer: 81% say water consumption is significantly increased during June and August, 75% say the same for July, followed by September (56%), May (50%), April (38%) and March (31%).



### Percentage of manufacturing businesses consuming water from sources other than the public water supply network

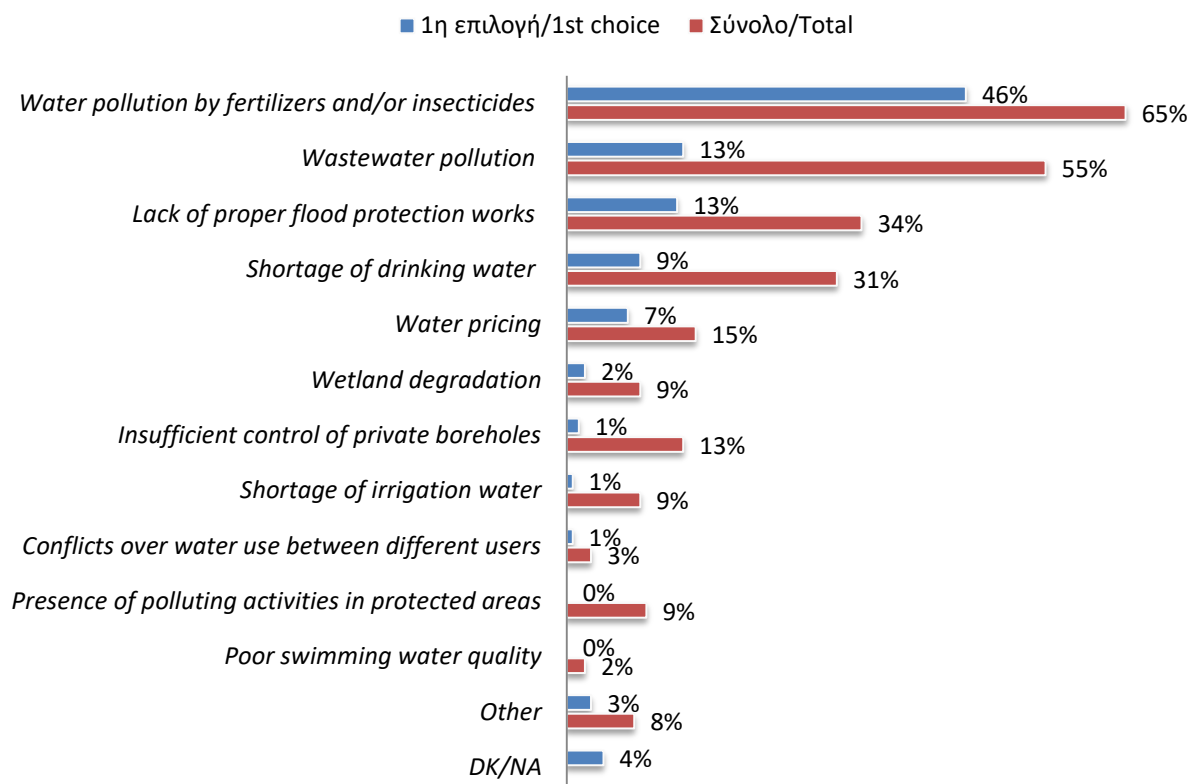


Just 2% of the manufacturing businesses asked, say that there is one or more stages of their production process that could be skipped or altered in a way that could reduce water consumption, whereas 71% say there is no such possibility and 27% have no opinion or do not know. Moreover, just 18% of manufacturing businesses in the Regional Unit of Thessaloniki use water recycling or reuse methods. Nevertheless, it should be underlined that the percentage of manufacturing businesses that apply water recycling or reuse methods is significantly higher (58%) among manufacturing businesses that use water as raw material or as a critical element in their production process. The majority of those not using any water recycling or reuse methods, mainly claim that they do not need such methods (60%) or refer to lack of knowledge for methods and technologies (21%), lack of availability of relevant methods and technologies (12%), high relevant costs (3%) and lack of required expertise (2%).



#### Views on whether different production technologies can achieve reduced water consumption

Half of the manufacturing businesses surveyed (49%) do not think that using alternative technologies would result to water consumption reduction, against just 15% who agree with this view, whereas 36% say they do not have any knowledge for this issue.



#### Most important water management issues in the Region of Central Macedonia:

Water pollution by fertilizers and/or insecticides is considered the main problem (65%) as far as water management in the Regional Unit of Thessaloniki is concerned, according to manufacturing businesses in the area. Other important issues concerning water management in the area, are wastewater pollution (55%), lack of proper flood protection works (34%) and shortage of drinking water (31%). Water pricing issues are not high in the list with just 15% of responses.

