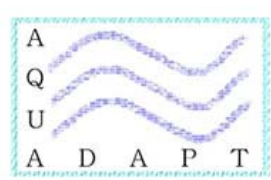


Socio-cultural determinants of water utilisation: Hérault river basin case study (France)

Aquadapt WP2 Final Report

BRGM/RP-53090-FR
Juin, 2004



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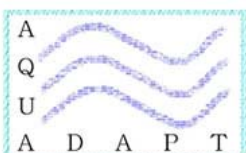
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Synthesis

In the framework of the AQUADAPT European funded project (contract : EVK1-CT-2001-00104), the work package 2 research activities aim at identifying the socio-cultural determinants of water utilisation in four national case studies (France, England, Spain and Slovenia).

This report presents the Hérault river basin (France) results where the BRGM realised a survey based on a sample of 400 households representatives of the Hérault river basin population.

The questionnaire is composed by about 80 questions that allow to identify behaviours, attitudes and perceptions related to water in general.

Results are analyse using basic frequencies analysis, khi2 independence tests, multiple correspondence analyse and agglomerative hierarchical clustering.

We then define five water profiles: (i) perception of the water within the environment, (ii) perception of the drinking water, (iii) attitudes face to water pricing, (iv) water saving behaviours and (v) attitudes face to alternative water resources. Based on this five profiles, we attempt to define some households profiles for the whole Hérault river basin, named "national user profile" in the report.

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1. Introduction

1.1. SITUATION AND HYDROLOGICAL CHARACTERISTICS

1.1.1. Geographic location

The Hérault is a small Mediterranean river located in the South of France (Figure 1) has its spring in the Cévennes Mountains at an altitude of 1280 metres and at a distance of 70 kilometres from the sea. The river is 160 kilometres long from the spring to its mouth at Agde. It receives ten major tributaries, including the Clarou, the Arre, the Vis, the Buège, the Lamalou, the Lergue, the Boyne, the Peyne and the Tongue. These tributaries represent a total length of 330 kilometres, out of which 113 kilometres can temporarily dry-up. Overall, the Hérault river basin covers an area of 2500 square kilometres.

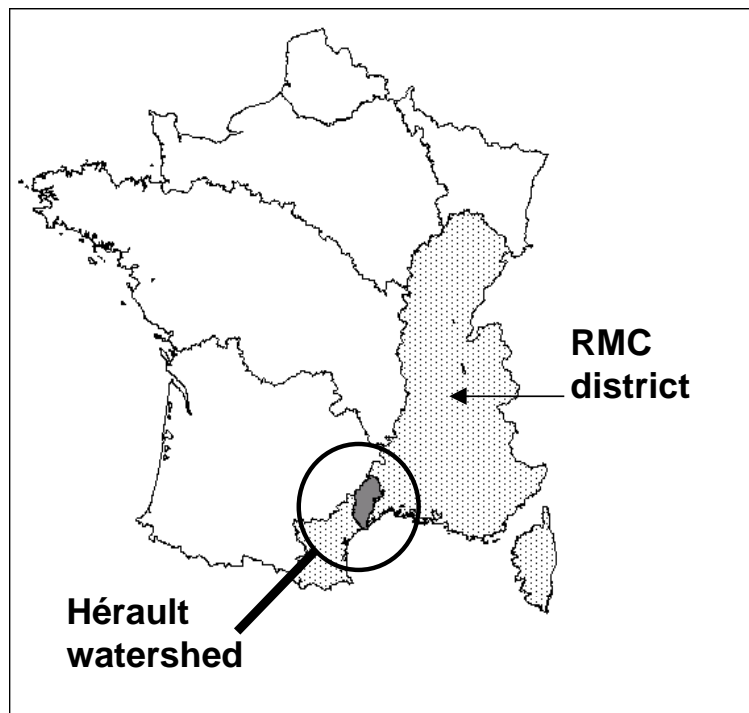


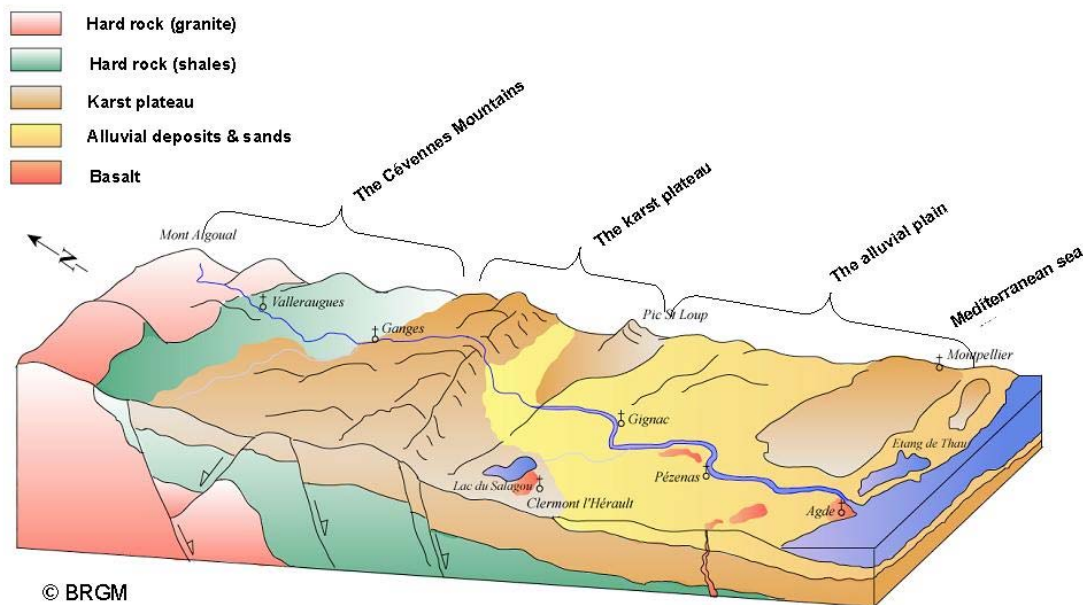
Figure 1. Location of the Hérault river basin

The basin can be divided into three **natural regions** (see Figure 2):

- A mountainous zone upstream, which covers an area of 300 km²; from a geological point of view, this mountainous zone corresponds to the crystalline basement

(shales and granite); the landscape is characterised by deep and narrow valleys; the steep sides of valley are covered with forests.

- a karst plateau in the central section, covering an area of 1500 km²; the plateau corresponds to carbonate formations of the late and middle Jurassic age; the landscape is characterised by large flat areas where rivers cut a gash; the vegetation is mainly composed of pasture lands, partly invaded by bushes and Mediterranean trees on the plateau and forests of pine in the valleys and their slopes.
- a plain in the middle lower valley (700 km²) where most of the human activity concentrates; the presence of alluvial and sedimentary deposits has generated a relatively flat landscape, characterised by the presence of vineyards and a large number of ancient villages; the area is crossed by a number of transport infrastructures (2 motorways, several highways, railway line, navigation “canal du Midi”, etc); the coastal section of the plain is highly urbanised since the 1960 (sea resorts).



Source : in Perron-Pinvidic (2002), adapted from a drawing of Pierre Berrard (BRGM)

Figure 2. *The three geological and landscape zones of the Hérault basin.*

August at Montagnac (15 kilometres from the mouth) is 8.7 m³/s for the period 1931-1973, and it can occasionally fall down to 1 m³/s at the river mouth at Agde.

It should be noted here that low flow period occur when the demand is maximum (irrigation, drinking water needs, tourism related activity water needs), which increase the relative scarcity of water. Moreover, point source pollution also reach a maximum during this period (increase of effluents discharge from waste water treatment plants as the temporary population rises, pollution by the wine factories in September) which can generate scarcity of high quality water.

Winter can be marked by floods : in December, the average discharge at Montagnac (period 1931-1973) is 104 m³/s. Discharges can reach 2000 m³/s at Agde. Approximately 1800 m³/s were recorded at Gignac in the middle valley in December 1997). Floods are not a recent phenomena and are frequently reported in historical records (Amiel, 1998). Most of the floods are flash floods which result from violent storms in the Cévennes mountains.

1.1.3. Groundwater resources

Aquifers are very significant water resources in the Hérault river basin. Three major resource should be distinguished : the hard rock aquifers (very limited reserves), the karst aquifers (significant reserves, high vulnerability to pollution) and the alluvial aquifers (significant reserves, moderate vulnerability).

Karst aquifers, being located in remote areas where little economic activity takes place, are not exploited intensively. The alluvial aquifer of the Hérault river and of its tributaries (the river Lergue in particular) are intensively exploited for drinking water supply and; to a lesser extent, by agriculture. They represent the major resource in the basin.

The alluvial aquifer is influenced by the karst aquifer (underground transfers of water from the karst to the alluvial aquifer) and by the river: the river recharges the aquifer in during high flow periods whereas the alluvial aquifer contributes to the discharge of the river in low flow period.

1.2. SOCIO-ECONOMIC CHARACTERISTICS

Using primary statistical data (population and agricultural census) and expert advise, the river basin has been divided into six different socio-economic zones.

The location and the extension of these zones are depicted on Figure 4 below and their characteristics are described, highlighting the social, economic and cultural coherence of each zone as well as the differences that distinguishes them in socio-economic terms, but also according to the previous physical characteristics (geology, hydro-geology, resource availability) .

The river basin population is about 152 000 permanent inhabitants divided into 166 towns and villages.

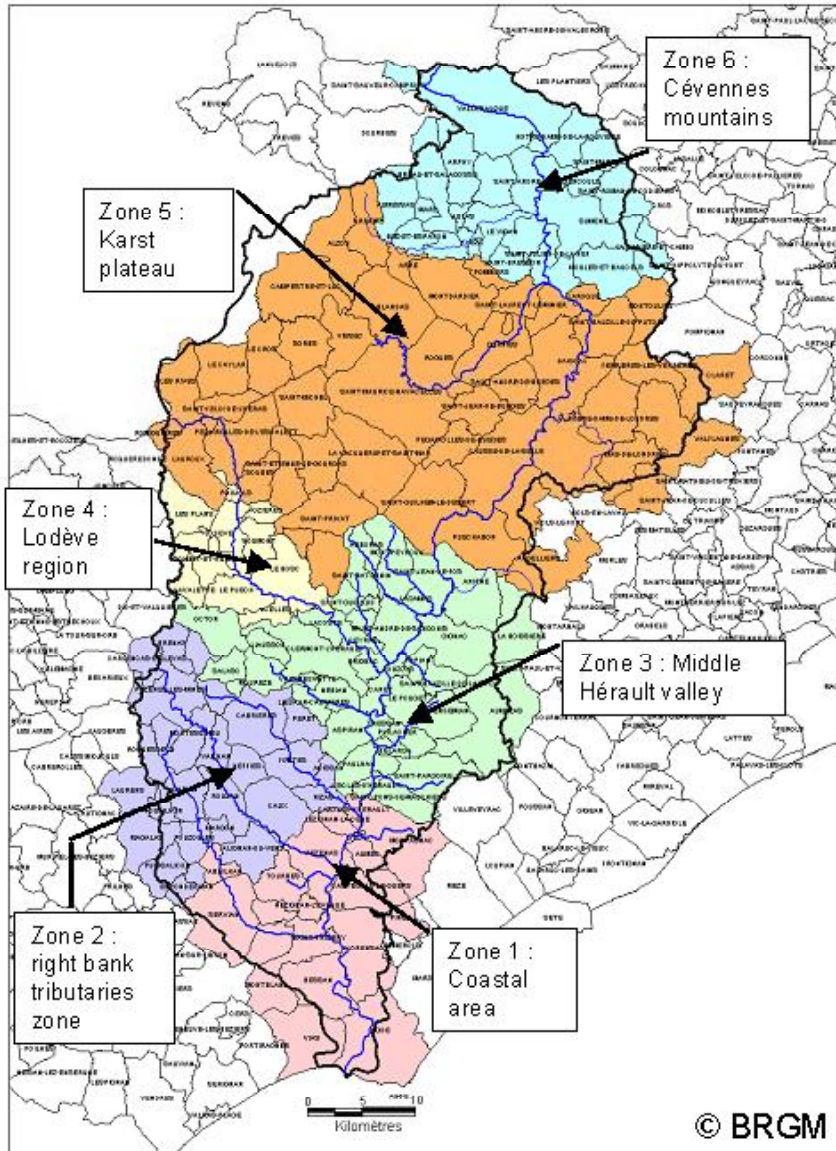


Figure 4. socio-economic zones in the Hérault river basin.

1.2.1. The coast

Most of the population of the watershed is concentrated in the coastal zone. It represent 12% of the river basin area and 38% of its permanent population. With 165 inhabitants by square kilometre, the population density is the higher of the whole basin zone. The major assets which have supported the development of the zone are the presence of the sea, the large scale tourism development projects initiated in the 1970s and the presence of communication infrastructure (A9 motorway linking Spain with the

Rhône valley; High Speed Railway (TGV) line which puts Agde and Vias at four hours from Paris). With more than 24,000 permanent inhabitants, Agde and Vias are the most densely populated city. It is followed by the historical city of Pezennas (7500 inhabitants). Except for Pezennas, the whole area has been marked by a rapid population growth (10.5% between the 1990 and 99 population census). The demographic growth remains, however, lower than what was observed in the 1982-90 period. It is also lower than the rate observed in the Middle Hérault valley.

The economy of the coastal zone is heavily depending on tourism related activities, which are mainly concentrated in the two coastal municipalities of Agde and Vias; the city of Pezennas also attracts a high number of visitors and offers some lodging opportunities. Although the production of high quality wines is rather limited (only one Controlled Origin Appellation: Pinet), agriculture continues to diversify with irrigated cereals and vegetable productions and it still plays a significant economic role. Food and beverage industry is also present with some of the French largest wine co-operatives (Montagnac for instance) and spirits factories – the famous Pastis Ricard is produced in this zone.

The quantity of water abstracted in the coastal zone is by far the highest in the entire basin. This is not only due to the size of the permanent population, which moreover is multiplied by a factor 5 to 10 during the summer months but also to the fact that local water resources are exported outside the Hérault catchment. Two Drinking Water Utilities, the Syndicat du Bas Languedoc and the Syndicat de la Vallée de l'Hérault abstract water from the Hérault alluvial aquifer to supply respectively municipalities of the coast (from Agde to Montpellier) and municipalities of the surroundings of Béziers. The Hérault valley aquifer is the major water resource exploited. The aquifer of the Astien Sands is also exploited, under very strict supervision of Government Agencies as it has already presented signs of over-exploitation, leading to sea water intrusion in the recent past. The fact that so much water is abstracted in this area does not create major conflicts because this is the most downstream section of the river.

1.2.2. The right bank tributaries

Being relatively far from the tourist areas (middle Herault Valley sites and Mediterranean sea), this area remains relatively rural. The 27 settlements of this zone are relatively small and their population is now slowly increasing (rate close to the regional average between 1990 and 99) after a period of sharp decline between 1962 and 1975. This increase in population is certainly due to the attractiveness of Béziers city which extends its economic influence area.

The right bank tributaries zone represents 10% of the basin permanent inhabitants and 12% of its area, that is to say a density of 45 inhabitants by square kilometre.

The economic activity is mainly dependent on vine crop and wine production. The total area under vine crop have decreased over the last two decades and the percentage of high quality products increased. A large percentage of the production is labelled "Appellation d'Origine Controlée Coteaux du Languedoc" and the region produces internationally reputed "crus" such as Faugères. Tourism related activities are not well

developed and are mainly related to the wine production; the rivers (Peyne, Thongue and Boyne) do not offer any recreational potential as they are partly dry in summer. Industrial activities as well as services are almost non-existent in this remote area.

The zone is relatively water scarce. Irrigation is practised by a very small number of farmers using water of the Olivette Dam (initially created as for flood protection). Municipalities exploit the poorly productive aquifer of the Miocene age geological formations to supply their population with drinking water. Groundwater water pollution by pesticides used by vine growers is an emerging issue.

1.2.3. The Middle Hérault valley

This is the area which has experienced the most tremendous changes during the last decade. It counts 25% of the basin permanent population on 18% of the basin area. The completion of the first section of the A750 highway which puts Gignac at 20 minutes drive from Montpellier, has provoked a wave of urbanisation of this rural area. The population growth (+12% between 1990 and 99) has exceeded 3% per year in many small and medium villages. The total population now amounts to 38,000 inhabitants. Three localities emerge as new “centres”: Clermont l’Hérault (6500 inhabitants), Gignac (4000) and Saint André de Sangonis (3800). A large part of the population is composed of commuters working in Montpellier who have settled in this area because the price of land is relatively lower than in the immediate surrounding of Montpellier. A large number of pensioners also settle in the area which presents the advantages of a rural area without being far from a large city. This inflow of “migrants” generates new needs in terms of infrastructure, including water related infrastructures (drinking water supply and waste water treatment plants). It also generates various sort of conflicts between the local populations and the migrants, some of them being related to water use (see below).

Agriculture, dominated by vine growing activities, represents the mainstay of the economy. Unlike other regions of the river basin, the area under vine has not significantly decreased during the crisis that has affected the wine industry. The average quality of the wine produced has increased faster than in other places which has contributed to the repute of labels such as “Terrasses du Larzac” (villages of Aniane, Saint Saturnin, Montpeyroux). Area under fruit orchards are decreasing (-60% in 15 years) and being replaced by cereals and new crops such as olive trees (local brand), the olives being processed in small factories located in the valley.

The economy is also driven by the demand generated by the arrival of migrants, particularly in the construction sector (renovation and construction of houses) and in the service sector (high demand for domestic services by pensioners settling in the area). Industrial and service related activities are also present and tend to develop (logistic platforms, SMEs) with the improvement of road networks and in particular the A75 motorway that will soon link the region with Montpellier and Béziers on the southern side, and Paris on the northern side.

Although several reputed tourist sites are located in this area (Salagou lake, Cirque de Mourèze) or not far from it (the middle Hérault valley is the gateway to the karst area),

tourism is only an emerging activity that does not create significant employment. This is mainly due to the very poor lodging capacity.

The Hérault and its alluvial aquifer are the two major water resources of this zone. The Hérault river is mostly used for crop irrigation (cereals, vegetables, seed production and vine in certain areas) and hydropower production (Gignac municipal hydropower plant produces electricity for an equivalent 40,000 inhabitant city). Over-abstraction occasionally generates tensions with non consumptive uses of the rivers such as fishing, swimming and canoeing. The alluvial aquifer of the Hérault river is the main source of drinking water for the municipalities of the area. This makes the overall water supply highly vulnerable to accidental pollution. One of the key water related issues is therefore the diversification of the water supply.

1.2.4. The Lodève region

Although they could have been merged with the Middle valley, the Right bank tributaries or the karst plateau zones, the 10 municipalities of the Lodève region are treated separately as they present distinctive demographic and economic dynamics. While other areas are characterised by positive population growth rates, the population of the Lodève region has decreased by 15% between 1990 and 1999. This trend is partly due to the decline of industrial activity which has been the mainstay of the economy for decades. The closing in 1997 of the uranium mines operated by COGEMA, causing 1500 job losses, has significantly contributed to this evolution. The municipalities are now counting on the nearly completed A 75 motorway to give a boost to the local economy. Today, the population of this zone represent only 6% of the whole basin population on 4% of the area. Agriculture is of very limited economic importance in this zone. Tourism is almost not existent although the municipalities have recently taken initiatives to improve their image (art exhibitions of the *Fleuri* museum which attracts 65,000 visitors yearly, poetry festival).

The Lergue river, which drains water from the karst plateau and account several hydropower plants, is one of the major tributaries of the Hérault. The river in itself is not attractive for leisure activities. Its alluvial aquifer, exploited for the production of drinking water, represents its major water resource. Municipalities located on the hills of the Lergue valley, exploiting other groundwater resources, are faced with high (natural) arsenic concentration. One of the key water related issue of this zone is therefore the development of an interconnected water supply network.

1.2.5. The karst plateau

The karst plateau is characterised by a relatively flat and arid landscape in which the two major rivers (Vis and Hérault) have cut a gash. It is sparsely populated (13 inhabitants per square kilometer on average) and the population is dispersed in 49 small settlements which never exceed 2000 inhabitants (only one exceed 1200 inhabitants and 8 exceed 500 inhabitants). Following a period of demographic regression in the 1960's and 70's, statistics show a trend reversal (+15% between

1990 and 1999) which is particularly marked in the area connected to the cities of Béziers and Montpellier with the new A75 motorway.

With no industries established in this zone, agriculture is the dominant economic activity. It is very extensive (farms located on the plateau operate 100 hectares on average) and it mainly consists in fodder cultivation and breeding activities. The production of sheep milk partly contributes to the production of Roquefort cheese (outside the zone). Vine is also grown in a few municipalities located on the sides of the plateau.

Several reputed tourist sites are located within this area. The medieval village of Saint Guihlem (abbey of XII century), the Navacelle cirque and the nearby Cave of Clamouse are among the most visited sites of the whole Languedoc Roussillon region. The sights, the swimming places and the canoe possibilities offered by the Vis and the Hérault valleys attract hundreds thousands of visitors every year. This however does not generate significant turn over for the zone as it does not offer any significant lodging opportunities.

Although the landscape looks very arid, this zone has very abundant ground water resources. Abundant karst springs feed the rivers in summer (Vis, Hérault). The karst water reserves, which are only exploited for supplying drinking water to the settlements of the plateau, represent an asset for the region. These resources are, however, very vulnerable and their protection from point source and diffuse pollution is a key issue.

1.2.6. The Cévennes mountains

This remote and mountainous region is dominated by two small towns, Le Vigan and Ganges (respectively 4429 and 3502 inhabitants, 1999 population census) and about 20 villages. This zone is similar to the right bank tributaries zone in terms of population, area and then density. It has experienced a period of population decrease (-10% between 1962 and 1975) which was partly linked to the crisis of the textile industry. The population then stabilised in the 1980's and started to grow again in the 1990's at a rate (+4.63% between 1990 and 1999) that remains lower than the average in Languedoc Roussillon region (+8.6%).

This relative geographic isolation of this zone, due to the poor quality of the transport infrastructure (no railway, secondary road to Montpellier) represents a major barrier preventing the development of industries and tertiary economic activities. The declining textile industry (3 companies) and the health sector (hospitals) represents the two main job providers (they employ respectively 1900 and 1800 persons). Agriculture is also experiencing tremendous changes : the number of farmers has declined continuously over the last 20 years, areas under orchards have dropped from 414 hectares in 1979 to 88 hectares in 2000. Irrigated onion crop, which seems to be with the apple the only opportunity for the sector, is cultivated in most of the small valleys where water is available in large quantities.

The local economy is increasingly relying on the development of rural tourism, which however does not create a lot of new job opportunities because of the absence of large

tourism infrastructures (self-catering cottages represent 40% of the lodging capacity against 8% for hotels) The major assets of the zone are the proximity of Mount Aigoual, the trekking possibilities offered by the Cévennes Mountains (the zone is partly included in the Cévennes Regional park).

Water resources are hardly sufficient to satisfy the needs of the different economic sectors. The settlements, which are generally very small and dispersed, mostly rely on small springs. The Hérault river is used to supply Ganges with drinking water supply, with occasional problems linked to river pollution. Farmers divert large amount of water from small streams to irrigate orchards and onion crops, which occasionally create conflicts with environment protection associations and fishermen.

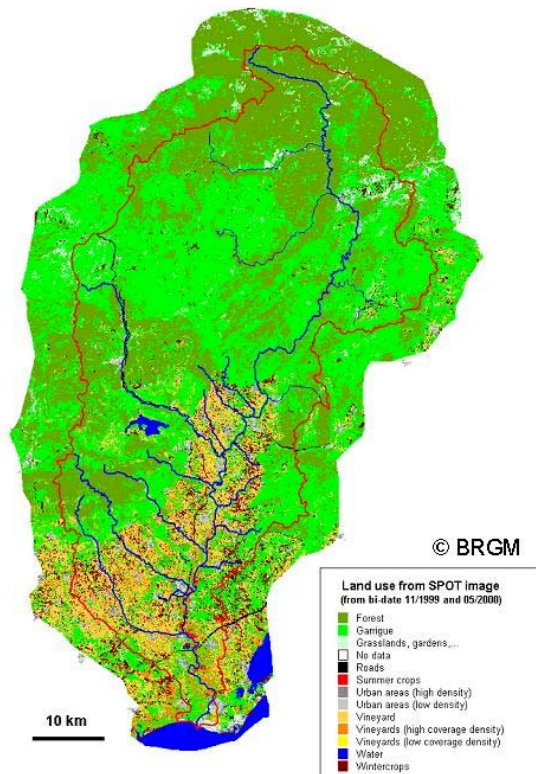


Figure 5. Land use in the Hérault river basin

1.3. WATER USES

Water uses are presented below. The distinction is made between direct water uses, which are characterised by abstraction and indirect water uses which use water in situ.

1.3.1. Direct water uses

The information presented below mainly relies on figures found in the preliminary report of Conseil Général de l'Hérault and Conseil Général du Gard (1998). Detail primary data on water abstraction are collected yearly by the Rhône Méditerranée Corse Water Agency but we have not been able to access those data.