Municipalities are considered by manufacturing businesses executives as the most important bodies/organizations in the water management/saving decision making process (60%), followed by the administration of the Region of Central Macedonia (27%), the national administration/government (19%) and the citizens themselves (14%).

Asked about the main obstacles in water management are lack of co-ordination between bodies/organizations (56%), followed by overlapping/conflict of responsibilities (37%), lack of law enforcement (30%), low priority for water management issues (26%), lack of proper legislation (24%) and lack of proper water management plans (24%).

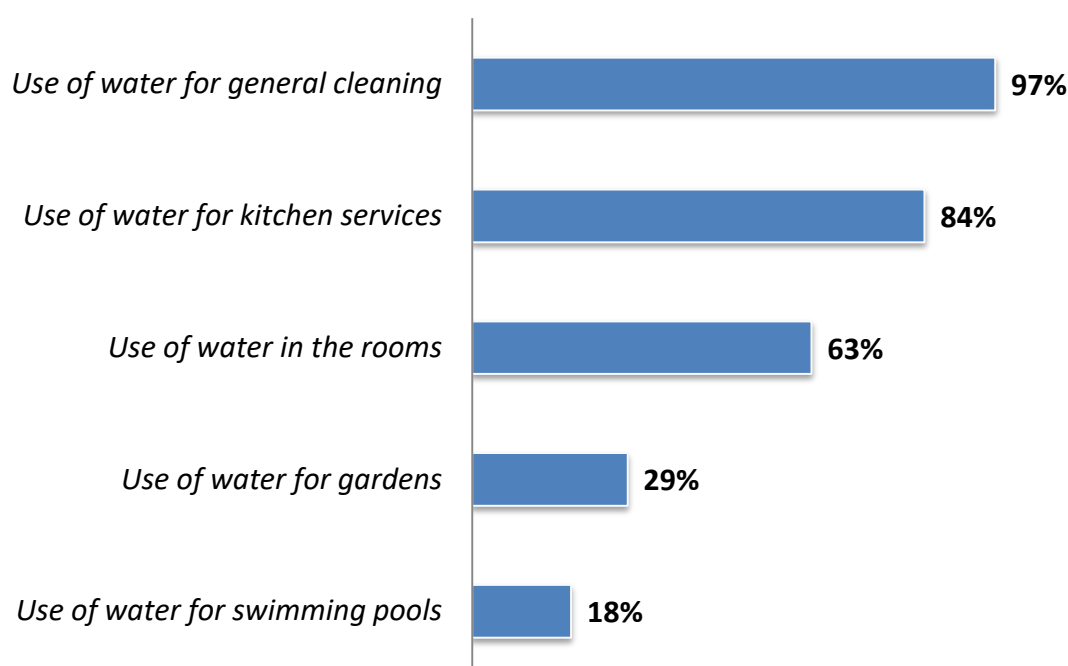
Finally, a wide range of solutions to water management issues are favored by manufacturing businesses in the Regional Unit of Thessaloniki. More specifically, environmental audit (41%), better training/education (36%), more public updates and information available by Mass Media (33%), increased funds available for

water management (32%), re-structuring of current water management decision making bodies/organizations (31%), enhanced local communities involvement (27%) and better implementation of the 2000/60/EC European Directive (11%).

## 2.2 Water Use in Tourism

For the vast majority (97%) of businesses in Tourism industry (hotels and restaurants), water is a key element for their operation. Water is mostly used for general cleaning purposes (97%), in the kitchen (84%), for room supply (63%), for gardens (29%) and swimming pools (18%).

1 in 10 businesses in tourism (10%) consume water using alternative sources, other than the public water supply network, such as boreholes, wells etc.

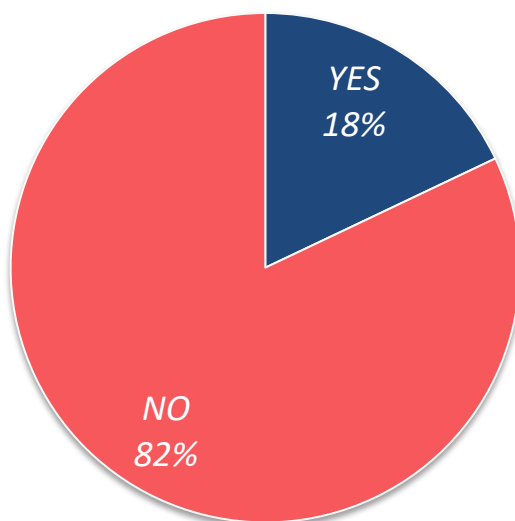


### Basic Water Uses in Tourist Businesses

For the vast majority (92%) of businesses in tourism, there is no stage or part of their operation that could be replaced in order to use less or no water and only 1 in 20 (5%) think that something like that could actually happen.

Only 1 in 5 (18%) of the businesses in the tourism sector surveyed, use some method of water recycling and/or reuse. Among those not using water recycling and/or reuse methods, the majority invoke lack of knowledge for such methods or technologies (44%), 13% believe that there is no such technology or method,

9% invoke high costs for incorporating such methods and 3% invoke lack of required expertise. 31%, though, state that it is not necessary to apply water recycling and/or reuse methods. Moreover, a similar 31% of the respondents do not believe that using alternative methods or technologies in their operation could lead to water consumption reduction (against 13% who believe so) and 56% say they do not have proper knowledge on this issue.

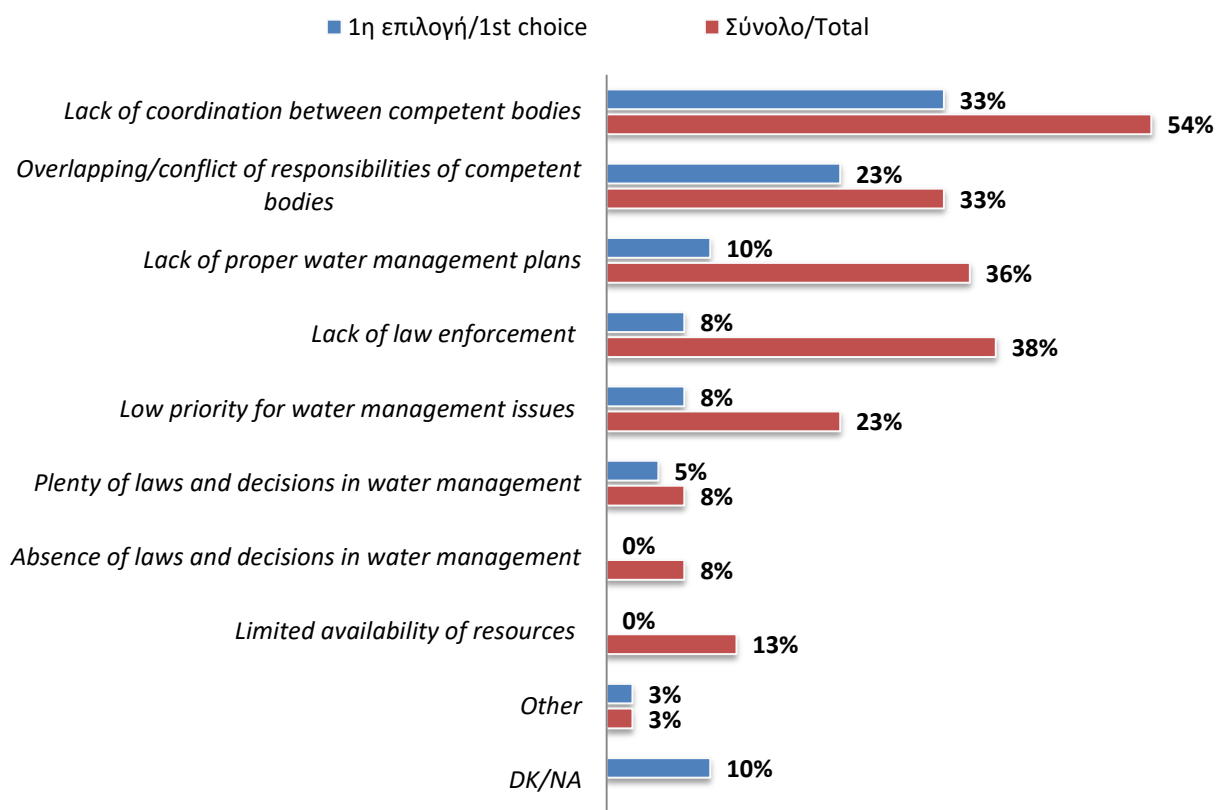


#### Percentage of businesses in the tourism sector applying water recycling or water reuse methods

Water pollution by fertilizers and/or insecticides is considered the main problem (61%) as far as water management in the Regional Unit of Thessaloniki is concerned, according to tourism businesses in the area. Other important issues concerning water management in the area, are wastewater pollution (48%), lack of proper flood protection works (42%) and shortage of drinking water (27%), water pricing issues (24%) and inadequate controls on underground water pumping (18%).