1.3.1.1. *Drinking water sector*

All drinking water utilities excepted one (Ganges) use groundwater for the production of drinking water. The karst aquifers and the Hérault alluvial aquifer are the major resource used by the municipalities of the middle and lower Hérault valley. Water from the alluvial aquifer is also exported towards the municipalities surrounding Montpellier (Syndicat du Bas Languedoc) and Béziers (Syndicat de la Vallée de l'Hérault). The largest Drinking Water Utility (Syndicat Bas Languedoc) withdraw 28 million cubic metres per year from the alluvial aquifer.

Drinking water utilities are mainly operated by municipalities or groups of municipalities organised in a "inter-municipal syndicate". In a limited number of cases, the management of drinking water utilities has been transferred to private companies (the municipalities or syndicate remain the owners of the assets). The SAUR is operating the water supply of Ganges and of a number of small municipalities in the upstream section of the basin; the SDEI is managing the two largest drinking water utilities of the Hérault valley, namely the Sndicat du Bas Languedoc and the Syndicat de la vallée de l'Hérault.

The karst aquifer resources of the Hérault basin could be exploited, in a near future, by the city of Montpellier, which supply currently depends on the karst aquifer of the Lez. This project causes serious tensions between actors (see description of conflicts below).

1.3.1.2. *Households*

A case study conducted as part of Workpackage 2 of the project (see Rinaudo et al. 2003) has shown that households increasingly tend to drill their own boreholes. The percentage of households drilling a private well is estimated at 10 to 15% in areas where groundwater is easily accessible. Untreated groundwater is used by those households as a cheap substitute to drinking water both for outdoors an indoors uses. The case study suggest that households owning a private tube-well use more water than others, mainly because the cost of this alternative resource is very low as compare to that of drinking water supplied by municipalities.

The rapid development of private tube wells is increasingly cited by the authorities in charge of groundwater protection and those in charge of drinking water and sanitation service as an issue of concern. Four negative impacts of private borehole development are now frequently cited.

- Firstly, the high numbers of individual boreholes represents a significant risk of pollution of the aquifers, which are being exploited for the production of drinking water. In effect, the boreholes often join up previously distinct hydrogeological layers at numerous points, thus allowing good quality aquifer layers to become contaminated by others (salt water intrusion, contamination of deep layers with nitrates and pesticides from upper aquifer layers, etc.). Also, private tube wells, which are not always constructed according to the standards, may be responsible for accidental contamination of the aquifer by surface pollutants (fertilisers and pesticides used for gardening, hydrocarbons and solvents running off from water drainage sources, etc.).
- Secondly, the construction of dual systems that enable indoor uses of untreated groundwater generates a risk of contamination of the municipal drinking water network by poor quality groundwater. This risk is due to the fact that, in most houses equipped with a dual system, the drinking water and the untreated water plumbing systems are not totally separate but interconnected, despite this being formally prohibited (see box 1). A wrong manipulation of the gate that separates the two plumbing systems results in backflow of water pumped in the tube well towards the public network. Such accidents are frequently reported and represent a major concern of actors in charge of drinking water utilities.
- Thirdly, the development of these tube wells makes it more difficult for district authorities to predict future demands for water and to plan investment accordingly. Because they did not anticipate the development of tube wells by households, certain district authorities have over estimated the drinking water demand and constructed over dimensioned infrastructures. This and the obligation to provision for the equipment replacement in the early 90s (Budgetary and accounting instruction M49), has resulted in a sharp increase of water price, which in turn has incited households to drill boreholes.
- Fourthly, the indoor use of untreated groundwater (for flushes, washing machines, etc.) creates financial difficulties for the actors operating wastewater treatment plants, who generally charge users accordingly to the volume of drinking water they consume. Households having a tube well consume very little drinking water, thus pay very little sanitation charges although they discharge a significant volume of wastewater. When the proportion of households using a tube well increases, the cost recovery ratio deteriorates which forces the manager to raise water charges. This induces inequity as most of the sanitation cost is paid by households who do not use untreated groundwater.

For all these reasons, government agencies involved in the protection of water resources as well as private and public actors in charge of drinking water supply and sanitation services are calling for measures to mitigate the development of private

boreholes. Today, boreholes are simply subject to a simple declaration to the local authorities if it doesn't exceed 8 m³/h and is subject to administrative authorisation for upper discharges.

1.3.1.3. Agriculture

The main agricultural use of water is crop irrigation, e.g. for vine and table grapes (specifically in the Gignac irrigated district), market garden crops such as melons and tomatoes, and cereals (seeds in particular) and onions in the valleys of the Cévennes mountains. Water is also used by vine growers for cleaning the spraying machines, the grape harvesters (every day during the vintage) and the wine-making equipment.

The irrigation water is derived largely from the Hérault, which supplies both collective irrigation and private pumping facilities. Private irrigation systems are generally not registered with the prefectural authorities, thereby making any estimation of private abstractions impossible¹. Small collective irrigation systems are registered but the volumes they abstract are not measured (in particular in the Cévennes Mountains).

The volumes abstracted by the large collective irrigation facilities are relatively well known. According to the RMC Water Agency, the Gignac canal abstracts a total volume of 40 to 50 million cubic metres per year, of which 70 to 90% is restored to the natural environment (by direct return to the Hérault or by percolation into the aquifer). The BRL pumping stations located within the area (at Aspiran and Le Pouget) abstract an annual volume of almost 2 million cubic metres from the Hérault to supply pressurised water to farmers, local authorities (watering of green areas, fire control) and individuals (household or industrial uses). Agriculture accounts for the bulk of this consumption (84% of discharge subscribed). These pumpings are relatively concentrated over time: on average 60% of the volume is abstracted between June and August and the percolated water is restore to the natural environment with a delay and can be re-used after the pick period.

1.3.1.4. Industry

Industrial water use are limited in the river basin. They are estimated at 6 to 7 millions cubic metres per year for the entire basin. Most of this volume is abstracted by hydropower plants and gravel pit operators which use water to wash the gravels. The volume abstracted by wine co-operative factories, which generally also have their own water well, is relatively small as compared to the figures given above.

¹ The prefectural authorities estimate that no more than 1% of private agricultural abstraction points are known to them in the Département. However, more and more farmers are regularising their situation (declaration or application for licence) in response to the new conditions for obtaining CAP subsidies.

1.3.2. Indirect water uses

The three major indirect water uses encountered in the Hérault basin are leisure related activities : fishing, swimming, and canoeing. These activities, which are practised both by the local population and by tourists, are socially and economically significant. The conditions in which they can be practised have a strong impact on the attractiveness of the region, thus an indirect economic impact for the tourism sector.

Fishing is practised in the Hérault river and several of its tributaries. Rivers are classified into two categories, the highest one corresponding to places where the streams are considered in a natural state and where highly appreciated species, such as trouts, can be found. The Arre, Vis, the Foux, the Buège and the upstream section of the Hérault and the Lergue rivers are classified in first category. Fishing is also practised in second category rivers.

Canoeing is mainly practised in the gorges of the Hérault river (karst plateau region). Several canoe rental companies operate between Ganges and Saint Guihlem le désert during the summer months. Canoeing is also practised on the Vis river but this is subject to specific regulations and it cannot be practised on a commercial basis (for environment protection reasons). The activity is heavily dependent on the river discharge.

Swimming is also a very popular activity. Famous tourist places are located along the Hérault in Karst plateau region and the Cévenne mountains and along the Vis river. The lower section of the Hérault (middle Hérault valley) is less known and mostly visited by local people. The quality of swimming places is determined both by the river discharge and the effluents of the waste water treatment plants.

2. Background information

Since the end of the 90s, international community progressively highlight the necessity to imply civil society within water resource management decisions.

Many countries have accepted the principle of public participation in signing engagement after international (Dublin 1992, La Haie 2000, Bonn 2001 and Kyoto 2003). Some pasted those engagement in ratifying international convention (Aarhus convention for par exemple) or in adapting specific legislation. This is for example the case in Europe where public participation principle is formalised in the recent Water Framework Directive which impose in its 14th article both stakeholders active involvement in the decision preparation and civil society consultation before final decisions.

In France, as well as in the others European countries, the implementation of public participation is a difficult task since experiences in such a domain are rare. Then, public participation tool are rarely known and apply in such a domain and their implementation face cultural reticence to abandon the top-down decision model.

The objective of the Hérault case study opinion pool (describe and analyse below) is to collect local characteristics of household and to analyse attitudes, behaviours and perception related to “water”. Results will be then used to build the model of the Hérault river basin by WP1 team and to test water scenarios (recycling, alternative water resource, water saving behaviours...) as well as socio-economic scenarios (population increase, quality improvement...).

The opinion pool realised in France highlight poor household knowledge related to water quality (tap water and environmental water), water cycle, water consumption... (KHI 2, 1999, IFOP, 2000, SOFRES, 2000, IFEN, 2001, IFOP, 2001, IPSOS, 2001, SOFRES, 2001, 2002).

But national opinion pool analyses are not useful since we want to assess very local characteristics and we can suppose that water related perception, behaviours and attitudes are mainly under local influence. For example, at the national level, 60% of the interviewees believe that water in the environment has deteriorated across the past ten years and this is only 32% in Hérault opinion pool.

3. Methodology

The design of the survey protocol consisted in three distinct phases : (i) the development of the questionnaire, (ii) the definition of the sample, using the quota method, and (iii) the interviews which were carried out face to face at the respondents' home.

3.1. DEVELOPMENT OF THE QUESTIONNAIRE

The development of the questionnaire has been carried out jointly by the four research team involved in WP2, representing France, Slovenia, Spain and the United Kingdom. Given the diversity of the cultural background of each national teams and the differences between the social reality found in each case study, the development of the questionnaire has involved a lot of discussions, several working sessions and lasted over 6 months. In May 2003, a final body of 60 common questions was finally agreed by the four teams. The interviews were then carried out between June (Hérault) and August in the four catchments. Each research team decided to add site specific questions, depending on the specificities of the site, local culture and focus of scientific interest of the teams.

The structure of the French questionnaire (see appendix), which contains 27 additional questions and a total of 87 questions, is the following:

- 11 questions are related to the socioeconomic characteristics of the interviewees; 6 of these questions are used to fill the quota.
- 6 questions address the perception of the interviewee on the significance of water related environmental problems;
- 9 questions are used to assess the respondents' knowledge of water institutions and their willingness to be involved in water management;
- 20 questions are related to the perception of water price and water consumption (estimate);
- 10 questions to assess the knowledge of the water cycle and the perception of water quality;
- 17 questions are specifically designed to characterise households' actual water use behaviours and their willingness to save water.
- 11 questions are related to the access to and the use of alternative water resources (including recycling systems).

- Finally, the respondents were asked to give an opinion on the likelihood of three scenarios of water resource evolution over the next 20 years.

3.2. SAMPLING PROCEDURE

3.2.1. Target population and sample size

The target population is defined as all the inhabitants (citizens or not), living in the catchment on a permanent basis, and aged of 20 or more². This represents a total population of 118 000 persons over a total of 152 000 inhabitants.

The size of the sample (400) is chosen to ensure, with a 0,95 probability, that the average values found in the sample are equal to the average of the entire population, with a margin of error of plus or minus 5%/. This sample of 400 interviewees corresponds to 0.34% of the target population.

3.2.2. Defining the quota

The answers to the questionnaire are likely to be very different from one individual to another, depending on socio-economic characteristics, location, age, type of house, type of occupancy, gender, etc. To account for this diversity of answers, and make sure that the sample is statistically representative of the population, we designed a sampling procedure which consist in selecting respondents following to a multiple-attribute quota system.

The quota are defined as follows :

- Geographic area: the number of respondents selected in each zone is proportionnal to the total population living there; 155 in the coast area, 34 in the right bank tributaries, 101 in the middle valley, 24 in the Lodève region, 42 in the karst plateau region and 44 in the Cévennes Mountains region.
- Type of municipality : for each geographic area, the number of interviewed households living in cities is chosen such as the percentage of urban households in the sample is equal to that of the entire population. For instance, we decided to interview 18 inhabitants of Clermont l'Hérault (out of 101 inhabitants interviewed in the Middle Hérault Region), as the population of the city represents 17,8% of the total population of the corresponding homogeneous region. Concerning the vilages of each zone, we excluded the smallest vilages from the sample, as well as those located on the border of

² The definition of age classes for the population is imposed by the National Institute for Statistic and Economic Studies (INSEE) which aggregate the 15-20 years in a single class.

Population Census conducted by INSEE in 1999

each zone. This decision was made to ensure that not less than 4 to 6 interviews were made in each selected village, in order to reduce the travels of the interviewers to a minimum.

- (iii) Gender and age : since gender and age are assumed to be crucial variables in understanding the diversity of water use behaviours, the composition of the sample was also specified with regards to these two variables. The age classes used are those used by INSEE in the population census (20 to 39 years, 40 to 59, 60 to 74 and over 75).
- (iv) Type of housing and occupancy: similarly, the type of housing (collective building or detached house) and the type of occupancy (rent versus owner) is assumed to influence responses to the questionnaire. A quota was thus also defined with regards to this variable at the level of homogeneous areas.

The quota was specified as shown in the figure below. Quota were defined with two decimals with possibility to round off in each village, provided the total number within each zone would be achieved. The implementation of the quota was managed in real time by the supervisor of the team conducting the interviews (subcontractor). Some flexibility was allowed within each of the six zones with compensations authorized between the villages belonging to the same zone.

Zone	Commune	Interview		Male				Female				Type of housing				TOTAL
		MIN	MAX	20 -	40 -	60 -	+	20 -	40 -	60 -	+	I	C	O	R	
				39	59	74	75	39	59	74	75					
1	AGDE	54	54	9,50	10,57	7,72	3,22	10,37	11,42	8,24	4,95	36	30	40	26	54
	VIAS	12	12													12
	PEZENAS	20	20	2,99	3,00	2,10	1,20	3,07	3,25	2,50	1,90	8	12	10	10	20
	BESSAN	10	12													
	FLORENSAC	10	12													
	SERVIAN	10	12													
	MONTAGNAC	10	12	10,51	10,43	7,18	4,58	9,56	11,33	9,26	6,15	33	36	44	25	69
	SAINT-THIBERY	10	12													
	TOURBES	4	6													
	LEZIGNAN-LA-CEBE	4	6													
CASTELNAU-DE-GUERS	4	6														
2	CAUX	6	8													
	ROUJAN	6	8													
	FONTES	4	6	4,58	5,56	4,00	2,13	4,67	5,51	4,51	3,04	14	20	28	6	34
	GABIAN	4	6													
	CABRIERES	4	6													
	PEZENES-LES-MINES	4	6													
3	CLERMONT-L'HERAULT	18	18	2,93	2,94	1,94	0,99	2,64	2,90	2,06	1,60	8	10	9	9	18
	GIGNAC	8	12													
	SAINT-ANDRE-DE-SANGONIS	8	12													
	PAULHAN	6	8													
	ANIANE	6	8													
	CANET	6	8													
	SAINT-PARGOIRE	6	8													
	LE POUGET	4	6	12,75	13,92	8,90	4,39	13,23	13,52	9,96	6,35	42	41	62	21	83
	MONTPEYROUX	4	6													
	NEBIAN	4	6													
	SAINT-BAUZILLE-DE-LA-SYLVE	4	6													
	OCTON	4	6													
	CAMPAGNAN	4	6													
SALASC	4	6														
4	LODEVE	19	19	3,06	3,01	2,00	1,18	2,72	2,85	2,25	1,94	7	12	10	9	19
	LE BOSQ	5	5	0,76	0,96	0,57	0,24	0,76	0,87	0,51	0,33	3	2	4	1	5
5	SAINT-MARTIN-DE-LONDRES	5	9													
	SAINT-BAUZILLE-DE-PUTOIS	4	6													
	NOTRE-DAME-DE-LONDRES	4	6													
	LE CAYLAR	4	6	6,16	7,65	4,70	2,17	6,29	7,11	4,89	3,03	20	22	32	10	42
	SAINT-GUILHEM-LE-DESERT	4	6													
	ALZON	4	6													
	MONTDARDIER	4	6													
SAINT-MAURICE-NAVACELLES	4	6														
6	LE VIGAN	12	12	3,34	3,29	2,15	1,41	3,04	2,89	2,40	2,48	5	16	10	11	12
	GANGES	9	9													9
	SUMENE	4	6													
	AVEZE	4	6													
	VALLERAUGUE	4	6	3,49	4,13	2,52	1,16	3,39	3,82	2,78	1,70	8	15	18	5	23
	NOTRE-DAME-DE-LA-ROUVIERE	4	6													
AUMESSAS	4	6														
TOTAL				60	65	44	22	60	66	49	34	184	216	267	133	400
				191				209								
				400								400				

I: Individual housing

C: collective housing

O: Owner

R: Renter

Figure 6. Specification of the quota

3.3. IMPLEMENTATION

Interviews were conducted at the respondents' home by a specialised sub-contractor during June 2003. Several interviewers conducted the interviews keeping close contact with the team manager in charge of implementing the quota. The duration of interview ranged between 25 and 40 minutes, depending on the questions addressed (higher number of questions when presence of a garden for instance).

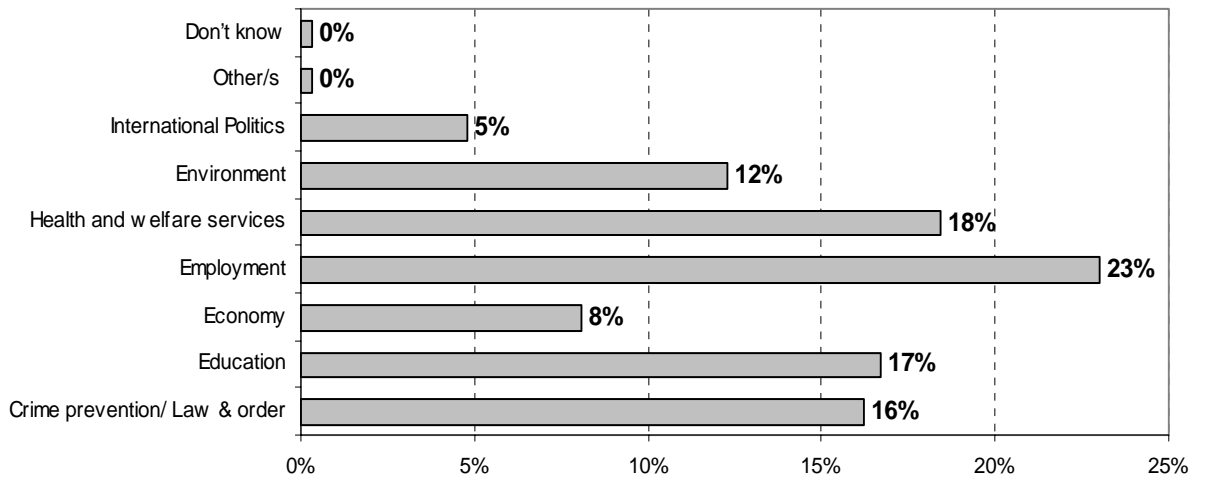
Note that all interviewees were conducted before the summer period which has been particularly hot in 2003 and characterised by very drastic water use restriction in some areas. We can therefore consider that the responses were not influenced by the crisis situation of summer 2003.

4. Basic frequencies

4.1. COMMONS SET OF QUESTION

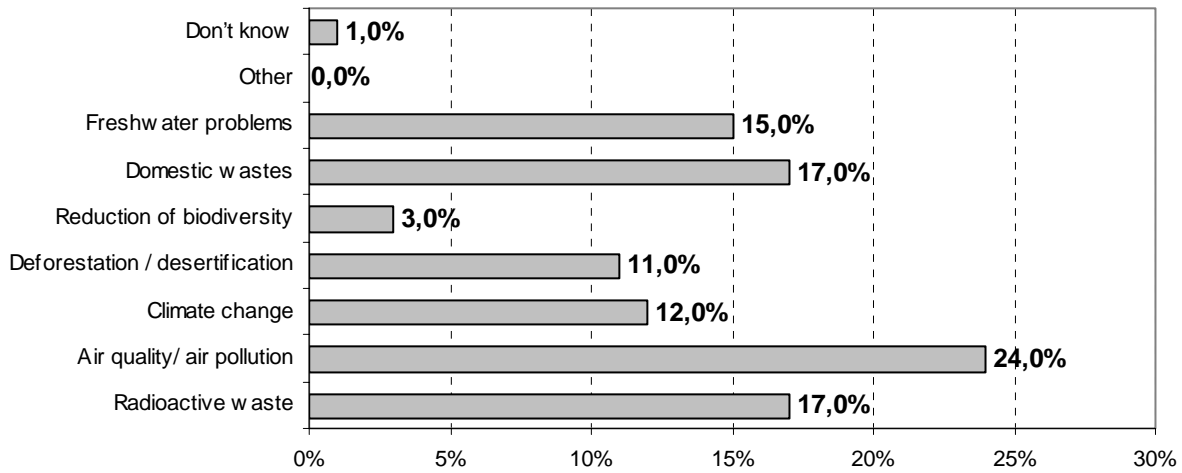
1. Amongst the issues listed please select the two which concern you the most at a national scale:

	NB	Freq.	Order
Crime prevention/ Law & order	129	16,2%	4
Education	133	16,7%	3
Economy	64	8,1%	6
Employment	183	23,0%	1
Health and welfare services	146	18,4%	2
Environment	98	12,3%	5
International Politics	38	4,8%	7
Other/s	2	0,3%	
Don't know	2	0,3%	



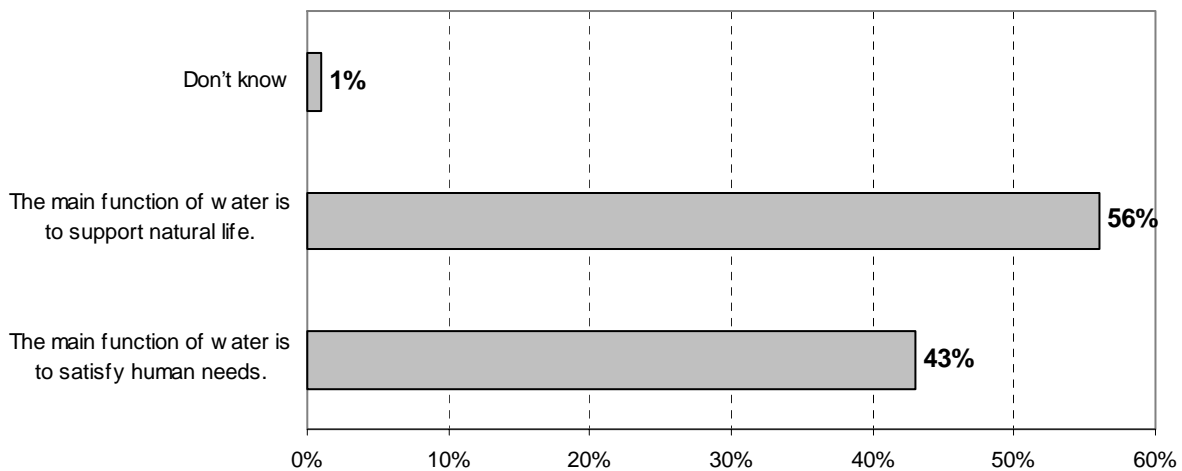
2. Amongst the environmental issues listed, select the two that concern you the most at a worldwide scale:

	NB	Freq.	Order
Radioactive waste	137	17%	2
Air quality/ air pollution	195	24%	1
Climate change	99	12%	5
Deforestation / desertification	84	11%	6
Reduction of biodiversity	23	3%	7
Domestic wastes	132	17%	3
Freshwater problems (pollution / scarcity / flooding)	121	15%	4
Other	0	0%	
Don't know	6	1%	



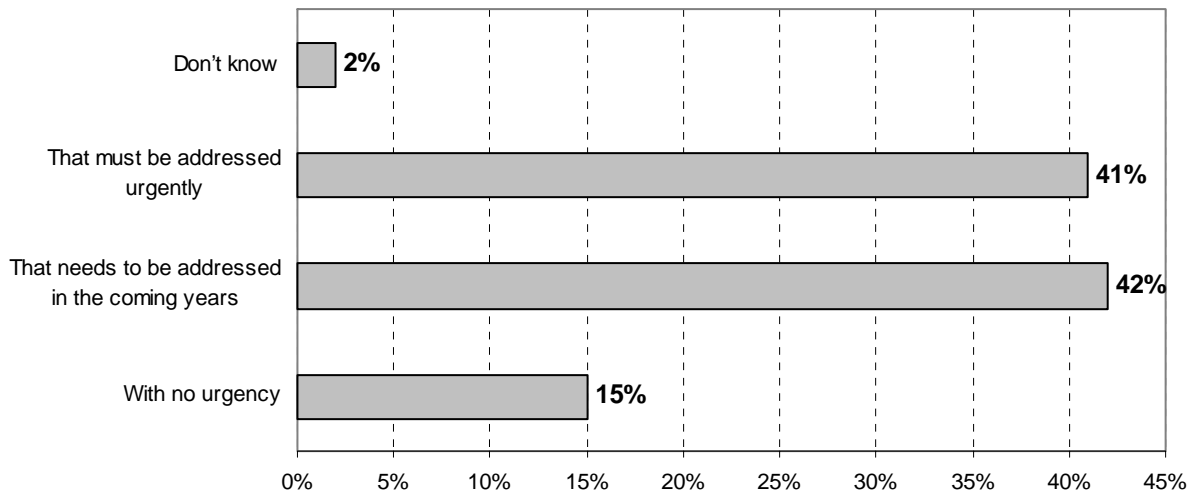
4. Which one of the following statements most closely reflects your views about water. Select only one