Municipalities are considered by tourism businesses executives as the most important bodies/organizations in the water management/saving decision making process (64%), followed by far by the national administration/government (23%), the citizens themselves (21%) and the administration of the Region of Central Macedonia (8%), whereas 18% choose all the above bodies/organizations.

Asked about the main obstacles in water management are lack of co-ordination between bodies/organizations (54%), followed by lack of law enforcement (38%), lack of proper water management plans (36%), overlapping/conflict of responsibilities (33%), low priority for water management issues (23%), and limited available resources (13%).

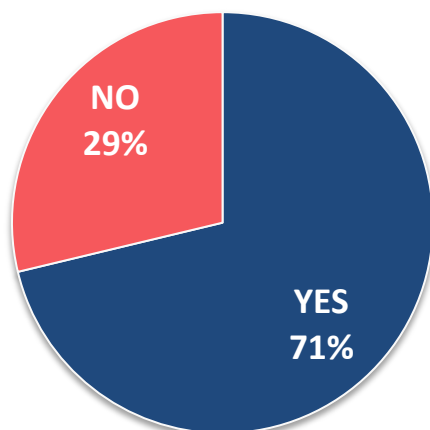


#### Major obstacles that make it difficult to address issues of water management:

Finally, a wide range of solutions to water management issues are favored by tourism businesses in the Regional Unit of Thessaloniki. More specifically, more public updates and information available by Mass Media (46%), environmental audit (38%), better training/education (36%), enhanced local communities involvement (33%), increased funds available for water management (28%), re-structuring of current water management decision making bodies/organizations (26%) and better implementation of the 2000/60/EC European Directive (15%).

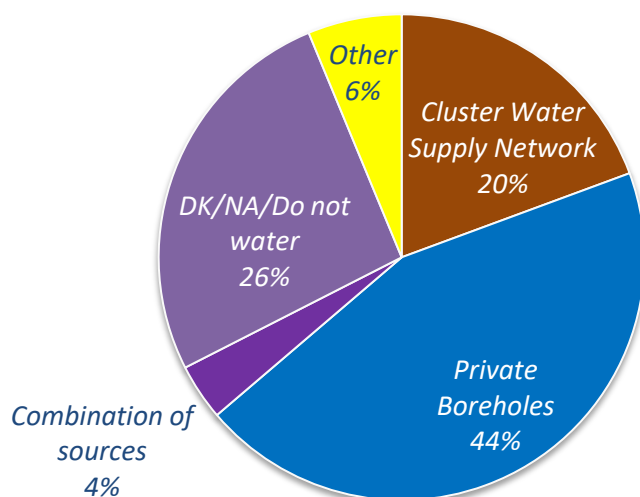
### 3. Results and Main Findings of the Survey among Farmers

The survey was conducted among farmers in the Regional Unit of Thessaloniki. Telephone interviews with farmers took place and respondents were reached with random dialing in rural areas of the Regional Unit of Thessaloniki. The final sample size was 160 individuals - farmers and a CATI (Computer Assisted Telephone Interviewing) was employed for the survey.



#### Percentage of farmers who water their crops

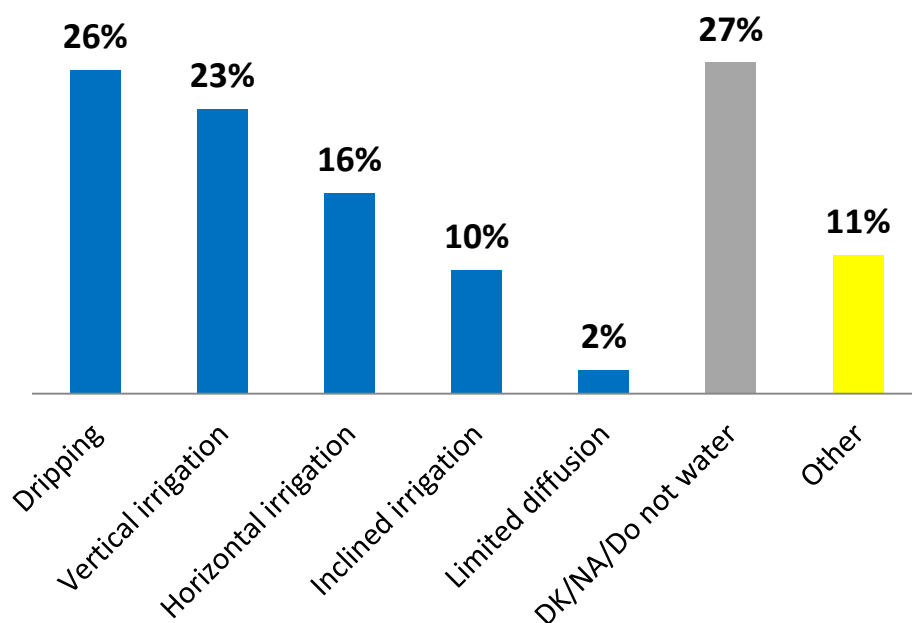
Approximately 7 out of 10 farmers (71%) say that they water their crops.