	NB	Freq.
The main function of water is to satisfy human needs.	173	43%
The main function of water is to support natural life.	222	56%
Don't know	5	1%



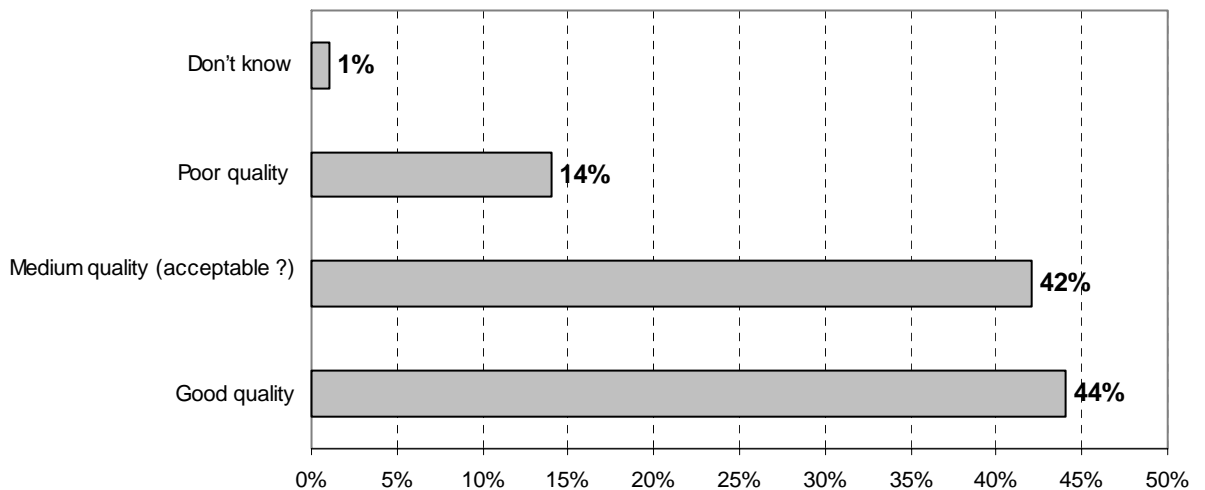
5. Water resource management is a term used to describe the way in which freshwater resources such as rivers, reservoirs and underground aquifers are managed by water companies and government bodies to ensure reliable, safe supply. In your opinion, is water resource management in your local area an issue that needs to be addressed:

	NB	Freq.
With no urgency	60	15%
That needs to be addressed in the coming years	167	42%
That must be addressed urgently	165	41%
Don't know	8	2%



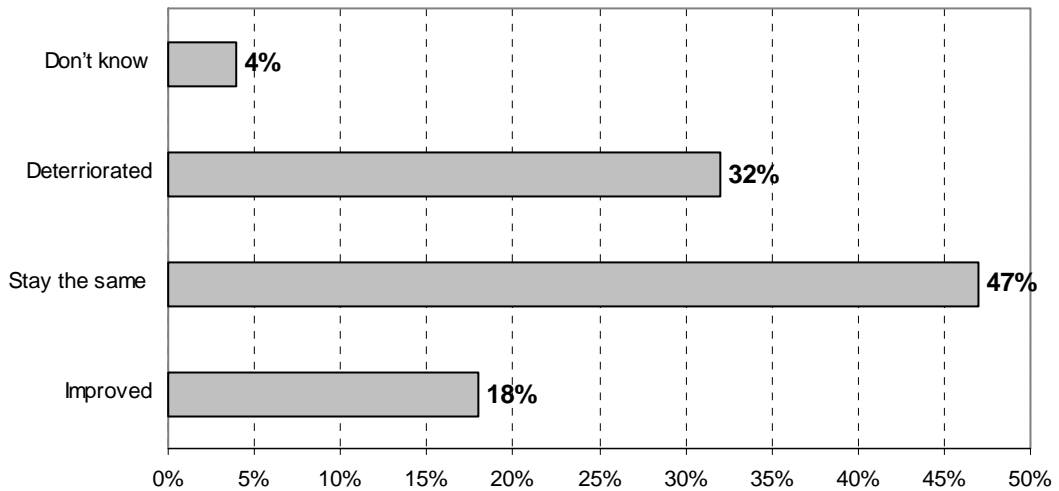
6. In your opinion please rate the overall quality of the water environment in your surrounding area (river, lakes, canals, sea...)

	NB	Freq.
Good quality	174	44%
Medium quality (acceptable ?)	167	42%
Poor quality	57	14%
Don't know	2	1%



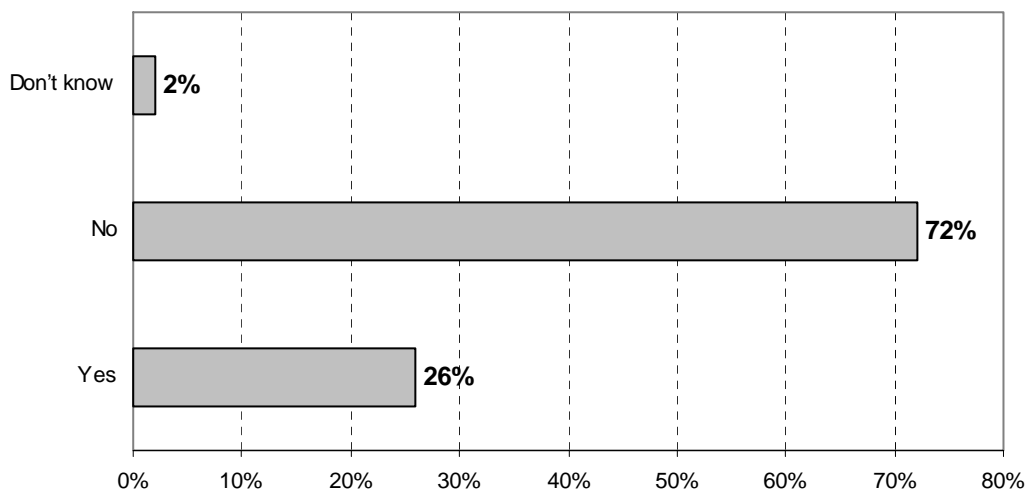
7. Would you say the overall quality of the water environment in your surrounding area in the recent past, i.e. the last 10 years, has...

	NB	Freq.
Improved	72	18%
Stay the same	187	47%
Deteriorated	127	32%
Don't know	14	4%



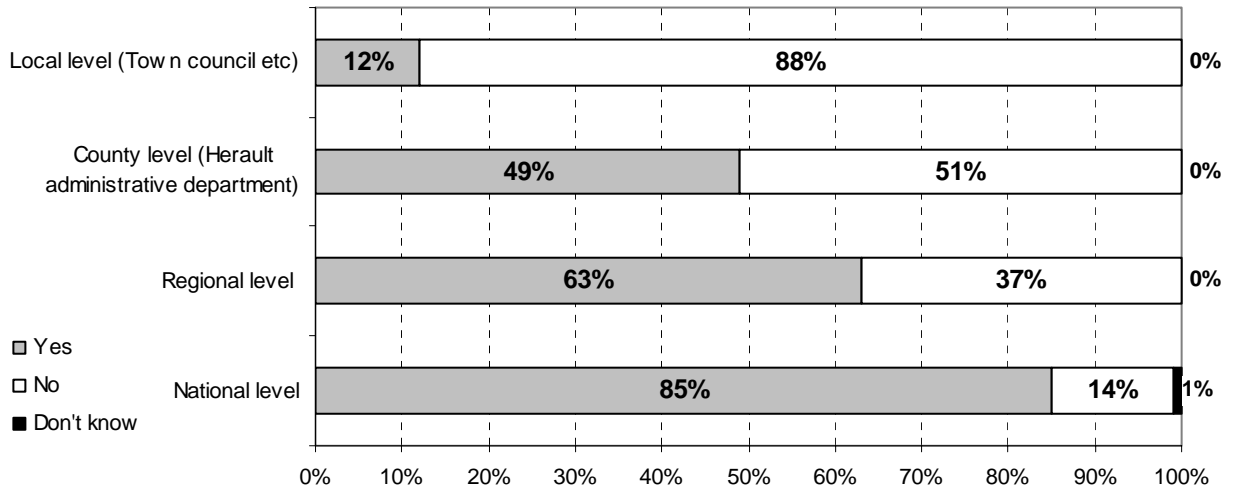
8. Would you like the opportunity to be involved in discussions and debates on the present and future management of water resources?

	NB	Freq.
Yes	105	26%
No	288	72%
Don't know	7	2%



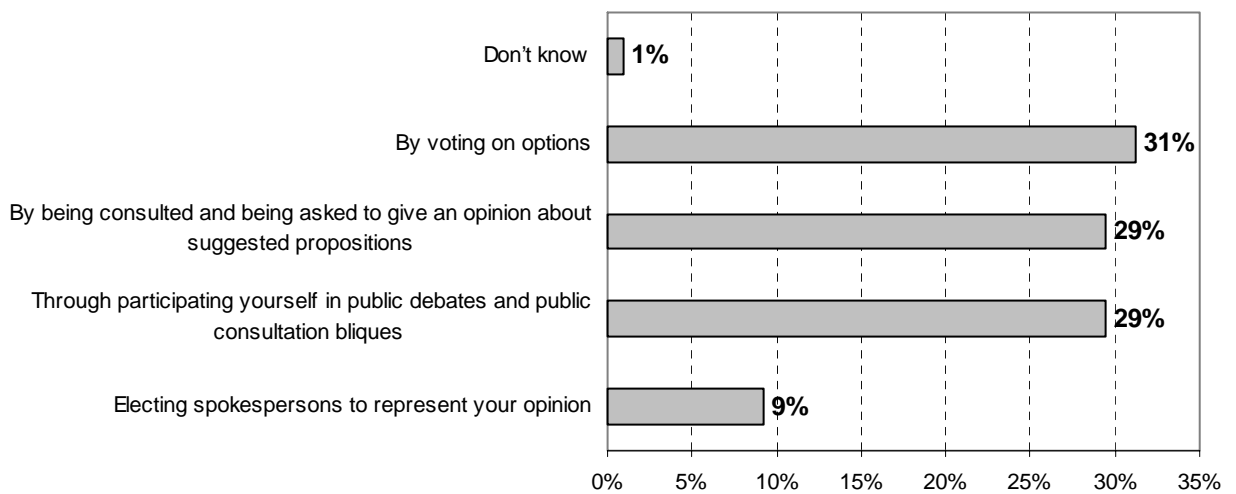
9a. Please tell me which one or ones you would you prefer to be involved with

	Oui	Non	NSP
National level	14%	85%	1%
Regional level	37%	63%	0%
County level (Herault administrative department)	51%	49%	0%
Local level (Town council etc)	88%	12%	0%



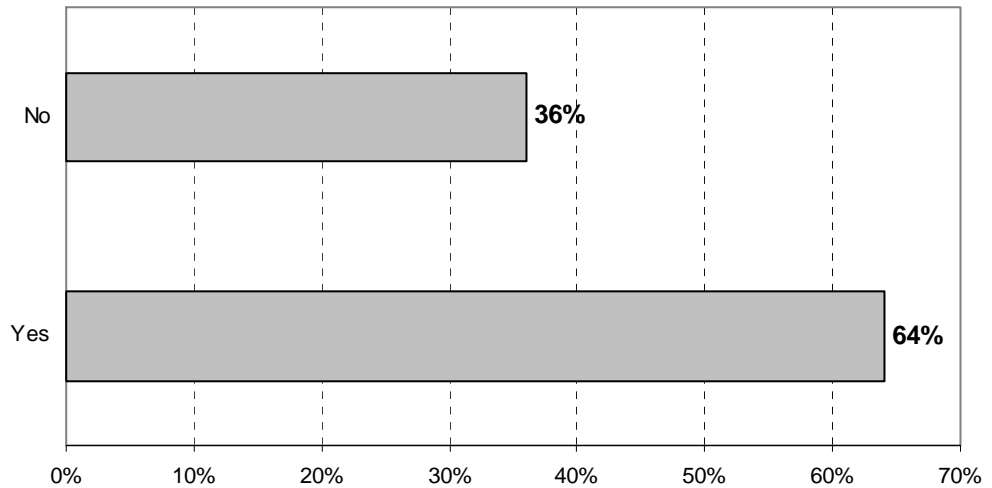
10. Through which type of method would you like to participate?

	NB	Freq.
Electing spokespersons to represent your opinion	10	9,2%
Through participating yourself in public debates and public consultation	32	29,4%
By being consulted and being asked to give an opinion about suggested propositions	32	29,4%
By voting on options	34	31,2%
Other	0	0,0%
Don't know	1	0,9%



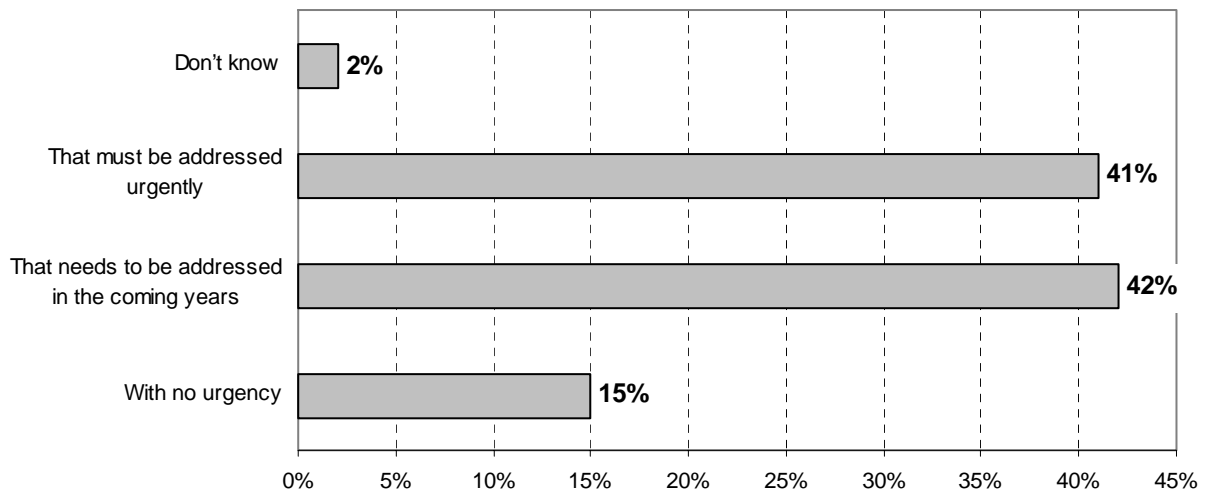
12a. Do you know where your water is extracted ?

	NB	Freq.
Yes	248	64%
No	139	36%



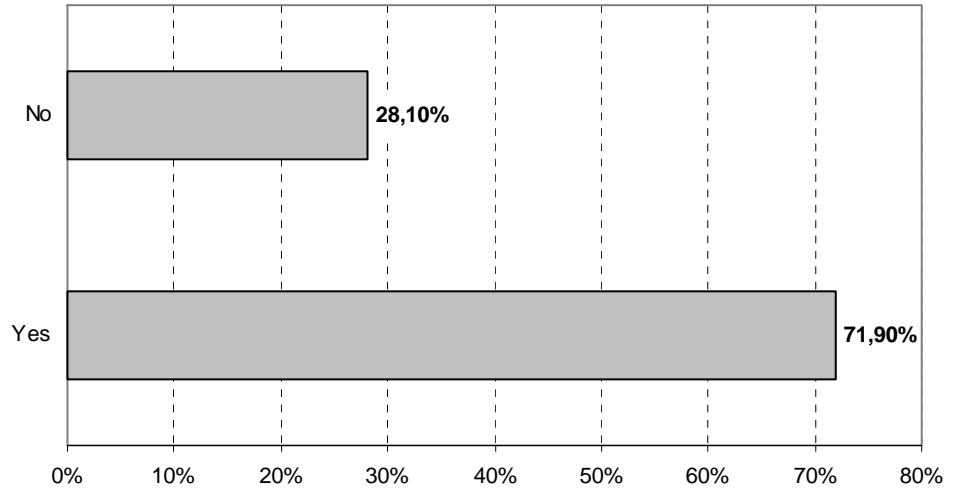
12b.

	NB	Freq.
Surface water rivers lakes streams (and springs in FR)	146	54,5%
Sea water	3	1,1%
Waste water treatment plant	57	21,3%
Underground water (aquifer borehole)	53	19,8%
Rainwater harvesting	6	2,2%
Other	3	1,1%
Don't know	0	0,0%



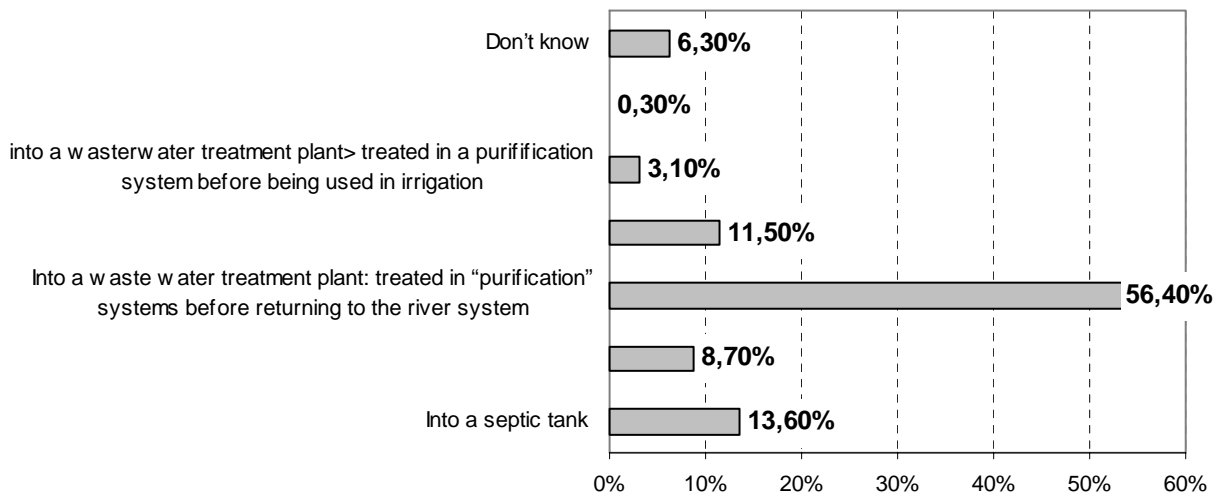
13a. Do you know what happens to your wastewater once it leaves your home?

	NB	Freq.
Yes	286	71,9%
No	112	28,1%



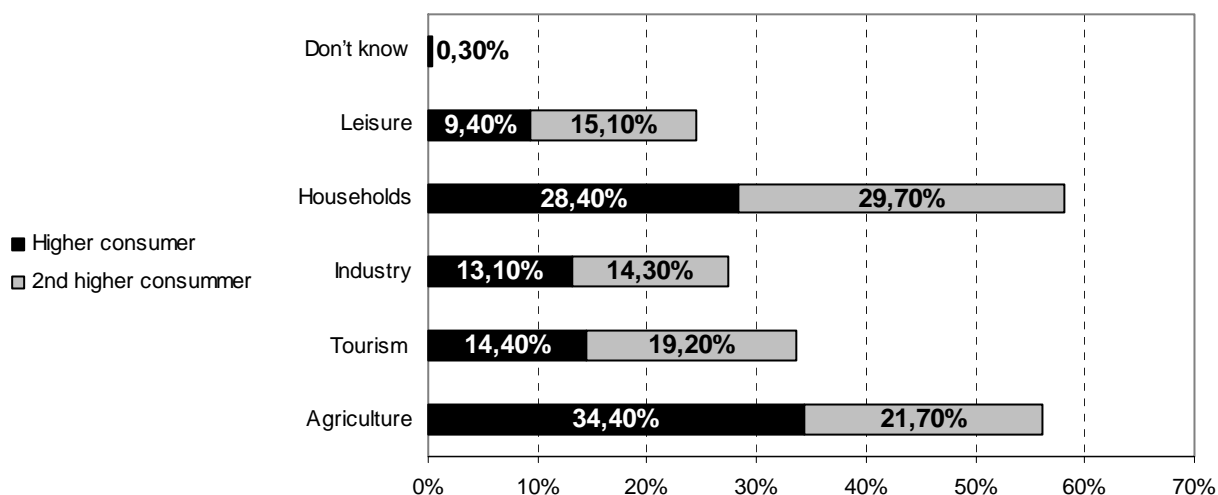
13b.

	NB	Freq.
Into a septic tank	39	13,6%
Directly into the environment (rivers, reservoirs, land fills)	25	8,7%
Into a waste water treatment plant: treated in "purification" systems before returning to the river system	162	56,4%
Into a waste water treatment plant: treated in "purification" systems before putting back in to the drinkable water system	33	11,5%
into a wastewater treatment plant> treated in a purification system before being used in irrigation	9	3,1%
Other	1	0,3%
Don't know	18	6,3%



14. please rank the following five categories of water user in your local region, with the highest consumer of water by volume

	NB	Freq.
Highest		
Agriculture	272	34,4%
Tourism	114	14,4%
Industry	104	13,1%
Households	225	28,4%
Leisure	74	9,4%
Don't know	2	0,3%
Second highest		
Agriculture	85	21,7%
Tourism	75	19,2%
Industry	56	14,3%
Households	116	29,7%
Leisure	59	15,1%



15a. No. of times per year you wash your car at home?

	NB	Freq.	Average
Car	328	82,0%	6,46
No car	69	17,3%	
Don't know	3	0,8%	

15b. Weekly no. of times your household uses the w/machine

	NB	Freq.	Average
w/machine	383	95,8%	4,50
Not equipped	7	1,8%	Ave.Pers.
Don't know	10	2,5%	1,73

15c. Weekly no. of times your household uses the d/washer

	NB	Freq.	Average
d/washer	195	48,8%	4,11
Not equipped	197	49,3%	Ave.Pers.
Don't know	8	2,0%	1,42

15d. Weekly no. of full sinks of water used to wash dirty dishes

	NB	Freq.	Average
Number	393	98,3%	9,29
Don't know	7	1,8%	

15e. The weekly no. of litre bottles of water consumed in your household

	NB	Freq.	Average
Refuse	2	0,5%	6,69
Number	391	97,8%	Ave/Pers.
Don't know	7	1,8%	2,58

15f. The no. of showers taken in your household during a week

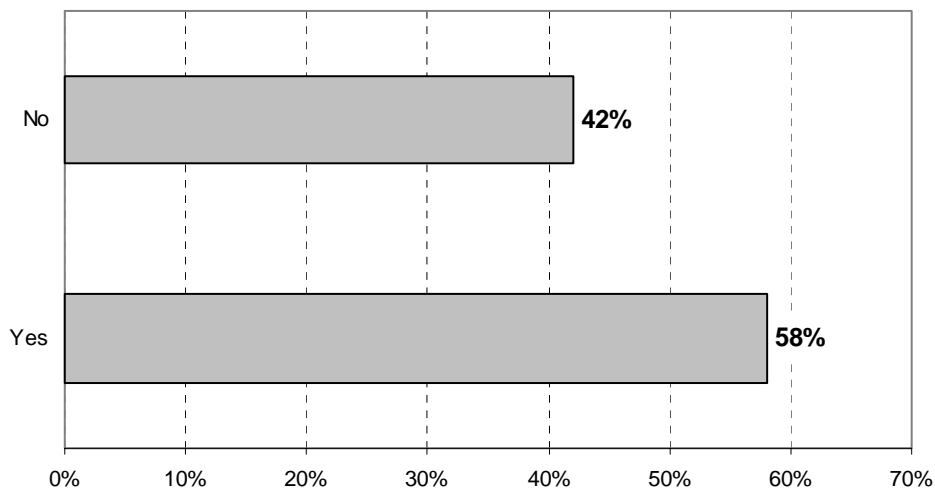
	NB	Freq.	Average
Shower	396	99,0%	15,85
Not equipped	3	0,8%	Ave.Pers.
Don't know	1	0,3%	6,12

15g. The no. of baths taken in your household during a week

	NB	Freq.	Average
Number	311	77,8%	2,36
Not equipped	86	21,5%	Ave.Pers.
Don't know	3	0,8%	0,90

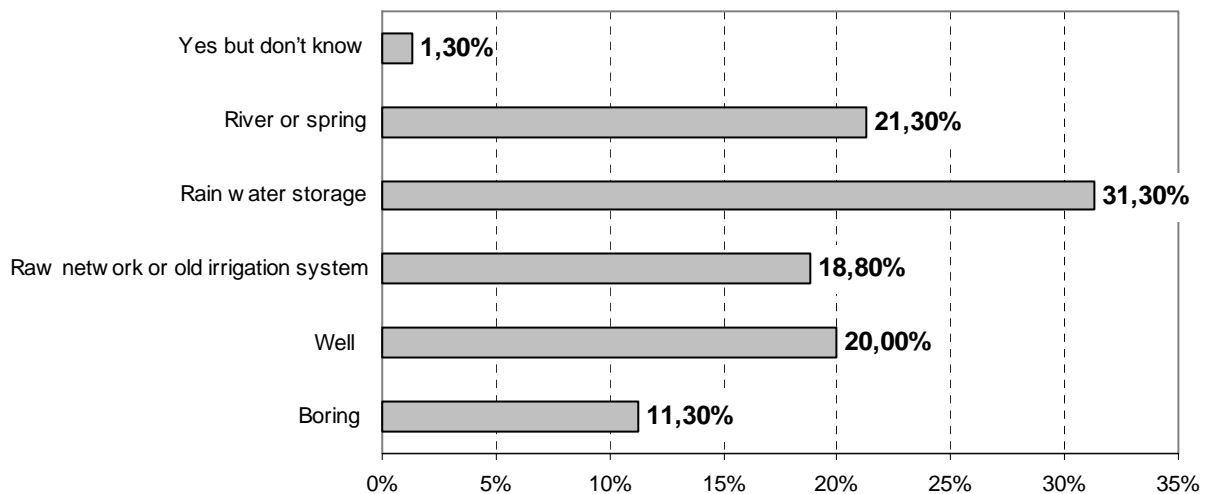
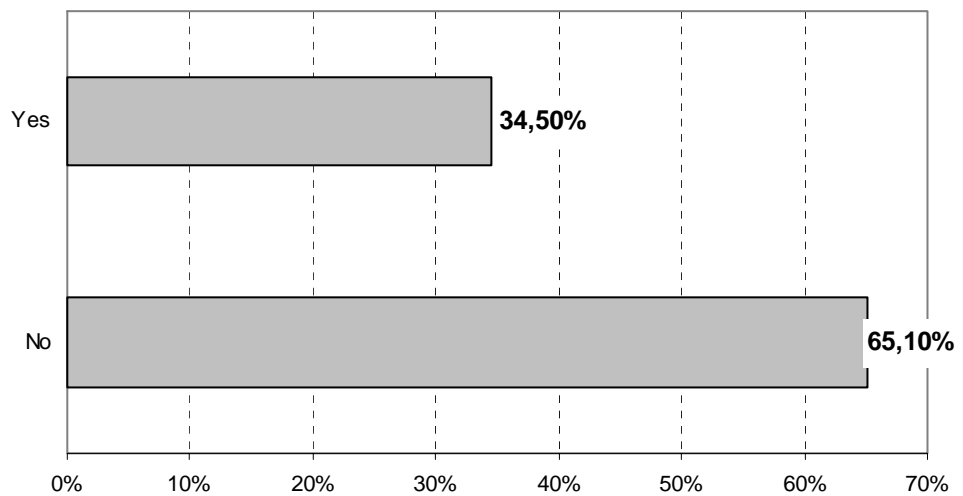
16. Does your household have a garden?

	NB	Freq.
Yes	232	58%
No	168	42%



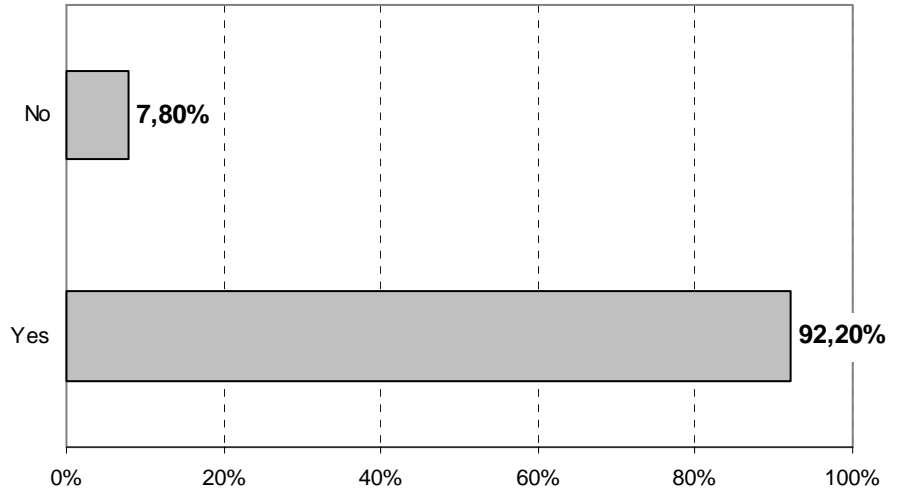
17b. (for people who have a garden either lawn, for fruits or vegetable) Do you have access to an other water resource (alternative to tap water) ? and if Yes, what kind.

	NB	Freq.
No	151	65,1%
Yes	80	34,5%
Boring	9	11,3%
Well	16	20,0%
Raw network or old irrigation system	15	18,8%
Rain water storage	25	31,3%
River or spring	17	21,3%
Yes but don't know	1	1,3%



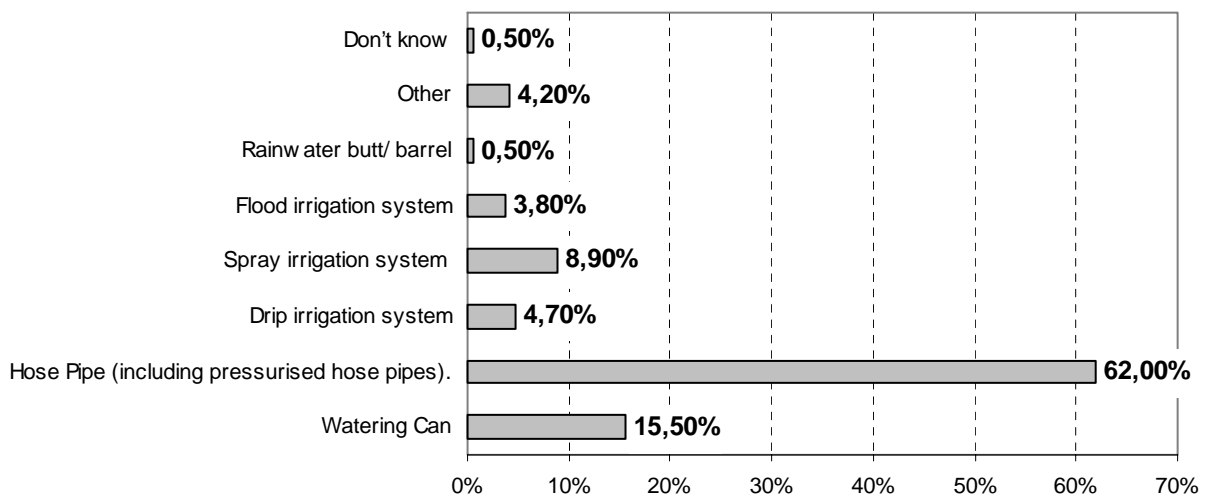
18. If Yes (Question 16) does your household water either part or all of the garden ? if yes, at what frequency?

	NB	Freq.	Average no. Time per week
Yes	214	92,2%	2,6
No	18	7,8%	



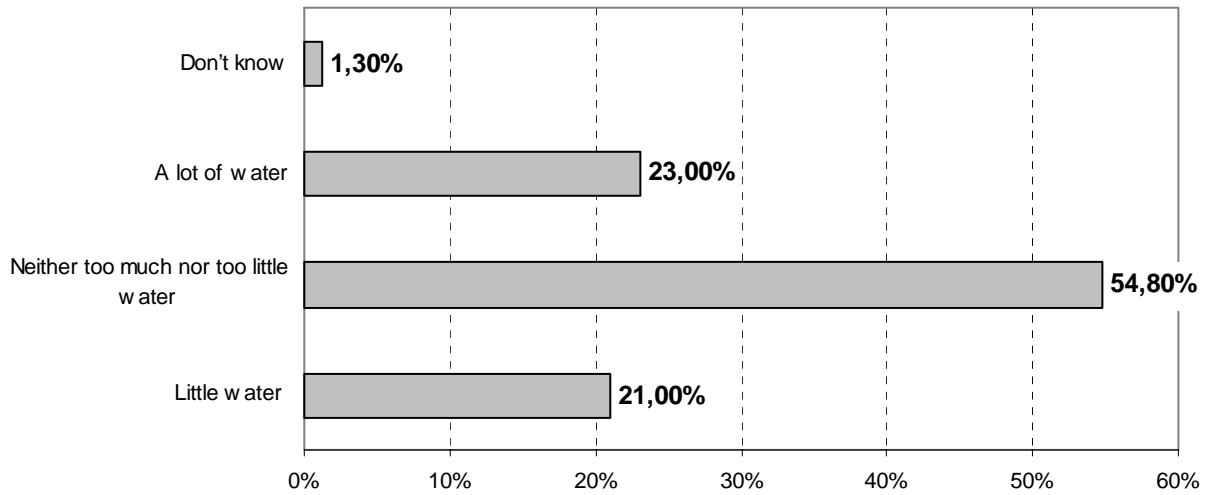
19. what watering system does your household usually use to water the garden ?

	NB	Freq.
Watering Can	33	15,5%
Hose Pipe (including pressurised hose pipes).	132	62,0%
Drip irrigation system	10	4,7%
Spray irrigation system	19	8,9%
Flood irrigation system	8	3,8%
Rainwater butt/ barrel	1	0,5%
Other	9	4,2%
Don't know	1	0,5%



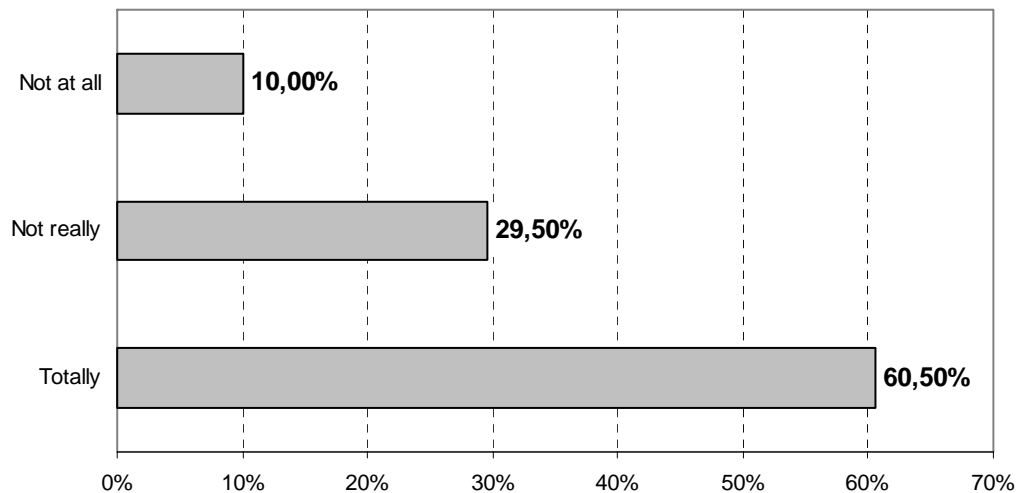
21. In your opinion, do you think that your household consumes...

	NB	Freq.
Little water	84	21,0%
Neither too much nor too little water	219	54,8%
A lot of water	92	23,0%
Don't know	5	1,3%



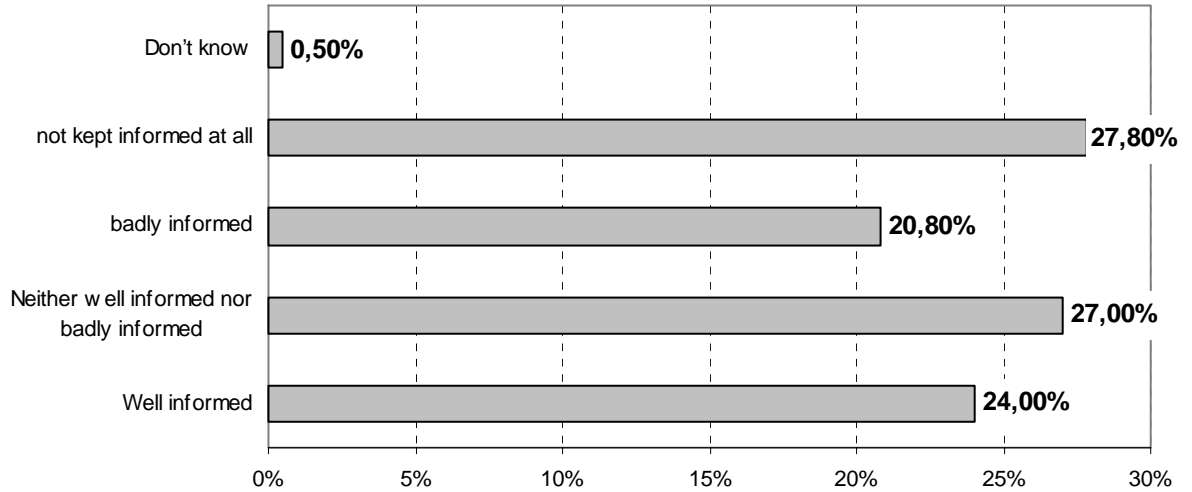
22. Day to day, do you trust the quality of tap water supplied to your home?

	NB	Freq.
Totally	242	60,5%
Not really	118	29,5%
Not at all	40	10,0%



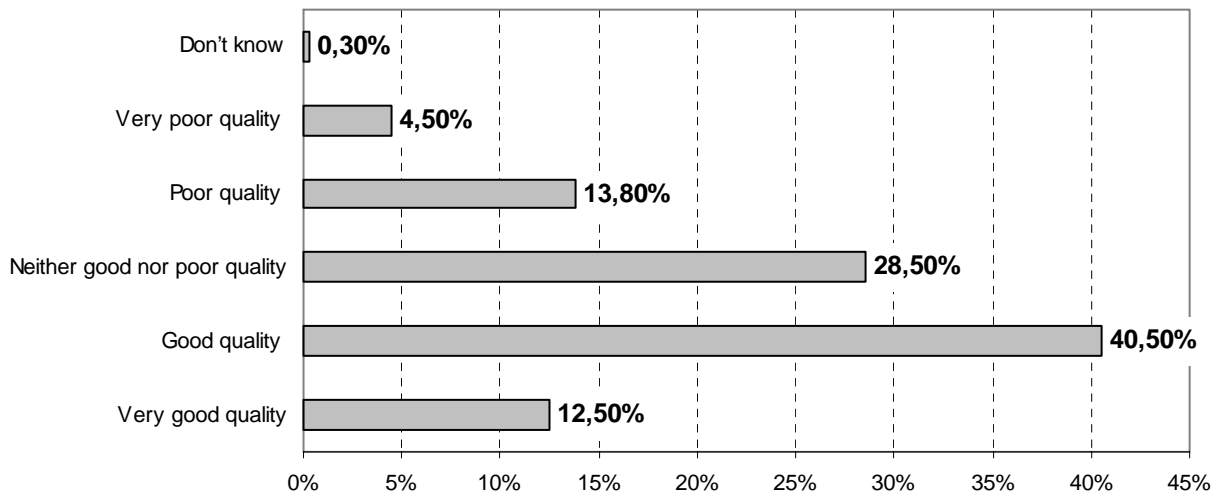
23. Thinking about the quality of your tap water would you say you are

	NB	Freq.
Well informed	96	24,0%
Neither well informed nor badly informed	108	27,0%
badly informed	83	20,8%
not kept informed at all	111	27,8%
Don't know	2	0,5%



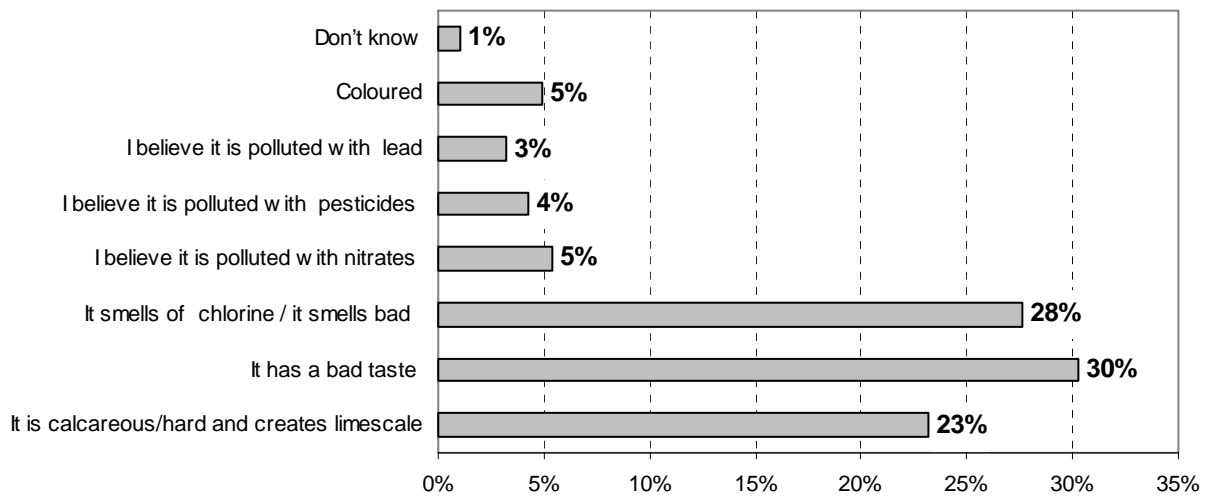
24a. Personally, would you say that your tap water is ...

	NB	Freq.
Very good quality	50	12,5%
Good quality	162	40,5%
Neither good nor poor quality	114	28,5%
Poor quality	55	13,8%
Very poor quality	18	4,5%
Don't know	1	0,3%



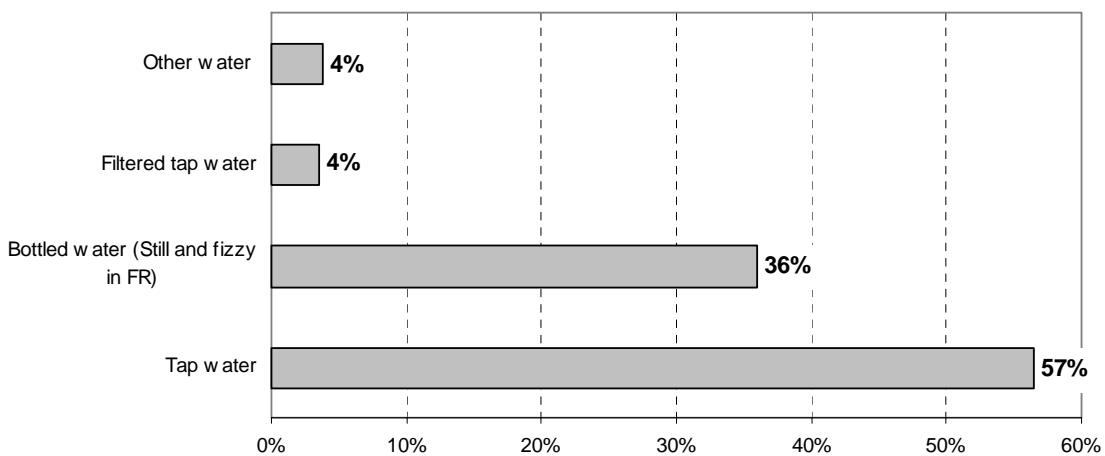
24b. For what reasons do you consider your tap water as poor quality ?

	NB	Freq.
It is calcareous/hard and creates limescale	43	23,2%
It has a bad taste	56	30,3%
It smells of chlorine / it smells bad	51	27,6%
I believe it is polluted with nitrates	10	5,4%
I believe it is polluted with pesticides	8	4,3%
I believe it is polluted with lead	6	3,2%
Coloured	9	4,9%
Don't know	2	



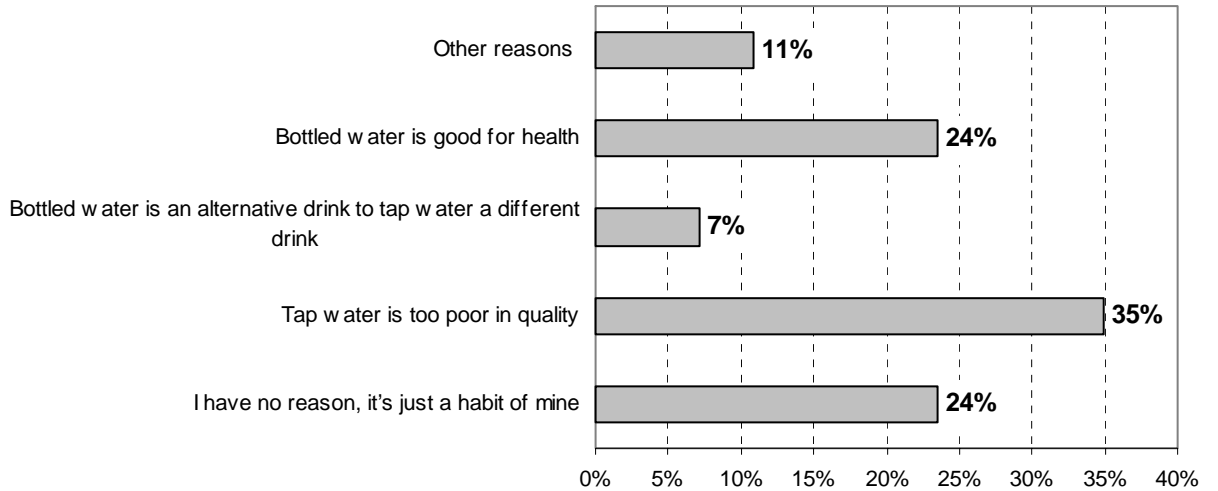
25. when you are at home, what type or types of water do you usually drink?

	NB	Freq.
Tap water	226	56,5%
Bottled water	144	36,0%
Filtered tap water	14	3,5%
Other water	15	3,8%
Don't know	1	0,3%



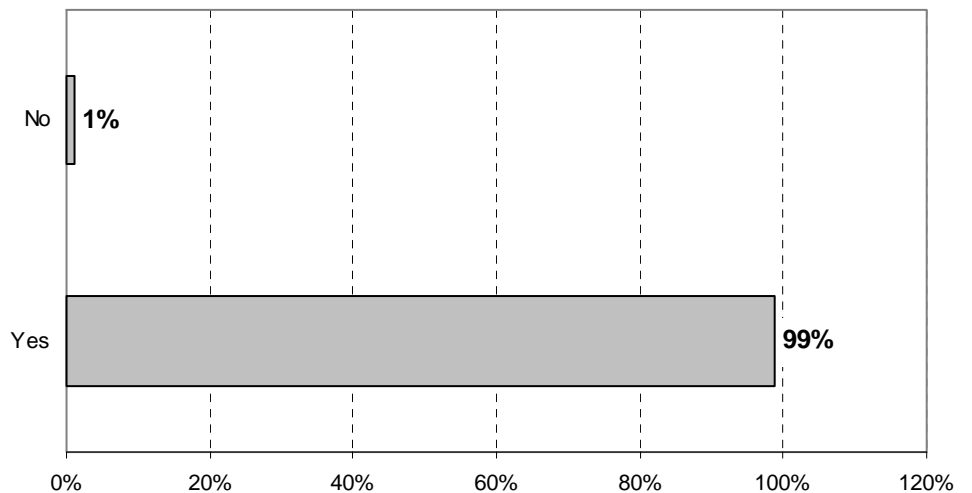
26b & c. Can you list two reasons why you consume bottled water at home?

	NB	Freq.
I have no reason, it's just a habit of mine	39	23,5%
Tap water is too poor in quality	58	34,9%
Bottled water is an alternative drink to tap water a different drink	12	7,2%
Bottled water is good for health	39	23,5%
Other reasons	18	10,8%
Don't know	0	0,0%



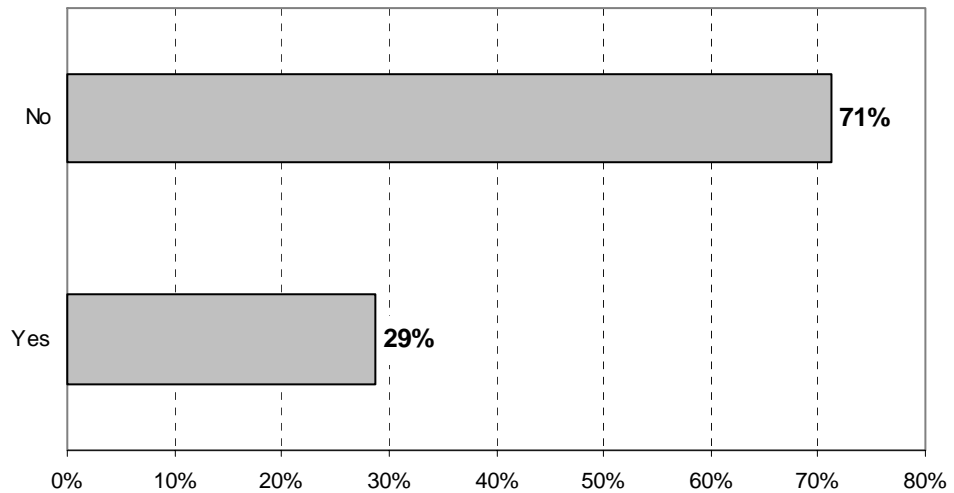
27. Is your household currently charged for water by a water meter installed at your home, or in your household block?