#### Sources of irrigation water for crops

Among those who water their crops, almost 6 out of 10 (59%) say that they use private boreholes for watering crops and almost 1 in 4 (27%) say that they use some kind of cluster water supply network. Only a mere 5% say that they use a combination of private boreholes and cluster water supply network.

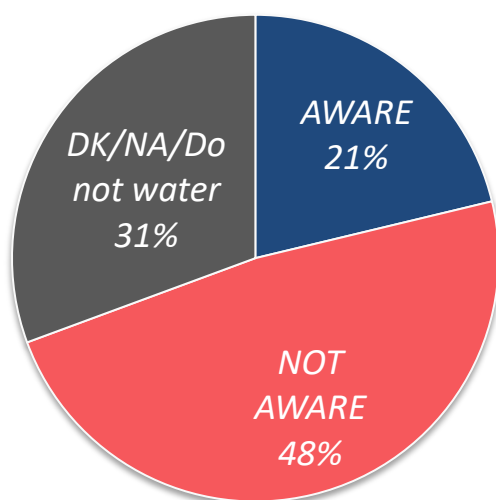
The most popular method for watering crops is dripping (36%), followed by vertical irrigation (32%), horizontal irrigation (22%), inclined irrigation (14%) and limited diffusion (3%). 15% of the respondents refer to other methods of irrigation.



#### Most popular irrigation systems

58% of those who water their crops, say they have pay no cost for the water they use, against 42% who state the opposite. The most popular pricing method for irrigation water appears to be the one based on consumption (34%), followed by pricing on size of crop area and crop type (22%), while 15% choose the existing pricing method as the preferred one.

Among those who water their crops, 35% say they are suffering losses of irrigation water, compared to 65% who do not. Moreover, 82% consider the amount of water used for their crops satisfactory, whereas only 15% consider it less than required and just 3% consider it more than required.

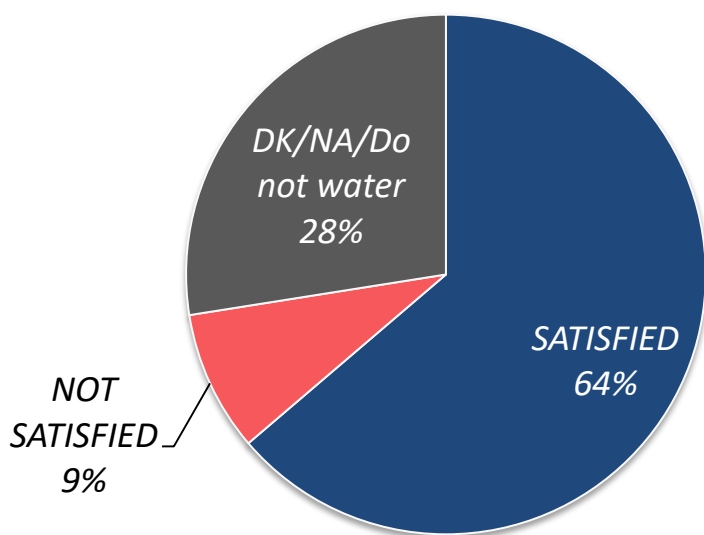


#### Percentage of farmers who are aware of the recommended annual amount of irrigation water for their crops

More than 2 out of 3 (67%) admit that they are not aware of the recommended amount of annual water consumption for their own crop, while 50% say they use irrigation water saving methods (against 50% not using). The most popular method of water saving is dripping (53%), followed by annual maintenance of irrigation networks (24%), calculating irrigation needs in critical stages of the plant's growth (17%), using hydrometers (14%) and the reduction of surface runoff losses (12%). Among those who do not use an irrigation water saving method, the main reason reported is the lack of proper information on these issues (35%), followed by high costs (18%), while 5% report lack of specialized knowledge. Finally, about 30% of those who do not use an irrigation water saving method say that they just do not need it.