	NB	Freq.
Yes	395	98,8%
No	4	1,0%
Don't know	1	0,3%



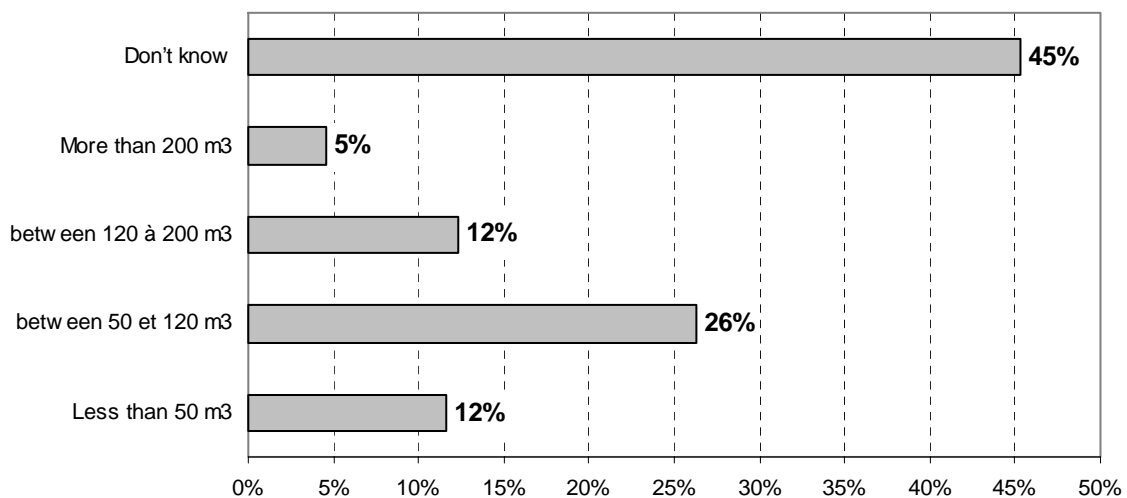
28a. Could you estimate the annual average volumes of water used in your household?

	NB	Freq.	Average
Yes	115	28,8%	
No	285	71,3%	
Per household (m ³ / year)			119,7
Per household (l / day)			328,0
Per person (m ³ / year)			52,1
Per person (l / day)			142,9



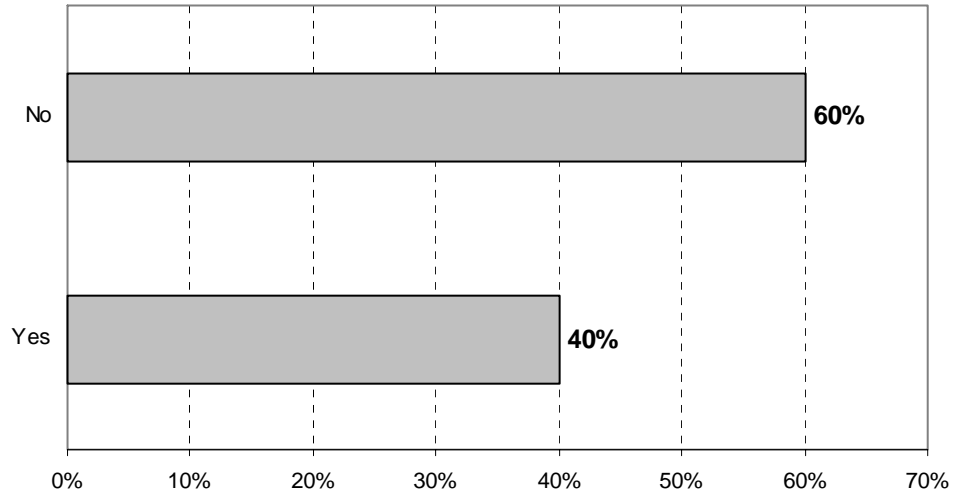
28b. Which of the following annual volumes of water do you think your household use:

	NB	Freq.
Less than 50 m ³	33	11,6%
between 50 et 120 m ³	75	26,3%
between 120 à 200 m ³	35	12,3%
More than 200 m ³	13	4,6%
Don't know	129	45,3%



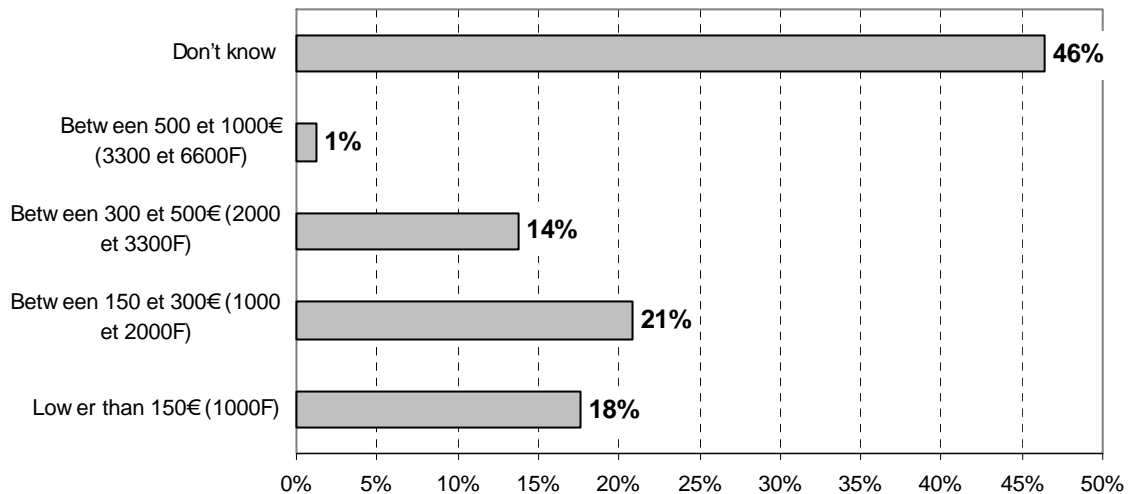
29 & 30a. Can you recall the total amount of your last household water bill?

	NB	Freq.	31a : Average bill in €/year
Yes	160	40,0%	259,5
No	240	60,0%	



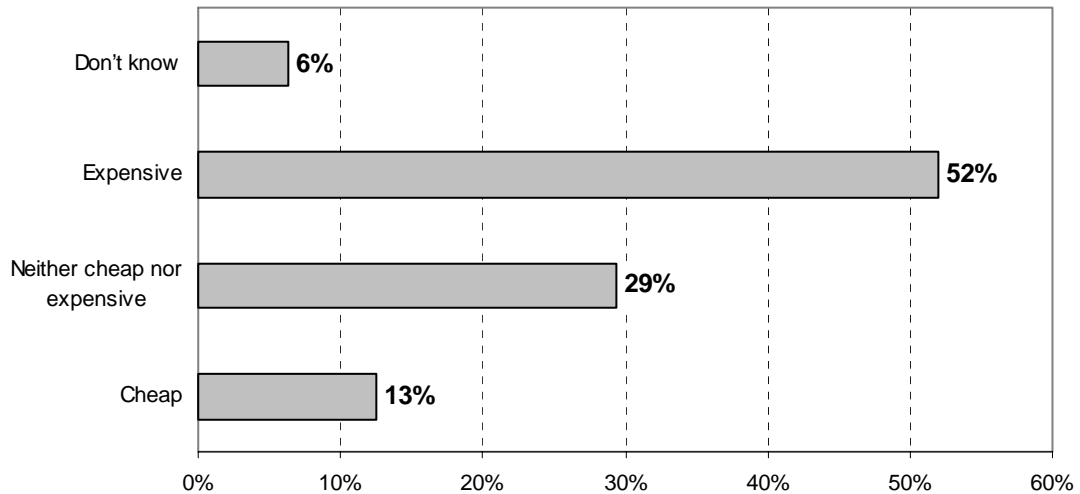
31a. According to you, which of the following categories do you think your last household water bill falls into:

	NB	Freq.
Lower than 150€	42	17,6%
Between 150 et 300€	50	20,9%
Between 300 et 500€	33	13,8%
Between 500 et 1000€	3	1,3%
More than 1000€	0	0,0%
Don't know	111	46,4%



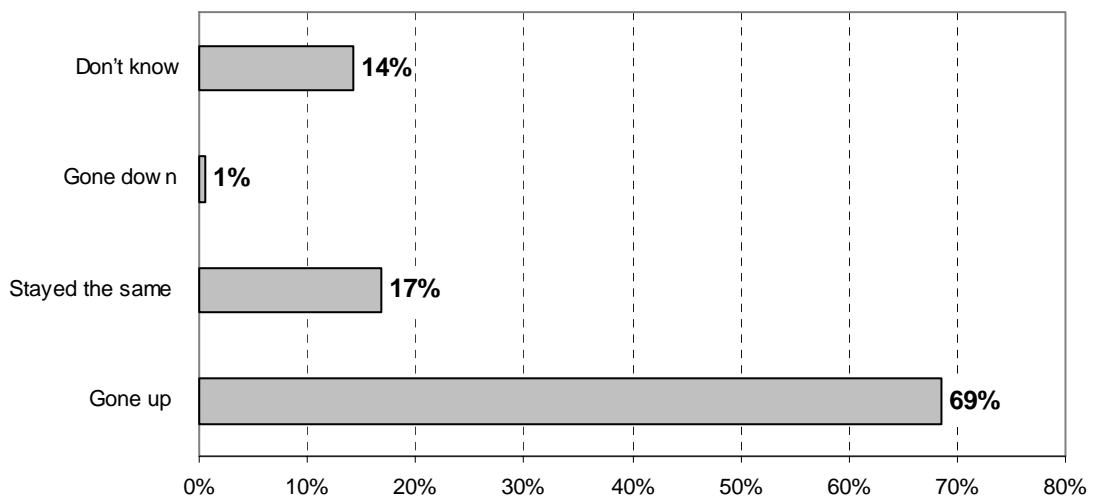
32. On the whole, do you think that the tap water that is supplied to your household is :

	NB	Freq.
Cheap	50	12,5%
Neither cheap nor expensive	117	29,3%
Expensive	208	52,0%
Don't know	25	6,3%



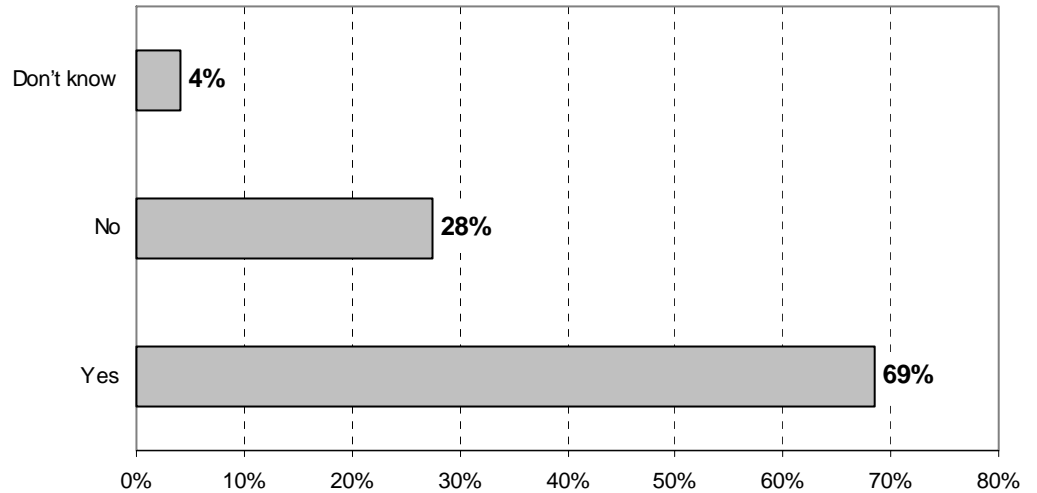
33. Do you feel that in the last 10 years, the overall price of your household water bill has:

	NB	Freq.
Gone up	274	68,5%
Stayed the same	67	16,8%
Gone down	2	0,5%
Don't know	57	14,3%



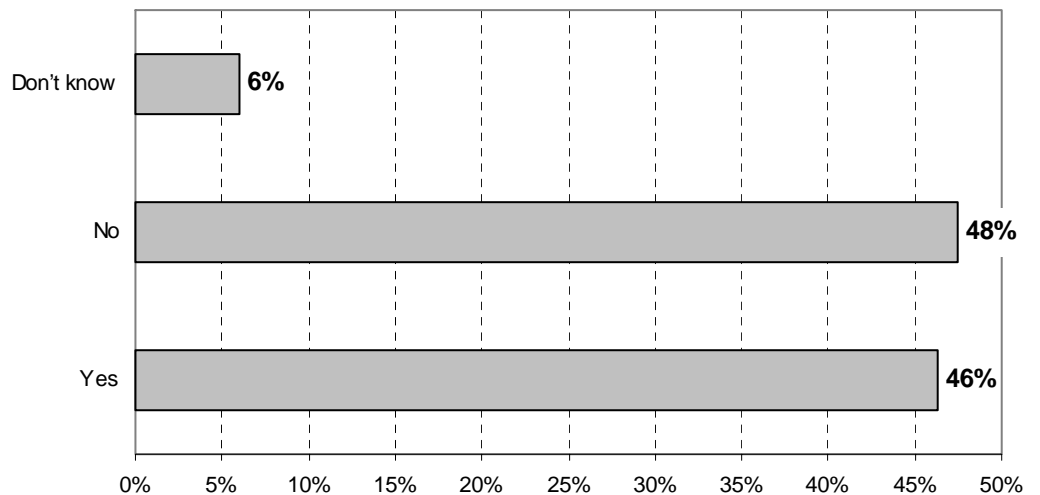
34. If a pricing system based on peak use were to be introduced, would you be willing to consider using smaller amounts of water during peak hours and instead switch most of your water use (i.e. garden watering, dishwasher, washing machine and baths) to off-peak times during the day and later at night if it saved you a quarter of your normal household water bill?

	NB	Freq.
Yes	274	68,5%
No	110	27,5%
Don't know	16	4,0%



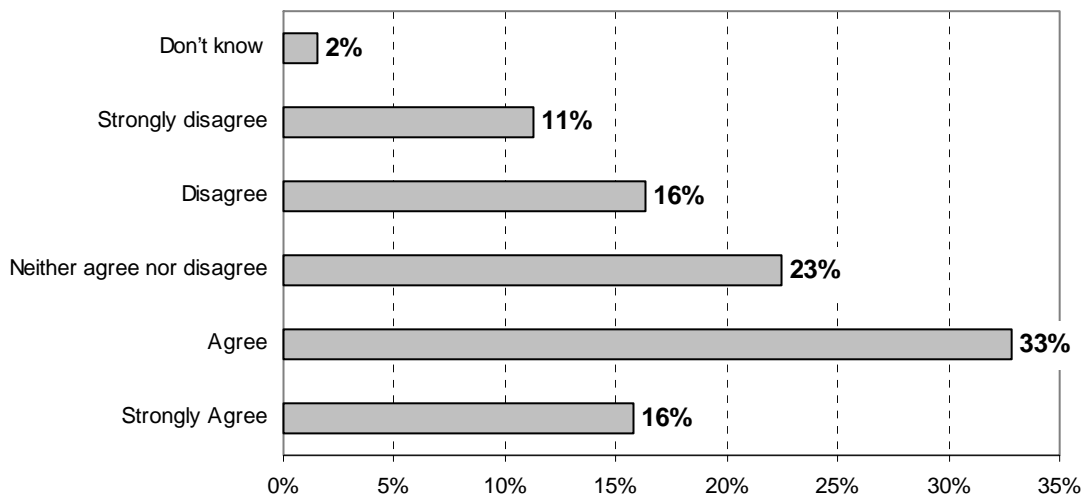
35. If your normal water bill was projected to increase by a quarter, do you think you would take measures to reduce your consumption?

	NB	Freq.
Yes	185	46,3%
No	190	47,5%
Refuse	1	0,3%
Don't know	24	6,0%



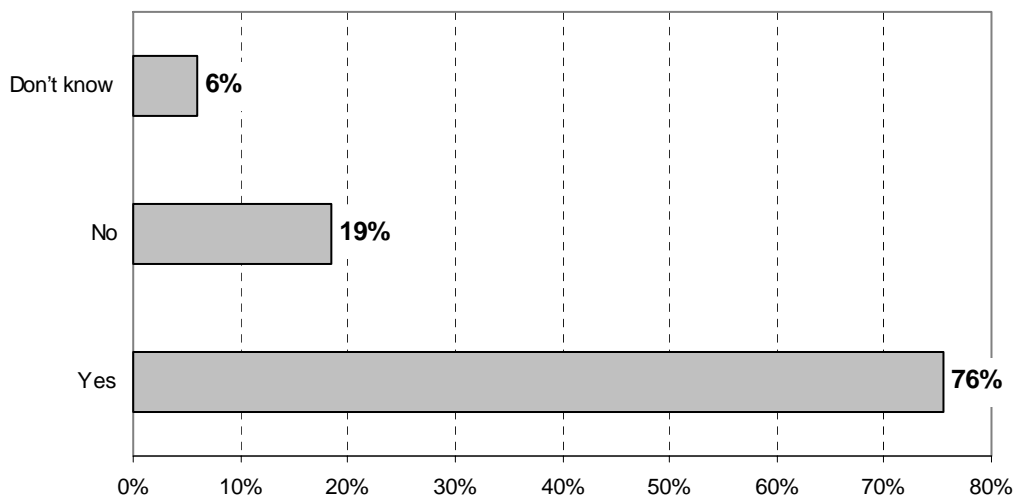
37. Do you agree or disagree with the following statement: I would be willing to pay an additional charge in my household water bill to directly support protection of water in the environment..

	NB	Freq.
Strongly Agree	63	15,8%
Agree	131	32,8%
Neither agree nor disagree	90	22,5%
Disagree	65	16,3%
Strongly disagree	45	11,3%
Don't know	6	1,5%



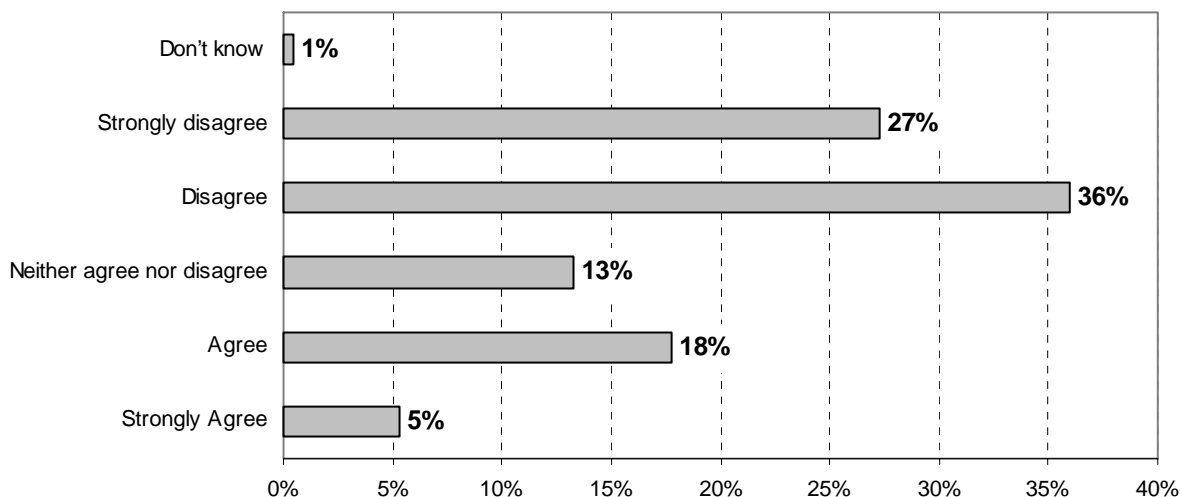
38. If it were possible would you be willing to accept lower water quality in your toilet with no effect on your normal household water bills if you knew it would be helping the environment?

	NB	Freq.
Yes	302	75,5%
No	74	18,5%
Don't know	24	6,0%



39. Do you agree or disagree with the following statement: In my region, water is very abundant; there is no need to save it.

	NB	Freq.
Strongly Agree	21	5,3%
Agree	71	17,8%
Neither agree nor disagree	53	13,3%
Disagree	144	36,0%
Strongly disagree	109	27,3%
Don't know	2	0,5%



40. I make sure the washing machine and/or the dishwasher has a full load before starting them up.

	NB	Freq.
Always	331	82,8%
Sometime	48	12,0%
Never	21	5,3%

41a. Take care when watering the garden

Always	119	29,8%
Sometime	67	16,8%
Never	53	13,3%
No garden	161	40,3%

41b&c. Take care when selecting wm and or dw programme

Always	284	71,0%
Sometime	55	13,8%
Never	46	11,5%
Not equipped	15	3,8%

41d. Close the tap to avoid unnecessary use

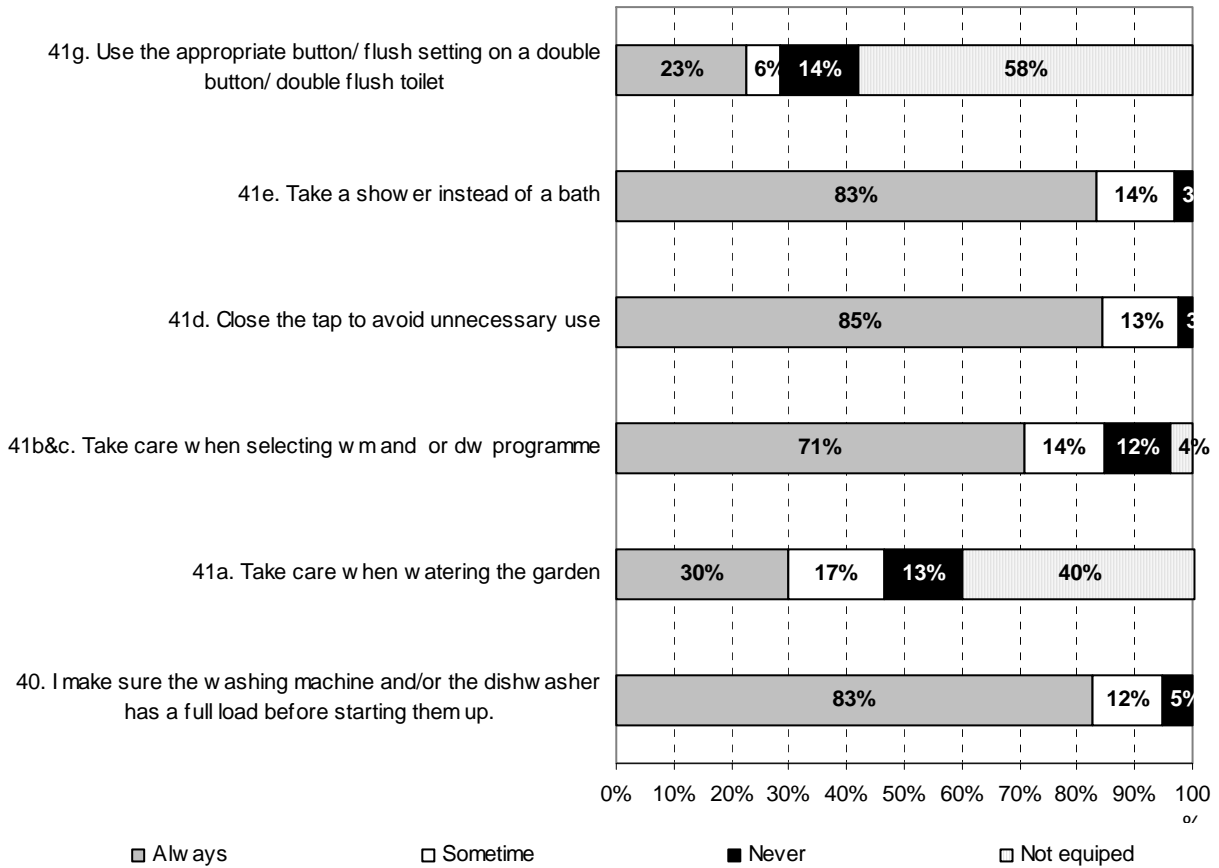
Always	338	84,5%
Sometime	52	13,0%
Never	10	2,5%

41e. Take a shower instead of a bath

Always	333	83,3%
Sometime	54	13,5%
Never	13	3,3%

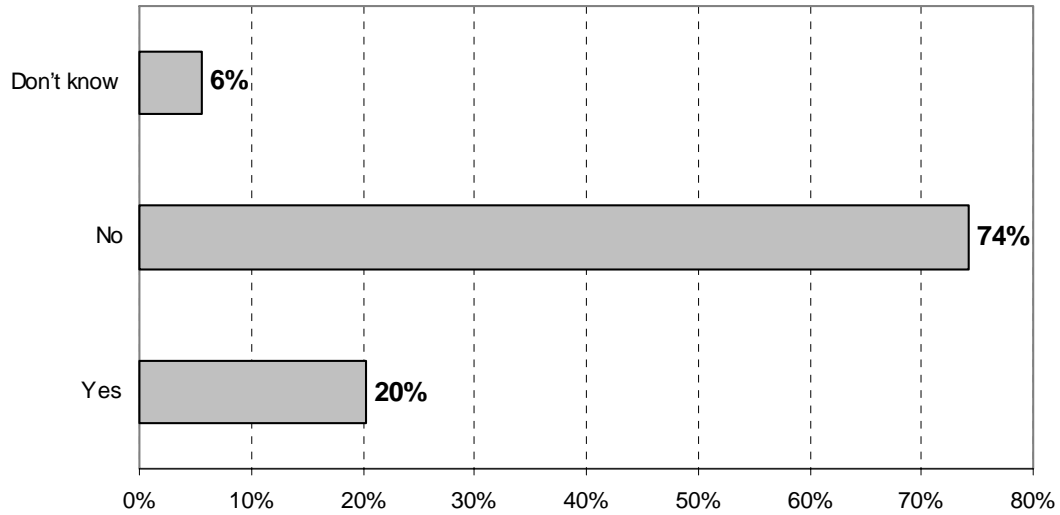
41g. Use the appropriate button/ flush

	NB	Freq
Always	90	22,5%
Sometime	24	6,0%
Never	54	13,5%
Not equipped	232	58,0%



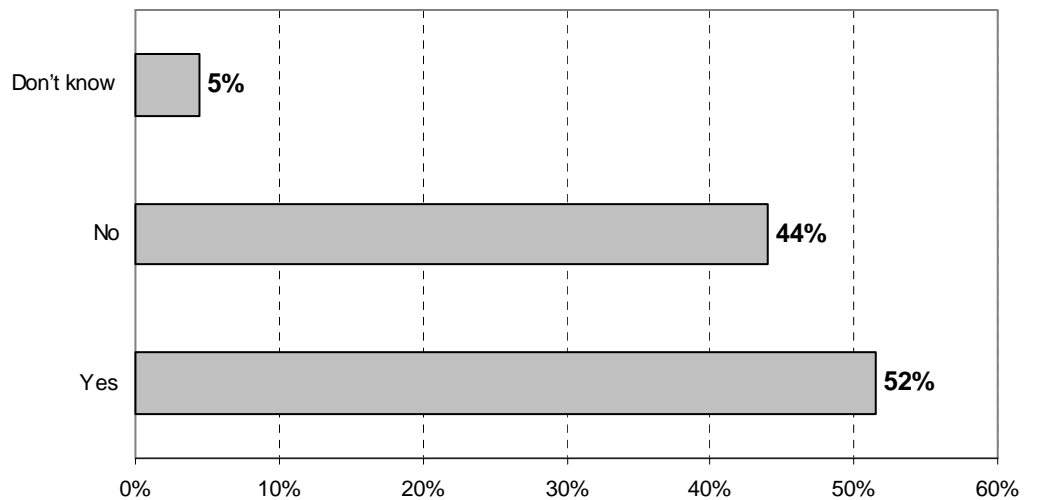
41f. Have installed a toilet hog or water saving device in your toilet cistern?