Among those who water their crops, about 3 out of 4 (75%) consider that they have achieved the maximum quantitative yield of their crops in relation to the amount of irrigation water used. Among those who do not believe that they have achieved the maximum quantitative yield in relation to the water used, more than half (56%) believe they will succeed that by increasing the amount of water used in each irrigation, while a smaller percentage (15%) rely on weather and rainfall, while 4% think that the solution is to increase the frequency of watering.

At the same time, among those who water their crops, 79% consider that they have achieved the highest quality of their crops in relation to the amount of irrigation water used. Among those who do not believe that they have achieved the highest quality in terms of irrigation water used, the majority (40%) consider that they will achieve that by increasing the amount of water used in each irrigation, while a significant proportion (30%) rely on weather and rainfall and 20% think that the solution is to increase the frequency of watering.

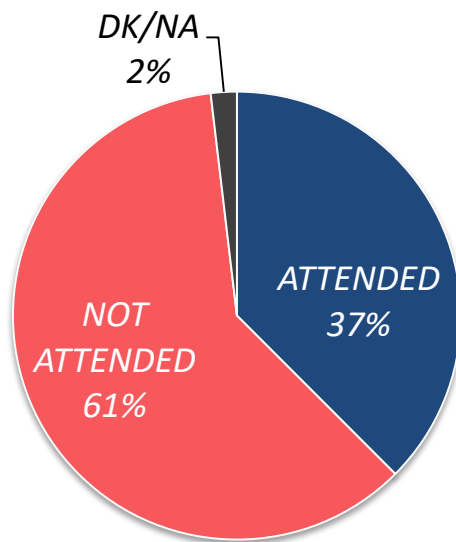


#### Percentage of farmers who are satisfied with the irrigation system they use

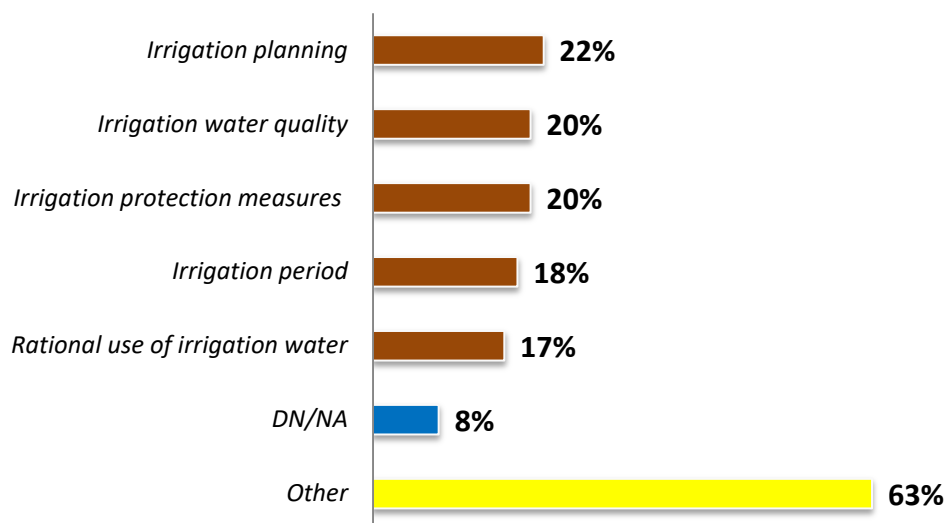


The overwhelming majority (89%) of those who water their crops seem satisfied with the irrigation system used, compared to only 11% who are unhappy. Among those who are not satisfied with the irrigation systems used, 29% refer to the uneven application of water to the crop, 21% the irrational use of irrigation water by the system used and 14% indicate the need for continuous maintenance of the irrigation system.

As far as training of farmers is concerned, a little more than 1 in 3 (37%) say they have previously followed some kind of training program / seminar about their agricultural activity, compared to 61% who have no such experience. Among those who have attended a training seminar for farmers, irrigation water related seminars range from 17% (rational use of irrigation water), 18% (irrigation period), 20% (irrigation protection measures and irrigation water quality) and 22 % (irrigation planning), while 63% mentioned various other topics in relation to agricultural production and crops.



Percentage of farmers who have attended a training program / seminar on agricultural issues



#### Content of training seminars / programs for farmers