	NB	Freq.
Yes	81	20,3%
No	297	74,3%
Don't know	22	5,5%



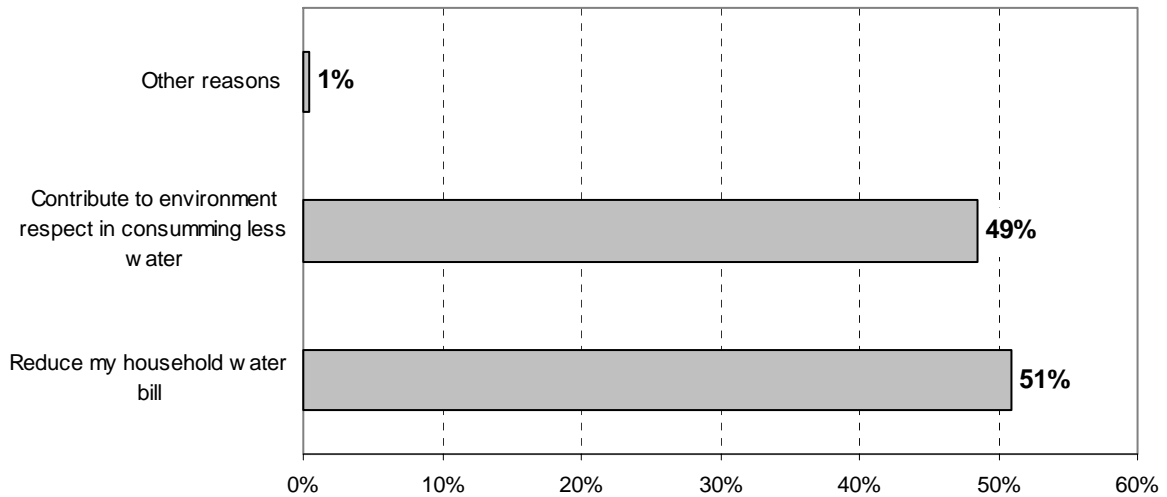
42a. This illustration shows a process called 'grey water reuse'. This lower quality water is perfectly safe but does not reach the very high standards needed for tap water. Given that this lower quality recycled water is safe would you accept to instal such a system.....

	NB	Freq.
Yes	206	51,5%
No	176	44,0%
Don't know	18	4,5%



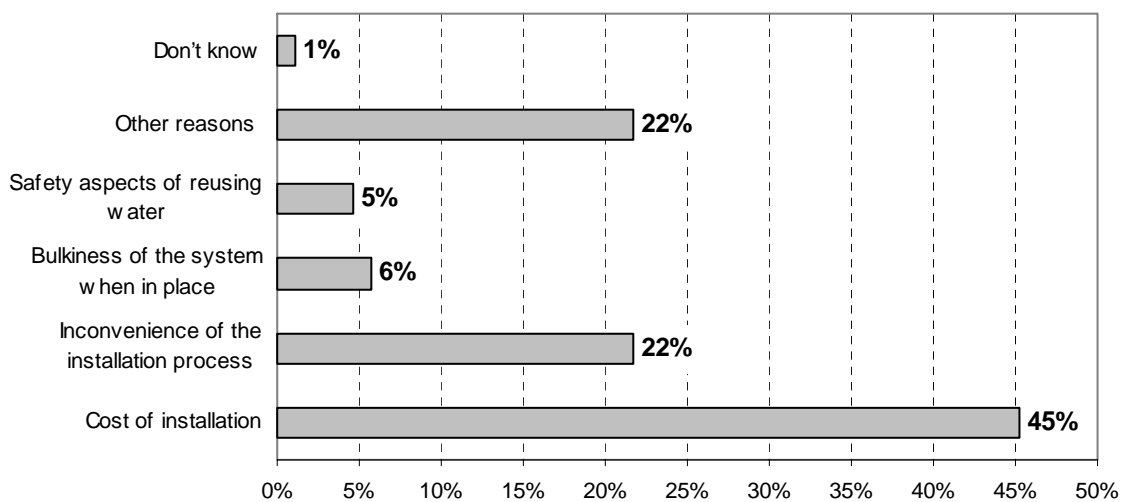
42b. Which of these following factors could influence you to install a 'grey water reuse system' in your home?

	NB	Freq.
Reduce my household water bill	105	51,0%
Contribute to environment respect in consuming less water	100	48,5%
Other reasons	1	0,5%
Don't know	0	0,0%



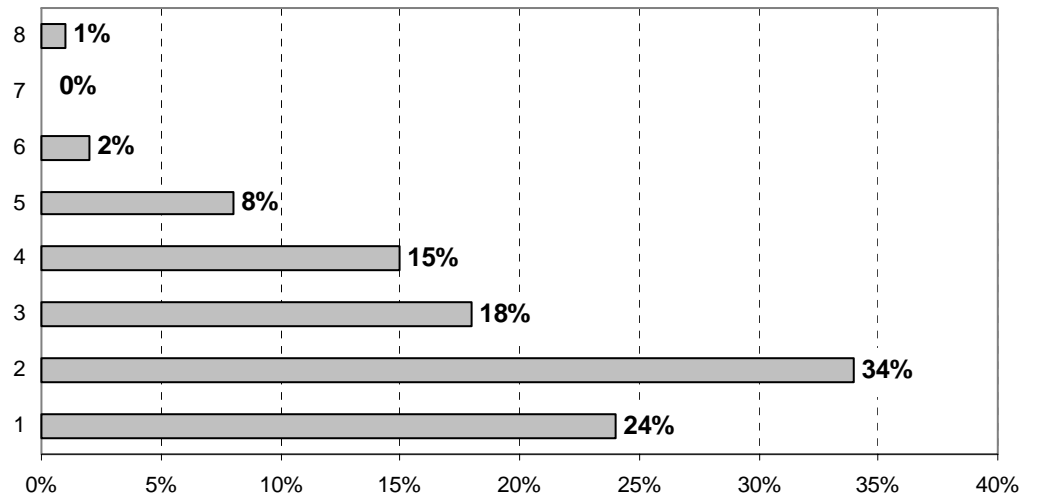
42c. Which of these following factors could deter you from installing such a system? (for people who say no in 43a)

	NB	Freq.
Cost of installation	127	45,2%
Inconvenience of the installation process	61	21,7%
Bulkiness of the system when in place	16	5,7%
Safety aspects of reusing water	13	4,6%
Other reasons	61	21,7%
Don't know	3	1,1%



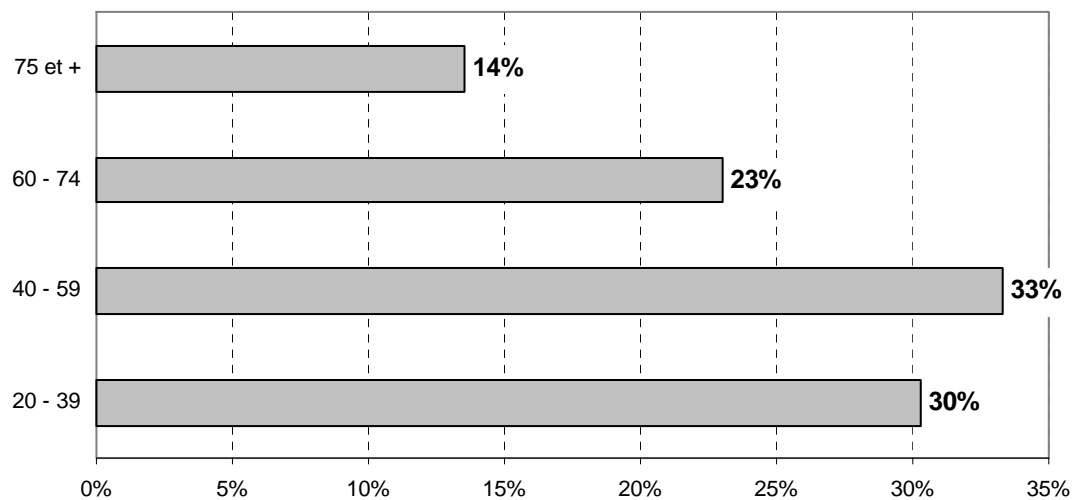
50. Permanent Household composition

	NB	Freq.
1	94	24%
2	135	34%
3	71	18%
4	59	15%
5	30	8%
6	8	2%
7	1	0%
8	2	1%



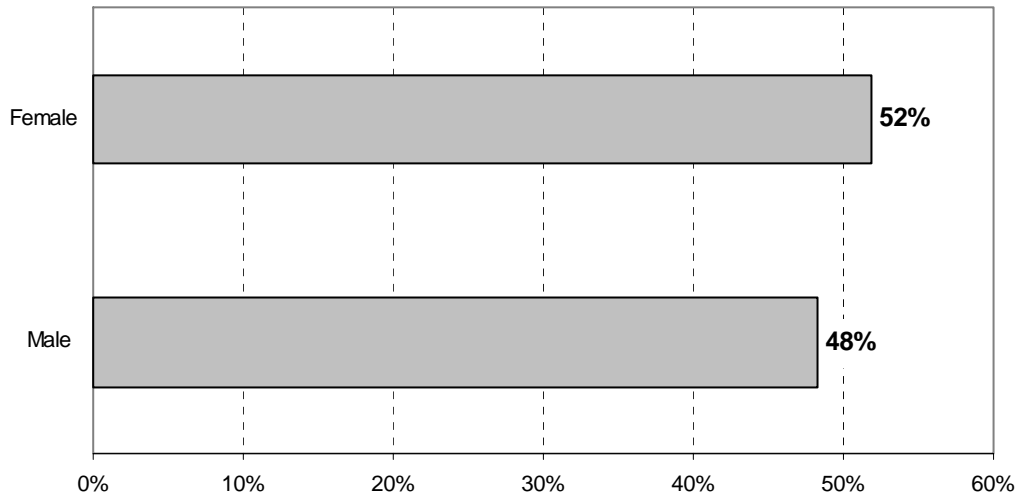
50. Age class

	NB	Freq.
20 - 39	121	30,3%
40 - 59	133	33,3%
60 - 74	92	23,0%
75 et +	54	13,5%



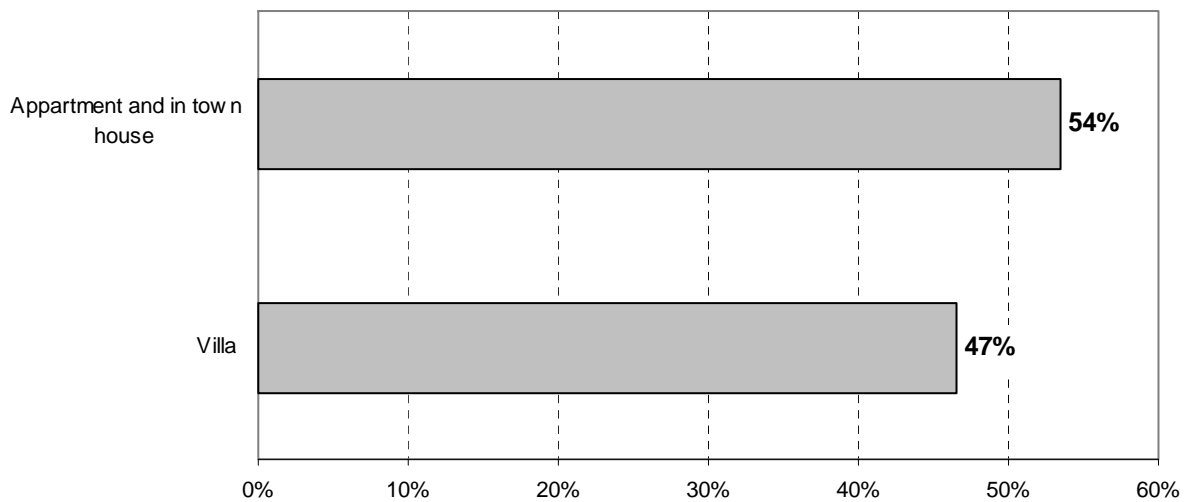
50. Sex

	NB	Freq.
Male	193	48,3%
Female	207	51,8%



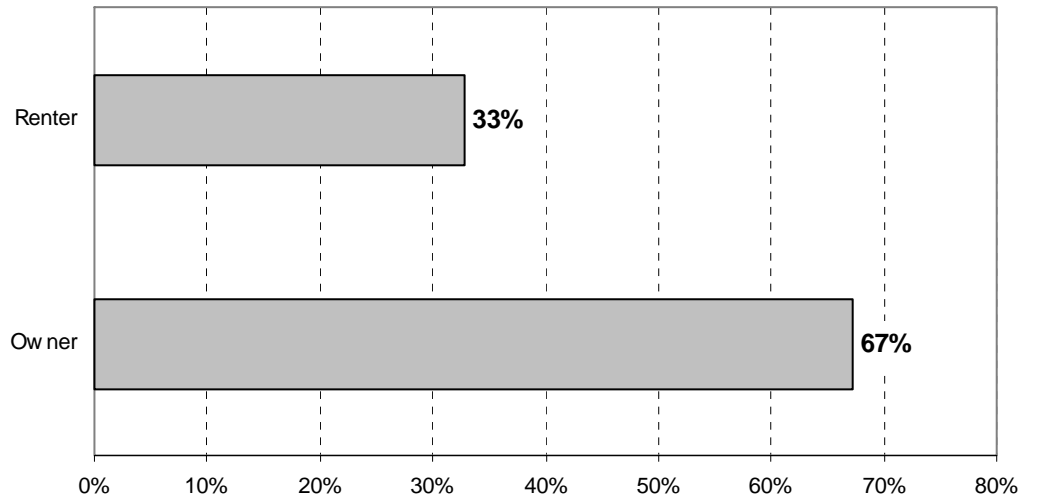
51. Type of living accommodation of the respondent's household:

	NB	Freq.
Villa	186	46,5%
Appartment and in town house	214	53,5%



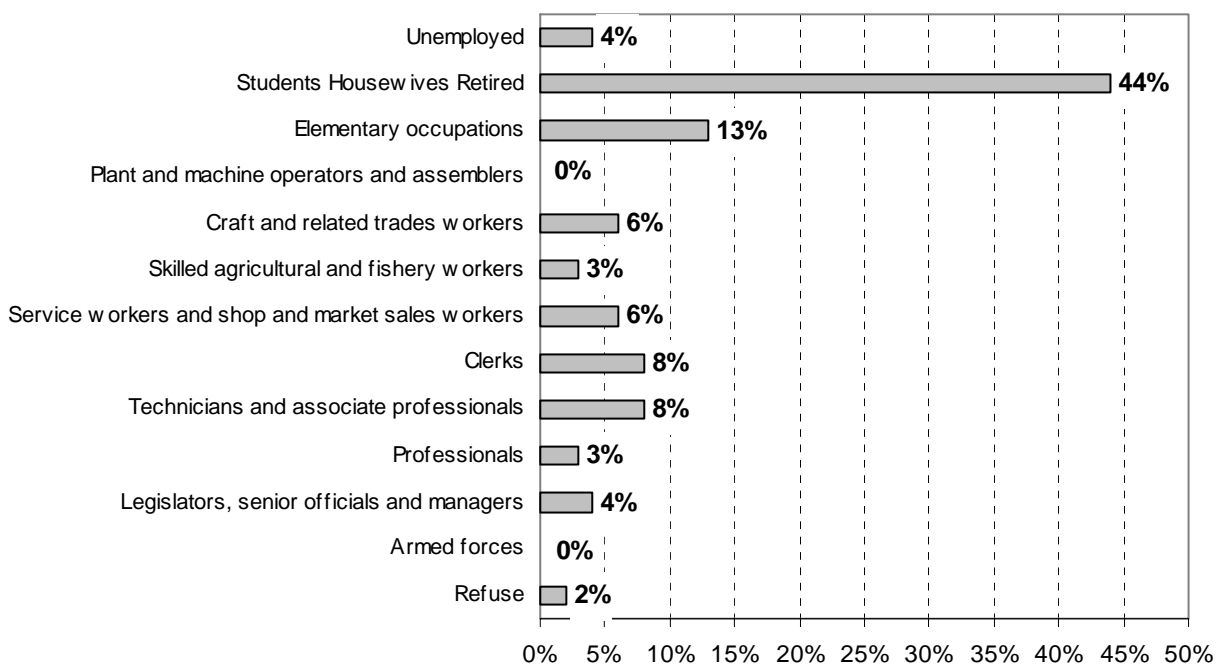
52. Ownership of the property

	NB	Freq.
Owner	269	67,3%
Renter	131	32,8%



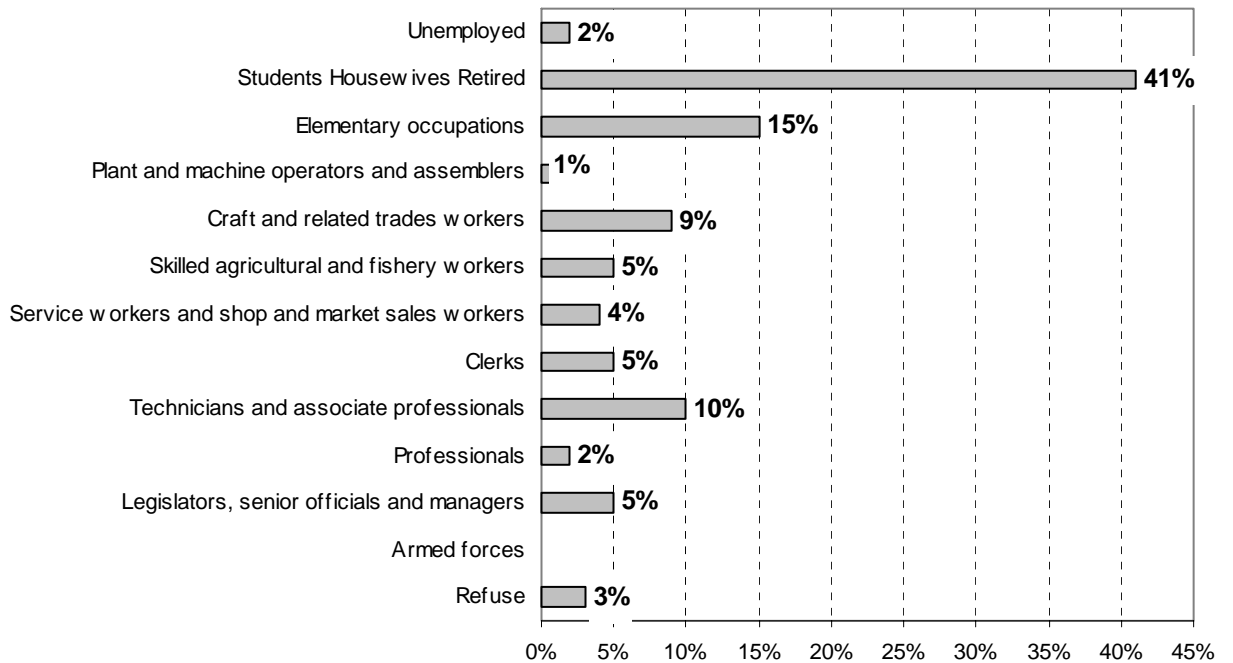
Occupation

	NB	Freq.
Refuse	6	2%
Armed forces	1	0%
Legislators, senior officials and managers	15	4%
Professionals	10	3%
Technicians and associate professionals	33	8%
Clerks	31	8%
Service workers and shop and market sales workers	23	6%
Skilled agricultural and fishery workers	11	3%
Craft and related trades workers	24	6%
Plant and machine operators and assemblers	1	0%
Elementary occupations	53	13%
Students Housewives Retired	176	44%
Unemployed	16	4%



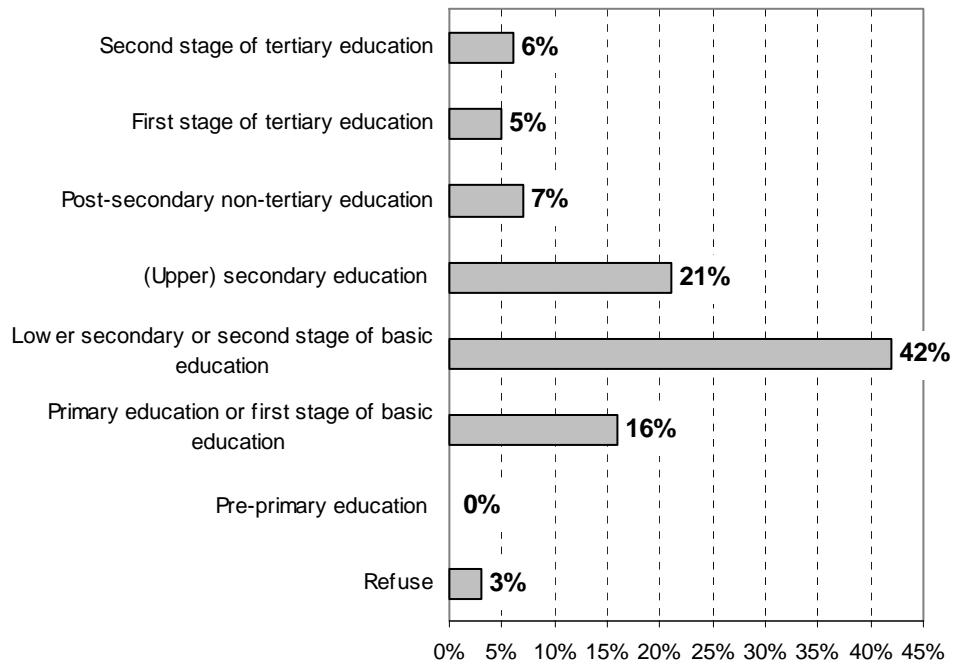
Chief family occupation ?

	NB	Freq.
Refuse	10	3%
Armed forces		
Legislators, senior officials and managers	20	5%
Professionals	9	2%
Technicians and associate professionals	39	10%
Clerks	18	5%
Service workers and shop and market sales workers	16	4%
Skilled agricultural and fishery workers	20	5%
Craft and related trades workers	34	9%
Plant and machine operators and assemblers	4	1%
Elementary occupations	59	15%
Students Housewives Retired	162	41%
Unemployed	9	2%



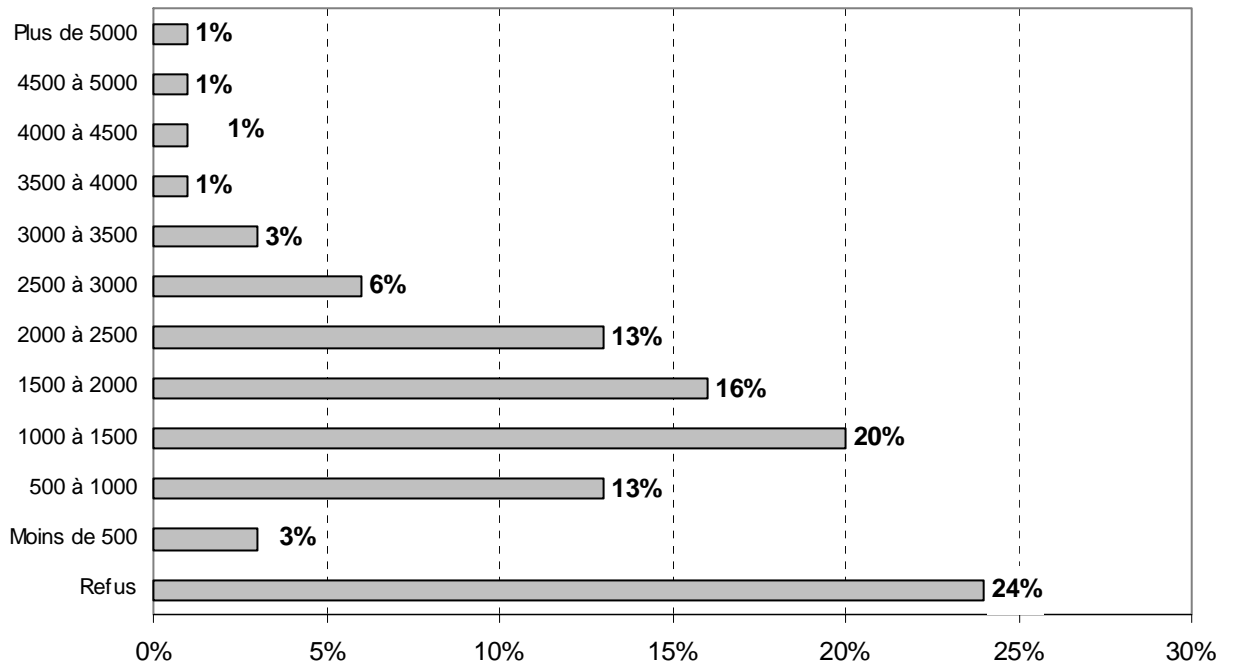
Higher education level ?

	NB	Freq.
Refuse	13	3%
Pre-primary education	1	0%
Primary education or first stage of basic education	63	16%
Lower secondary or second stage of basic education (Upper) secondary education	167	42%
Post-secondary non-tertiary education	84	21%
First stage of tertiary education	27	7%
Second stage of tertiary education	21	5%
	24	6%



Monthly income for the whole household?

	NB	Freq.
Refuse	96	24%
Less than 500€	10	3%
500 to 1000€	53	13%
1000 to 1500€	78	20%
1500 to 2000€	64	16%
2000 to 2500€	53	13%
2500 to 3000€	22	6%
3000 to 3500€	12	3%
3500 to 4000€	5	1%
4000 to 4500€	3	1%
4500 to 5000€	2	1%
Plus de 5000€	2	1%
Average per household		2,6



4.2. FRENCH SPECIFIC QUESTIONS

Area	NB	Freq.
1	155	38,8%
2	34	8,5%
3	101	25,3%
4	24	6,0%
5	42	10,5%
6	44	11,0%

8. In your mind, does it exist any organisms in charge of water management and protection ?

	NB	Freq.
Yes	274	69%
No	50	13%
Don't know	76	19%

9. In your mind, these organisms are ...

	Yes	No	Don't know
European	41%	40%	19%
National	67%	25%	8%
Regional	73%	21%	6%
Departmental	73%	19%	8%
Locals	62%	30%	8%
Others	14%	58%	28%

10. Do you think those organisms are composed by... Yes No Don't know

	Yes	No	Don't know
Civil servants	71%	22%	7%
Elected persons	69%	22%	9%
Drinkable water user or representatives	54%	31%	15%
Water companies	70%	20%	10%
Industrials	38%	43%	19%
Fishers	35%	49%	16%
Environment NGO	54%	35%	12%
Tourism representatives	27%	58%	15%
Other	6%	59%	35%

12. Giving my mind won't change anything! Would you say you are agree, neither disagree nor agree or disagree with this sentence?

	NB	Freq.
Refuse	2	1%
Agree	173	61%
Neither agree nor disagree	55	19%
Disagree	32	11%
Don't know	23	8%

30. Do you have a swimming-pool ?

	NB	Freq.
Yes	29	13,6%
No	185	86,4%

63. If you have alternative water resource, what do you use it for?

	NB	Freq.
Garden watering	49	61,3%
Swimming-pool	28	35,0%
Car wash	16	20,0%
Domestic uses	12	15,0%
Other uses	6	7,5%
No uses	7	8,8%
Don't know		

64. If you do not have well or borehole, do you envisage to invest in such a system?

	NB	Freq.
Yes	11	5,3%
No	188	91,3%
Don't know	7	3,4%

65. What would be your main motivation ?

	NB	Freq.
Reduce my water bill	7	63,6%
Contribute to environment respect	3	27,3%
Water more abundantly	1	9,1%
Owning my own resource, be independent	0	0,0%
Other reason	0	0,0%
Don't know	0	0,0%

66. Tell me the main reason why you will be willing to make a well or a borehole?

	NB	Freq.
Because I'm renter	36	19,1%
Because I've no utility	77	41,0%
Because it is too expensive	31	16,5%
Because technically, it is not feasible	21	11,2%
For an other reason	22	11,7%
Don't know	1	0,5%

67. Do you know the cost of a borehole?

	NB	Freq.
Yes	61	26,3%
No	171	73,7%

68. Do you think it exist a specific regulation related to borehole?

	NB	Freq.
Yes	91	39,2%
No	141	60,8%

69. Do you know this regulation?

	NB	Freq.
Yes	13	14,3%
No	78	85,7%

70. If you had the possibility to connect to an ancient irrigation or a raw network, would you do it?

	NB	Freq.
Yes	80	34,8%
No	115	50,0%
Already connected	16	7,0%
Don't know	19	8,3%

71. What will be your main motivation?

	NB	Freq.
Reduce my water bill	44	55,0%
Contribute to environment respect	24	30,0%
Water more abundantly	11	13,8%
Owning my own resource, be independent	1	1,3%
Other reason	0	0,0%
Don't know	0	0,0%

72. Why would you refuse such a connection?

	NB	Freq.
Because I'm renter	18	15,7%
Because I've no utility	68	59,1%
Because it is too expensive	16	13,9%
Because technically, it is not feasible	3	2,6%
For an other reason	8	7,0%
Don't know	2	1,7%

73. The increase of pollution is so important that in 20 years, the region will face water scarcity. Do you think this scenario is ...

	NB	Freq.
Optimist	24	6,0%
Realist	302	75,5%
Pessimist	74	18,5%

74. Taking into account the climate change, Hérault river could be dry one year on two. Do you think this scenario is...

	NB	Freq.
Optimist	18	4,5%
Realist	252	63,0%
Pessimist	130	32,5%

75. The generalisation of water saving equipment and recycling, should reduce significantly drinking water consumption in 20 years. Do you think this scenario is...

	NB	Freq.
Optimist	130	32,5%
Realist	234	58,5%
Pessimist	36	9,0%

76. The European Commission asked BRGM to uptake research about public participation in water management. It is then envisaged to conduct a few citizen focus groups to discuss about water. Would you accept to join such groups?

	NB	Freq.
Yes	67	16,8%
No	333	83,3%

4.3. BASIC FREQUENCIES ANALYZE

4.3.1. Interviewees Socio-economic and geographic characteristics

Several questions allowed to identify socio-economic characteristics of the interviewees. Most of them are asked to respect the quotas. This is true for sex, age, occupation (owner or renter), the type of housing, the area of residence, and the municipality.

In this category, five supplementary questions are asked to allow cross analysis with the questions relative to the other 7 issues. These questions allowed to identify the occupation of both the interviewee and the chief of the family, its higher level of education, the average revenue for the whole household and its structure (number of person, sex and age).

An International Standard Classification of Occupations (ISCO 1988) is used for the comparisons between the four case studies. For the same reason, we used the International Standard Classification of Education (ISCED 1997).

In the same way as the education level and occupation, we make the assumption that the average revenue of the household is probably an explicative factor of several behaviours, perceptions and attitudes. Eleven revenue levels are defined. Three persons on four accepted to answer the revenue question. The average revenue is about 1300 euros per month and per household. About 50% of the interviewed person declare a revenue between 1000 and 2000 euros per month for the whole household.

It is then possible to calculate the number of household living under the relative poverty threshold. See Loubier (2003) for a description of this threshold. This threshold was about 538 euros per month and per unit of consumption. In the Hérault river basin, 17% of the interviewed household live under this threshold (51 on 304). If we suppose that the 96 household which refuse to mention their revenue is upper this threshold, this is 13% of the river basin population living under this poverty threshold against 9.5 to 11% in France according to the considered year.

Three quarter of the household live in apartments or an in town house while this type of housing represent half of the sample. However, it is surprising that the variable owner / renter is not linked to the poverty level.

Poverty seems to be a geographic characteristic since, on the sample, it concern 29% of the households living in the middle Hérault valley, 23% in the Cévennes mountains region, 10% in the karst plateau and from 3 to 4 % on the three other territories.

4.3.2. Water quality within the environment and place of water within general societal and environmental issues

Quite obviously, environment is not a priority issue since it occupies the fifth rank after employment, Health and welfare services, education, and crime prevention/ law & order but before economy and international politics.

In the same way, water within environmental issue is not qualified as a priority issue by interviewees. The issue «flooding, scarcity and water pollution» occupies the fourth position behind air, radioactive wastes but before desertification and deforestation, and reduction of biodiversity.

About water quality within its immediate environment, the opinion of the interviewees is quite ambiguous. 86% think that water is good or medium quality but 32% think it has deteriorated during the 10 past years. This perception goes against the state services which declare that water quality has improved in the Hérault department. Several assumptions can be made to explain this mis-perception: (i) media influence in relating negative evolutions which influence local water perception through events occurring outside the area, (ii) a deficit in information, (iii) a correlation of water quality perception with other variables.

4.3.3. Water management: knowledge of institutions and participation wishes

41% of the interviewees think that water management within their immediate environment is an issue to be addressed urgently. This supposes (i) that individuals perceive specific problems, (ii) that they think these problems are due to a default or a non-existence of water management problems or at least that (iii) an improvement of water management could reduce the previous hypothetical problems.

The assumption of absence of water management institution can not be excluded totally since 13% of the interviewees think it does not exist any organisms in charge of water protection and management. 19% do not know if such organisms exist (41% think these organisms are European and 2/3 to ¾ that they are National, regional, departmental or local).

The structure of these organisms in charge of water management and protection is quite vague. Most of the people think that within these organisms, industrialists, water users and water companies are represented. This attests either a very good knowledge of the water management institution (since water users are represented in very specific commissions) or a total absence of knowledge.

Although 37% of the interviewees think that such organisms do not exist, only 26% would like to be implied in discussion and debate on present and future water management and 17% who accept to participate in citizen water focus groups.

So it seems that citizen propensity to participate in water management is rather low.

Individuals who accepted to be involved in focus groups is ten years younger than those who refuse, have a slightly higher revenue for the household and the level of education is much high. This can be explain by high willingness to participate in certain socio-professional class such as elected persons, managers, scientific, intellectual and intermediaries occupations.

4.3.4. Perception of the water price and volumes consumed

Largely before tourism, industry and leisure, agriculture and households are cited as the bigger water consumers.

Various questions allow to assess the household water consumption by type of uses and to identify the characteristics of some equipment. The Table 1 present several results in term of household equipment rate and frequency where certain activities are undertook.

The quasi-totality of the household is equipped by washing machine and showers but 22% do not have bath, 50% do not have dishwashers and 58% are not equipped by saving flushes. In average, households wash their car 6 to 7 time per year and those who have a garden (53.5%) water it 2.6 time per week in summer.

Households who are dishwasher equipped use it 4.1 time a week and made 5.2 hand wash-up per week instead of 13.2 for those who are not equipped. Then, the relative advantage to own dishwasher is not so evident in term of water consumption even for modern dishwashers using less water than older ones.

Every week, an Hérault river basin inhabitant makes 3.6 hand wash-up, use 1.6 time the dishwasher, 1.7 time the washing machine, takes 6.1 showers and 0.9 bath.

Baths and showers represent half of the in-house consumption, flushes 22% clothes and dish washing 18% and food uses 6% of which 1% for the beverage.

Using these declarations, we assess that the generalisation of modern flushes would allow to reduce in-house water consumption by 9%.

Activity	Equipment rate	Frequency	Volume margin* (l)	Average volumes (l)	Annual volumes per household (m3/year)	in % of the total in-house consumptions	
Washing	Washing machine	98,2%	4,5 /house/week	40 to 120	80 **	18,4	18%
	Dishwasher	50,7%	4,1 /house /week	20 to 40	30 **	3,3	
	Hand washing-up	100%	9,3 /house/week	10 àto12	11 **	5,3	
WC	Showers	99,2%	15,9 /house/week	60 to 80	70 **	57,2	49%
	Baths	78,5%	2,4 /house /week	150 to200	175 **	16,9	
WC	Traditional flush	58,0%	5,0 / pers./day **	6 to 12	9 **	24,7	22%
	Saving flush	42,0%		3 or 6	4 **	7,9	
Food	Beverage (l/pers./day)				1,4 *	1,3	6%
	Other (l/pers./day)				8,2 *	7,8	
Other uses (l/pers./day)					8,2 *	7,8	5%
Total					150		

(*) Source CIEAU³ and CEG⁴

(**) Source : from CIEAU and CEG

Table 1. Average annual consumption of Hérault river basin households.

Only 29% of the interviewees know the volume they consume and 40% their water fee. However, a majority of them feel water expensive and 69% affirm that their water bill have increased during the last 10 years. This is only one person on five, which know both the volume consumed and the bill, and 51% who know neither one nor the other.

We then try to assess the profile of persons who perceived water as expensive. It is surprising to see that traditional socio-economic variable are not explicative factors (sex, age, occupation, type of housing, education or revenue). On the other hand, these persons are more subject than others to think that tap water is bad quality and then, drink it less frequently. It looks like if people establish an unconscious quality / price ratio, i.e. a ratio between the perception of the tap water quality and its price.

People who know their water bill are younger, more frequently men and owner instead of renter. Other socio-economic characteristics do not seems to be determinant in the price knowledge.

³ <http://www.cieau.com/toutpubl/sommaire/texte/6/f61.htm>

⁴ http://www.ceg-eau.com/html/ceg_eau_maison_quotidien.php

4.3.5. Knowledge of the drinkable water cycle and perception of its quality

In a first analyse, it seems that people knowledge of drinking water cycle is rather good since 72% know what become of their used water and 64% where the tap water is withdrawn. Only 20% do not know either where its is withdrawn and where it goes after use. Perhaps because of the water utility size, urban people have a lower knowledge of the water cycle than rural ones.

However, people who declare knowing where the water is withdrawn and where it goes after use (54%) can not be qualified as having a good knowledge since a majority think that water comes from surface, and they are less numerous thinking that it comes from underground than from waste water treatment plant⁵.

People who feel well informed about tap water quality (24%) are more subject than other to think that it is good or very good quality and inversely, those who feel bad informed or not informed at all (49%) feel their tap water as poor quality.

So, tap water quality perception, its relative expensiveness and the information received are three linked variables. People make then an unconscious ratio expensiveness / quality / information. We will highlight in the water profile analysis section, that these variables are also correlated with the relative confidence in tap water.

The relative water expensiveness is then function of its perceived quality through physicochemical, bacteriological, olfactory, gustatory and visual parameters but also function of the relative confidence in tap water and the information received.

The reasons why people feel tap water as bad or very bad quality are first it taste (30%), its chlorine odour (28%) and its calcareous nature which favoured deposits (23%). Taste and odour are then frequently cited as responsible for the bad quality perception whereas the modification of these two parameters are mainly due to treatments needed to rend it potable.

People who mainly drink an other water than tap water do so because of the poor quality (34%) but not only since it also concern 34% of those perceiving tap water as good or very good quality and 32% of those perceiving it as neither good nor bad quality. The determinants of drinking an other water are also habits and because it is good for health (with 23.5% each).

⁵ The percentage of person thinking that their tap water comes from waste water treatment plant is certainly over-estimated since only 8% think that their used water goes to a treatment plant before returning to the drinkable network. An other possible explanation is related to the phrasing of the questions since people can have been mislead with: "waste water treatment plant" and "treatment for drinking water".

4.3.6. Households behaviours and attitudes related to water saving

Although only 29% know the volume consumed in the household, a large majority has saving behaviours. Most of the people declare they take care at the garden watering, the choice of the washing machine and dishwasher programs, closing taps and take showers instead of bath.

Nevertheless, 58% are not equipped by modern saving flushes and within the equipped ones 32% do never use it although toilets water represent a quarter of in-house consumption.

The behaviour of people who have a garden is paradoxical since on the one hand they always take care when they water it but not for financial reasons and on the other hand, those who never take care have generally access to free or cheap alternative water resource.

Several questions have then been asked to assess the relative social acceptability of two alternative water pricing system.

It appears that if water price increased by a quarter, half of the sample would undertake measures to reduce their consumption. Two assumption can be made to explain the attitude of the remaining half: those people already have saving behaviours and think it won't be possible to do more, or (ii) the increase in price is not sufficient to induce a change in behaviours. We reject assumption 2 since revenue is not a determinant variable of this attitude and that these people already think more than others that tap water is expensive. This reinforces assumption 1 especially since people willing to change their behaviour assess their consumption 22% under the others.

Half of the sample would accept an increase of the tap water bill if the supplement were directly affected to water protection. Those persons are younger and paradoxically are more subject to think that water within the environment is good quality (and inversely for those who refuse an increase of water bill).

A possible explanation of this paradox is the following. People are willing to pay more if the probability they really have to do so is low, i.e. if water within the environment is already good quality according to them, it is less probable that the water bill increase to finance water protection.

Note also that the willingness to pay is positively correlated with the relative importance of environment within general societal issues.

More than 2 persons out of three will accept to advance or differ some water consumption in case of peak hour pricing and if this allowed to reduce by a quarter the water bill. Several assumptions can then be made.

- People are more sensible to bill reduction than an increase, but this seems less probable even if we are not able to prove it.

- Some individuals which can not reduce their consumption, could at least plan it differently along the day. This assumption find confirmation since 56% of the those who would not reduce their consumption after a price increase, would accept to differ some consumption.
- The only easily delayed consumption are washing machines and dishwashers, and most of the household already have this behaviour because of the existence of this pricing system for the energy.

Two systems allowing a reduction of water consumption are presented:

- A connection to a second low water quality network to supply flushes, to contribute to environment protection;
- An in-house recycling system, treating grey water for flushes or outside uses.

Three persons out of four will accept the first system even if it do absolutely not contribute to environment protection since volumes consumed will remain unchanged (this will only prevent extra drinkable water treatment costs). It looks like if people trusted the supposed effectiveness of the system and only base their choices on the environment protection aspects. This assumption is verified since the people willing to accept such a system are also willing to accept an increase of the water bill to support water protection.

These results translate a rather high propensity to contribute to environment protection what is the first reason mentioned by a quarter of the sample concerning the recycling system acceptance (75% of the sample in the first system). The main motivation of other individuals is to reduce the water bill. The main reason evoked to refuse such a system is its cost.

More generally, young and women are more likely subject to accept the two proposed systems.

4.3.7. Alternative water resource

The questions related to alternative water resource are only asked to the 232 household having a garden.

More than a third of the concerned household already have an alternative water resource : rainwater shortage (31%), well or borehole (31%), river or springs (21%) and raw or old irrigation network (19%)⁶. Those resources are mainly used to water the garden.

⁶ Total is over 100% since some people have several alternative water resource access.

The access to alternative water resource is largely function of the geographic area. Wells and boreholes are mainly concentrated in the middle valley, springs or direct river harnessing is more frequent in Cévennes mountain region and rainwater harnessing is concentrated in the Karst plateau (Figure 7). Among those who have a garden, the proportion having access to an alternative water resource is quite high in the karst plateau (70%), in the middle valley (65%) and in the Cévennes mountain area (54%).

The higher diversity of alternative water resource is met in the middle valley because of easier natural conditions and the presence of raw networks (BRL) or old irrigation network (Canal de Gignac).

Among people who do not have a well or a borehole, more than 90% do not envisage do realise one mainly because they do not perceived any utility but also because they are renter or because of the price judged too high.

Surprisingly, 6% of the individuals declare envisage getting its own well or borehole and 35% would be willing to connect to a raw or old irrigation network. Their main objective being to reduce their water bill (55%) to contribute to environment protection (30%) and water the garden more frequently (15%).

Acces a divers types de ressources alternatives
 exprimé en pourcentage de la population de chaque zone ayant un jardin

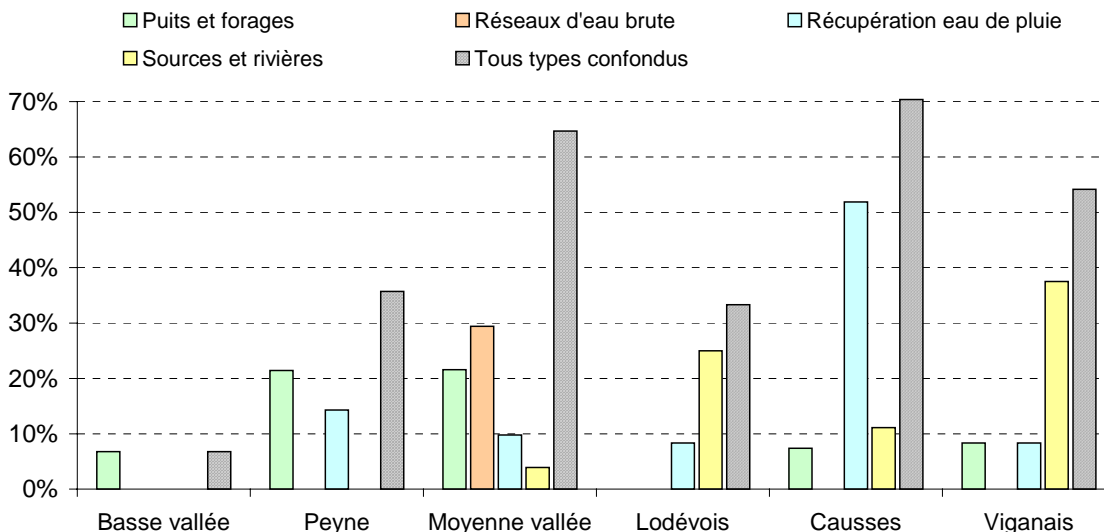


Figure 7. Access to alternative water resources per zone

It is rather difficult to analyse the reasons for the preference for network connection instead of well and borehole that guarantee a certain independence, lower costs and a better water quality. Several assumption can be formulated (i) people are certainly judge the borehole technique too risked (especially in the karst plateau, the Cévennes

mountains and the right bank tributaries where natural conditions are not favourable), (ii) people either over-estimate borehole costs (under-estimate raw networks costs) or prefer higher costs with a better service quality, a guaranty of the supply and a delegation of maintenance and operation charges.

4.3.8. The three scenarios

Three scenario of water resource evolution have been presented to interviewees/

- Scenario 1 : The increase of pollution is so important that in 20 years, the region will face water scarcity.
- Scenario 2 : Taking into account the climate change, Hérault river could be dry one year on two.
- Scenario 3 : The generalisation of water saving equipment and recycling, should reduce significantly drinking water consumption in 20 years.

Interviewees were asked to express on their relative optimism, pessimism or realism for each scenario. For a very large majority of respondent, those scenarios are realists. No correlations with socio-economic variables exist but scenarios responses are linked to other specific questions.

People who perceived the first two scenario realist are frequently those who believe in the urgency to deal with the water management and people who perceive the drinkable water scarcity scenario as realist are those who feel water within the environment as bad quality, that it deteriorate during the 10 pas years and also that tap water is poor quality.

5. National User Profile

5.1. METHODOLOGY

The methodology developed to construct water user profile is the following.

1. Firstly, we select a few question related to the same topic and also all related to attitudes, behaviours or perceptions, for example (i) the perception of the tap water price, (ii) of its quality, (iii) the relative confidence in tap water and (iv) the perception of the price evolution. This will constitute the Tap Water Profile.
2. Secondly, we realise some Khi2 independence tests on the selected variable to be sure that there are some correlations between modalities. In the absence of correlation either positive or negative, we will exclude the non-linked variable. For the variable selected, we then look at the basic frequencies to exclude from the analyse some low frequencies modalities such as “Don’t know” or “Refuse” in some variable. When the number of modalities of the variables are quite different, we can also regroup some of them, for example “bad” and “very bad”.
3. Thirdly, taking the selected variables and modalities, we realise a Multiple Correspondence Analyse (MCA). Note that in classical factorial analysis, the percentage of variance explain by the two first axes is of prime importance. But in the MCA treating qualitative variable this percentage has lower significance since it translates distances instead of variances. Higher percentages are still preferable to lower ones. A first graphical interpretation of the MCA can be realised. When the percentage of the first two axes are high, a first visual group of modalities is possible. Even in case of good visual interpretation, specific classification methods must be used to realise the profiles, i.e. the group of modalities.
4. Using the coordinates of each individual on all the factorial axes, we classify them in homogenous groups. Two methodologies can be used: Agglomerative Hierarchical Clustering (AHC) or k-means Clustering. We choose the first one since the K_means does not produce stable classification and that it is adapted to circular or spherical clusters. In our case, most of the correlated variables are related to stretched or oval clusters. So, AHC produce classes of individuals, which classes are used as new profile variable.
5. To interpret this profile, it is necessary to look at the correlation between the profile variable modalities, those of the initial set of variable and the socio-economic ones using Khi2 independence tests. The interpretation of this last set of correlation provides the specific profile related to the initial set of questions.
6. The five previous steps are applied to other sets of variables to construct as much profiles (water in the environment, alternative water resources, water saving

behaviours...). Each profile will also be analysed at different level: individual, family, community and at the catchement level.

- The individual level analyse (Table 17), will cross profile modalities to individual variables such as the age, the revenue, the level of education, the sex, the type of housing and the property right (owner or renter).
- The family analysis (Table 18) will be done through reconstructed variable such as the revenue of the households by unit of consumption, the number of persons of the family and the type of family (family with children under 5 years, between 5 and 15 years, active or retired couple, active or retired single or widow person).
- For the community level (Table 19), will cross profiles with geographic variables such as “live in town or village” or the area of residence: Coast, Right Bank tributaries, middle Hérault valley, Lodève region, karst plateau and Cévennes mountains. We also create an aggregated geographic variable in grouping the second to five previous areas. This new area is named «Cœur d’Hérault» and represents a homogenous region where most of the water related conflicts are concentrated.

When it will be possible, some assumption about trends (water vision in 2025) will be produced using past socio-economic dynamics such as education levels, age, geographic increase in population...

7. The last work consists in the determination of a general water profile. For this, we realise step 1 to 5 using the specific profiles as new set of variables.

5.2. WATER PROFILES

5.2.1. Drinkable Water Profile (DWP)

5.2.1.1. *Selection of the variable*

Four perception variables are selected. The questions and the response modality are the following:

- Day to day, do you trust the quality of tap water supplied to your home?

Totally / Not really / Not at all / Don't know

- Thinking about the quality of your tap water would you say you are
Well informed / Neither well informed nor badly informed / badly informed / not kept informed at all / Don't know

- Personally, would you say that your tap water is ...

Very good quality / Good quality / Neither good nor poor quality / Poor quality / Very poor quality / Don't know

- On the whole, do you think that the tap water that is supplied to your household is :

Cheap / Neither cheap nor expensive / Expensive / Don't know

Because of the very low “don't know” answer, we choose to neglect them.

In order to have a number of modality as close as possible for each variable, we also choose to regroup the following modality of the question “ Personally, would you say that your tap water is...”: Very good quality or Good quality / Neither good nor poor quality / Poor quality or Very poor quality.

5.2.1.2. Khi-2 independence tests

		Trust			Information				Quality		
		Not really	Not at all	Totally	Well	Bad	Neither nor	Not informed	Very good or Good	Poor or Very poor	Neither nor
Information	Well	(-) ***	(-) **	(+) ***							
	Bad	(+) *	(+) NS	(-) NS							
	Neither nor	(+) NS	(-) NS	(+) NS							
	Not informed	(+) NS	(+) ***	(-) *							
Quality	Very good or Good	(-) ***	(-) ***	(+) ***	(+) ***	(-) ***	(+) NS	(-) ***			
	Poor or Very poor	(+) **	(+) ***	(-) ***	(-) ***	(+) NS	(-) NS	(+) ***			
	Neither nor	(+) ***	(-) NS	(-) ***	(-) **	(+) **	(-) NS	(+) NS			
Price	Expensive	(+) NS	(+) **	(-) *	(-) NS	(+) NS	(-) NS	(+) *	(-) **	(+) **	(+) NS
	Neither nor	(-) NS	(-) **	(+) NS	(+) NS	(+) NS	(+) NS	(-) **	(+) **	(-) **	(-) NS
	Cheep	(+) NS	(-) NS	(+) NS	(+) NS	(-) NS	(-) NS	(-) NS	(+) NS	(-) NS	(-) NS

(+) : observed strength upper theoretical strength
 (-) : observed strength under theoretical strength
 NS : khi² test by case not significant at threshold alpha=0,100
 * : khi² test by case not significant at threshold alpha=0,100
 ** : khi² test by case not significant at threshold alpha =0,050
 *** : khi² test by case not significant at threshold alpha =0,010

Table 2. Drinkable Water Profile - Khi-2 test

5.2.1.3. MCA and Classification

The MCA realise on the four previous variable leads to the following results.

The distance between individuals is explained at 39% on the first two axes (Table 3). Note that in the case of MCA, the variance doesn't mean anything since we work on qualitative data. "Variance" in the following table just illustrates the distance between individuals.

	F1	F2	F3	F4	F5	F7	F8	F9	F10	F11	F12	
Valeur propre	0,526	0,361	0,267	0,254	0,240	0,212	0,186	0,163	0,073	0,012	0,001	0,000
% variance	22,940	15,726	11,620	11,051	10,481	9,227	8,124	7,103	3,162	0,514	0,042	0,011
% cumulé	22,940	38,666	50,286	61,337	71,818	81,044	89,169	96,272	99,433	99,947	99,989	100,000

Table 3. Drinkable Water Profile - MCA

Using Agglomerative Hierarchical Clustering method apply to the coordinates of the 400 individual on each factorial axis, we determine 3 classes.

Class	Individual	Trust			Information				Price			Quality		
		Not really	Not at all	Totally	Well	Bad	Neither nor	Not informed	Expensive	Neither nor	Cheep	Very good or Good	Poor or Very poor	Neither nor
1	138	(+) NS	(-) ***	(+) NS	(-) ***	(+) ***	(+) ***	(-) ***	(+) NS	(+) ***	(-) ***	(+) **	(-) ***	(+) ***
2	121	(-) ***	(-) ***	(+) ***	(+) ***	(-) ***	(-) ***	(-) ***	(-) ***	(-) NS	(+) ***	(+) ***	(-) ***	(-) *
3	141	(+) *	(+) ***	(-) ***	(-) ***	(-) *	(-) ***	(+) ***	(+) ***	(-) ***	(-) ***	(-) ***	(+) ***	(-) NS

See Table 2 for the significance of the signs

Table 4. *Drinkable Water Profile – Classification Khi-2 test*

The Khi-2 test between the initial set of four variables and the synthetic one (class variable) allows to verify some correlation between modalities (Table 4).

Class 1, which regroup 138 individuals can be named “**medium class**” since most of the individuals feel bad or not too bad informed, perceive water price as normal (neither expensive nor cheap) and think that tap water quality is medium (neither bad nor good). Those individuals are proportionally less numerous as others to feel itself not informed at all.

Class 2, accounting for 121 individual is a “**satisfied class**” since individual are mainly totally confident, well informed, feel tap water as good or very good quality and rather cheap.

Class 3 is the opposite of class 2. This is a “**unsatisfied class**” mainly thinking that tap water is bad quality, expensive, who feel not informed at all and who do not trust in tap water.

The following MCA graph allows to visualised theses 3 Drinkable Water Profile.

5.2.1.4. *Socio-economic analyse*

To complete the analyse of these 3 Drinkable Water Profile, we realised some Khi-2 independence tests between the DWP synthetic variable and the socio-economic ones.

DWP Medium

The Medium DWP have socio-economic characteristics common with the whole population. This class is slightly over represented in the Lodève region and the intermediary occupation as well as administrative ones are also over represented. Higher level of education is under-represented in that class. Revenues, sex, age, number of person of the household, the type of living, its possession or not and its location in city or village are not explicative variables of this group.

DWP Satisfied

Individuals of the Satisfied DWP have lower revenues, are more frequently the older ones, men instead of women, owner instead of renter and live in villages instead of towns. This class is over-represented in the upper part of the river basin (Cévènes mountain region) and under represented down stream (Littoral).

DWP Unsatisfied

Contrary to the previous DWP, the unsatisfied class is over represented in Littoral and Karst plateau, in towns, among renters, households composed of 3 to 5 persons and among families with children under 5 years. Those individuals are younger than in the satisfied DWP and they frequently have the following occupations: Intellectual occupation, managers, elected members, farmers, artisans or workers of the two previous.

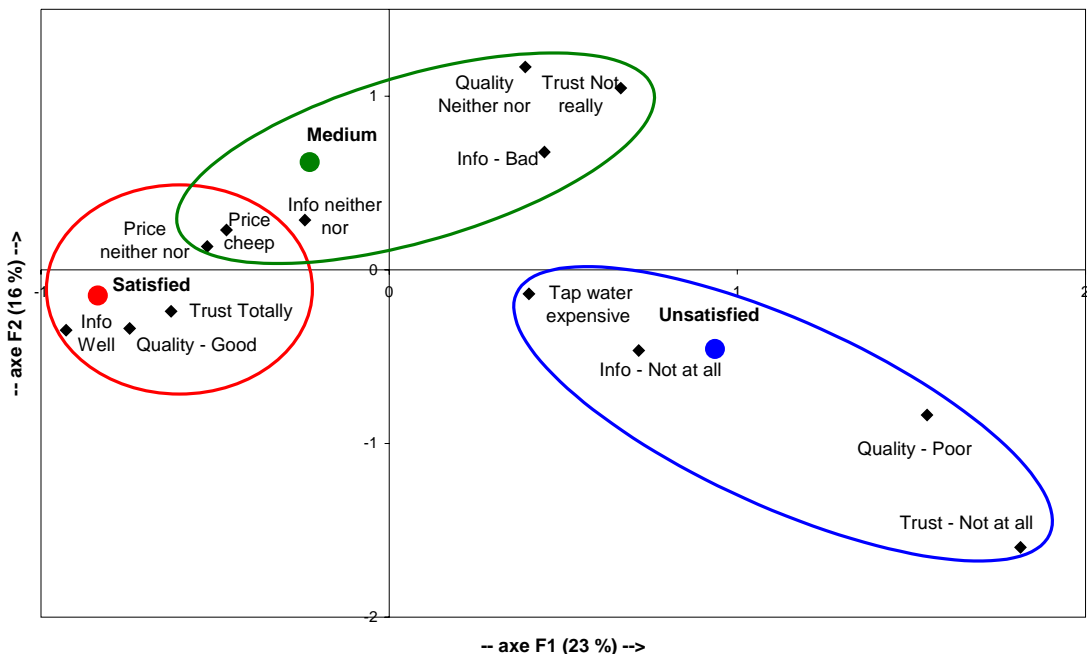


Figure 8. DWP Graphic representation on the first two factorial axis

5.2.2. Environment Water Profile (EWP)

5.2.2.1. Selection of the variable

Three perception variables are selected. The questions and the response modality are the following:

- Water resource management is a term used to describe the way in which freshwater resources such as rivers, reservoirs and underground aquifers are managed by water companies and government bodies to ensure reliable, safe supply. In your opinion, is water resource management in your local area an issue that needs to be addressed:

With no urgency / That needs to be addressed in the coming years / That must be addressed urgently / Don't know

- In your opinion please rate the overall quality of the water environment in your surrounding area (river, lakes, canals, sea...) :

Good quality / Neither good nor bad / Poor quality / Don't know.

- Would you say the overall quality of the water environment in your surrounding area in the recent past, i.e. the last 10 years, has...

Improved / Stay the same / Deteriorated / Don't know

Because of the very low “don't know” answer, we choose to neglect them.

5.2.2.2. Khi-2 independence tests

	Environment water quality (EWQ)			EWQ evolution			
	Poor	Good	Neither nor	Improved	Deteriorated	Unchanged	
Relative Urgency	Urgent	(-) **	(+) ***	(-) ***	(+) ***	(-) ***	(+) **
	Coming years	(+) *	(-) **	(+) NS	(-) **	(+) NS	(+) NS
	No urgency	(+) NS	(-) ***	(+) ***	(-) ***	(+) ***	(-) ***
EWQ evolution	Improved	(-) ***	(+) ***	(-) ***			
	Deteriorated	(+) ***	(-) ***	(+) ***			
	Unchanged	(-) ***	(+) ***	(+) NS			

See Table 2 for the significance of the signs

Table 5. Environment Water Profile - Khi-2 test

5.2.2.3. MCA and Classification

The MCA realise on the three previous variable leads to the following results.

The distance between individuals is explained at 49% on the first two axes (Table 6).

	F1	F2	F3	F4	F5	F6	F7	F8
Valeur propre	0,620	0,384	0,361	0,286	0,228	0,147	0,010	0,003
% variance	30,386	18,839	17,709	14,038	11,169	7,221	0,472	0,167
% cumulé	30,386	49,224	66,933	80,971	92,141	99,362	99,833	100,000

Table 6. *Environment Water Profile - MCA*

Using Agglomerative Hierarchical Clustering method apply to the coordinates of the 400 individual on each factorial axis, we determine 3 classes.

Class	Individual number	Relative urgency			Environment water quality (EWQ)			EWQ evolution		
		Urgent	Coming years	No urgency	Poor	Good	Neither nor	Improved	Deteriorated	Unchanged
1	60	(-) ***	(-) ***	(+) ***	(-) ***	(+) ***	(-) ***	(+) NS	(-) ***	(+) ***
2	145	(+) NS	(+) ***	(-) ***	(-) ***	(-) NS	(+) ***	(-) ***	(-) ***	(+) ***
3	195	(+) ***	(+) NS	(-) ***	(+) ***	(-) ***	(-) NS	(+) **	(+) ***	(-) ***

See Table 2 for the significance of the signs

Table 7. *Environment Water Profile – Classification Khi-2 test*

The Khi-2 test between the initial set of four variables and the synthetic one (class variable) allows to verify some correlation between modalities (Table 7).

Class 1, which regroup 60 individuals can be named “**satisfied class**” since most of the individuals feel water in the environment as good quality, its evolution unchanged and mainly thinking that it is an issue that doesn’t need to be addressed urgently.

Class 2, accounting for 145 individual is a “**medium class**” perceiving water as medium quality, unchanged across the 10 past years but also thinking that water in the environment should be addressed in the coming years.

Class 3 is the opposite of class 1. This is a “**unsatisfied class**” mainly thinking that water in the environment is poor quality, has deteriorated and that it is an issue to be addressed urgently.

The following MCA graph allows to visualised theses 3 Environmental Water Profile.

5.2.2.4. Socio-economic analyse

To complete the analyse of these 3 Environment Water Profile, we realised some Khi-2 independence tests between the DWP synthetic variable and the socio-economic ones.

The three Environment Water Profile have no specific socio-economic characteristics but geographic ones sine the satisfied are over-represented upstream and downstream and the unsatisfied ones in the centre of the Hérault basin (Middle valley, karst plateau and Lodève region). Note that the medium EWP tends to have higher revenue by unit of consumption (function of the number and age of the household individuals).

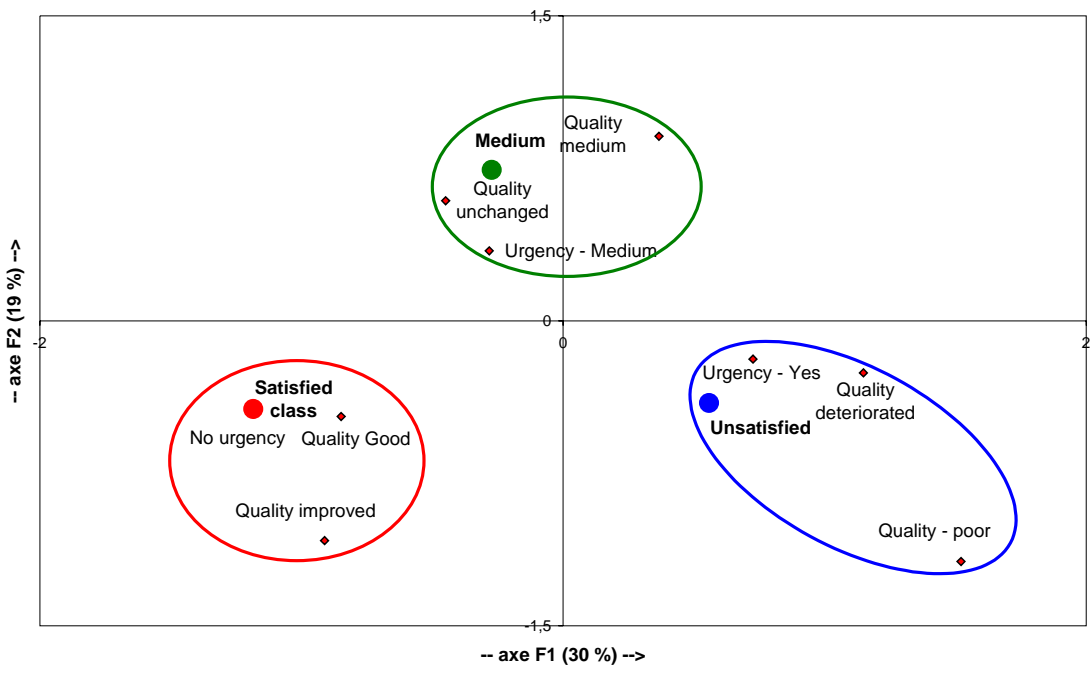


Figure 9. EWP Graphic representation on the first two factorial axis

5.2.3. Pricing Water Profile (EWP)

5.2.3.1. Selection of the variable

Three attitude variables are selected. The questions and the response modality are the following:

- If a pricing system based on peak use were to be introduced, would you be willing to consider using smaller amounts of water during peak hours and instead switch most of your water use (i.e. garden watering, dishwasher, washing machine and baths) to off-peak times during the day and later at night if it saved you a quarter of your normal household water bill?

Yes / No / Don't know

If your normal water bill was projected to increase by a quarter, do you think you would take measures to reduce your consumption?

Yes / No / Don't know

- Do you agree or disagree with the following statement: I would be willing to pay an additional charge in my household water bill to directly support the protection of water in the environment.

Strongly agree / Agree / Neither agree nor disagree / Disagree / Strongly disagree / Don't know

Because of the very low “don't know” (6) answer to the last question, we choose to treat it with the answer neither agree nor disagree. We also regroup the modalities “ Strongly agree / Agree” and “Disagree / Strongly disagree “.

5.2.3.2. Khi-2 independence tests

		Environment contribution			Price elasticity		
		Agree	Neither nor	Disagree	Yes	No	Don't know
Energy	Yes	(-) NS	(+) **	(-) NS	(+) ***	(-) NS	(-) NS
	No	(-) *	(+) NS	(+) NS	(-) NS	(+) ***	(-) ***
	Don't know	(+) **	(-) NS	(-) NS	(-) NS	(-) ***	(+) ***
Price elasticity	Yes	(-) NS	(+) NS	(+) NS			
	No	(-) NS	(-) NS	(+) NS			
	Don't know	(+) *	(-) NS	(-) NS			

See Table 2 for the significance of the signs

Table 8. Pricing Water Profile - Khi-2 test

5.2.3.3. MCA and Classification

The MCA realise on the three previous variable leads to the following results. The distance between individuals is explained at 45% on the first two axes (Table 9).

	F1	F2	F3	F4	F5	F6
Valeur propre	0,449	0,442	0,323	0,311	0,239	0,236
% variance	22,461	22,104	16,172	15,536	11,947	11,781
% cumulé	22,461	44,565	60,737	76,272	88,219	100,000

Table 9. Pricing Water Profile - MCA

Using Agglomerative Hierarchical Clustering method apply to the coordinates of the 400 individual on each factorial axis, we determine 3 classes.

Class	Individual	Energy			Price elasticity			Environment contribution		
		Yes	No	Don't know	Yes	No	Don't know	Agree	Neither nor	Disagree
1	102	(-) NS	(+) *	(-) **	(-) NS	(+) **	(-) ***	(-) ***	(-) ***	(+) ***
2	117	(-) **	(-) NS	(+) ***	(-) *	(-) *	(+) ***	(-) ***	(+) ***	(-) ***
3	181	(+) ***	(-) NS	(-) ***	(+) **	(-) NS	(-) ***	(+) ***	(-) ***	(-) ***

See Table 2 for the significance of the signs

Table 10. Pricing Water Profile – Classification Khi-2 test

The Khi-2 test between the initial set of four variables and the synthetic one (class variable) allows to verify some correlation between modalities (Table 10).

Class 1, which regroup 102 individuals can be named “**refractory class**” since they most frequently tend to refuse new pricing system, not to modify their consumption in case of water price increase and to refuse to contribute through an increase of water price to water protection.

Class 2 accounting for 117 individual is a “**indecisive class**”. Those individuals are proportionally more numerous than in the whole population to have no specific opinion about the pricing issue proposed.

Class 3 is a “**reactive class**” since its 181 individuals are more likely subject to accept pricing modification since they will be able to differ peak period consumption, to reduce the consumption in case of price increase and to accept an increase of the water bill to support water protection programs.

The following MCA graph allows to visualise these 3 Pricing Water Profile.

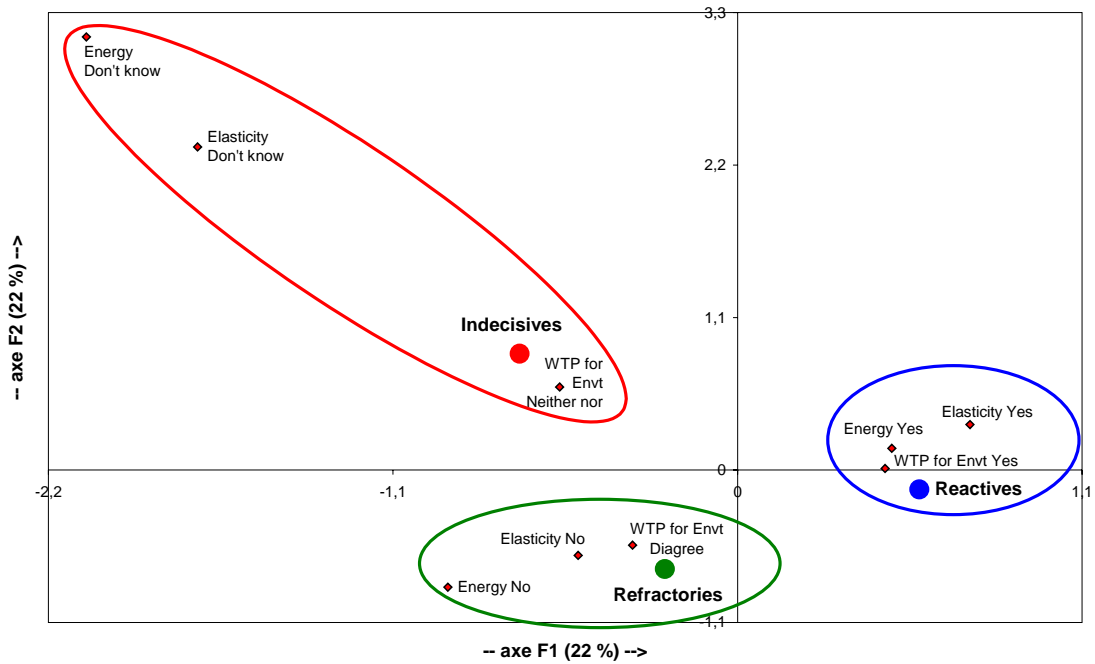


Figure 10. PWP Graphic representation on the first two factorial axis

5.2.3.4. Socio-economic analyse

Refractory PWP

The refractory Pricing Water Profile have no specific socio-economic characteristics, excepted that people composing are also refractory to communicate their education and revenue level. The inhabitants of the karst plateau are over-represented in that class.

Indecisive PWP

Individuals of the Indecisive PWP have frequently low education level, do not have high revenue by unit of consumption, are under represented in the younger age class and are frequently owners. This water profile is also over-represented in the upstream (Cévennes mountain region) which account only for 11% of the whole sample.

Reactive PWP

The reactive PWP seems to be at the opposite of the indecisive one. Young people with high education level and revenue by unit of consumption are over-represented as well as households composed by active single or widow and household accounting for old persons. Geographically, this class tends to be over-represented in the Lodève region and under-represented in the Karst plateau and in Cévennes mountain region.

5.2.4. Saving Water Profile (EWP)

5.2.4.1. Selection of the variable

Six behavioural variables are selected. The questions and the response modality are the following:

- I make sure the washing machine and/or the dishwasher has a full load before starting them up.

Always / Sometime / Never

- Take care when watering the garden

Always / Sometime / Never / No garden

- Take care when selecting washing machine and or dish washer programs

Always / Sometime / Never / Not equipped

- Close the tap to avoid unnecessary use

Always / Sometime / Never

- Take a shower instead of a bath

Always / Sometime / Never

- Use the appropriate button/ flush setting on a double button/ double flush toilet

Always / Sometime / Never / Not equipped

The objective of this Saving Water profile is to characterise the relative water saving behaviour of the interviewed. We then neglected the modalities “not equipped” and “no garden” since it does not reveal specific behaviours.

5.2.4.2. *Khi-2 independence tests*

	Shower / bath			Toilets			Garden			Tap			Program choice			
	Always	Sometime	Never	Always	Sometime	Never	Always	Sometime	Never	Always	Sometime	Never	Always	Sometime	Never	
Full washing machine	Always	(+)NS	(+)*	(-)**	(+)NS	(-)NS	(-)NS	(+)NS	(+)NS	(-)NS	(+)**	(+)NS	(-)**	(+)**	(-)NS	(-)**
	Sometime	(+)NS	(+)NS	(-)NS	(+)NS	(+)NS	(-)NS	(+)**	(+)NS	(-)**	(-)NS	(+)**	(-)**	(+)**	(+)NS	(-)**
	Never	(-)*	(-)NS	(+)**	(-)NS	(-)NS	(+)*	(-)**	(-)NS	(+)**	(-)**	(-)**	(+)**	(-)**	(-)**	(+)**
Program choice	Always	(+)**	(+)NS	(-)*	(+)NS	(+)NS	(-)NS	(+)NS	(+)NS	(-)*	(+)**	(+)NS	(-)*			
	Sometime	(-)NS	(+)**	(-)*	(-)NS	(+)NS	(-)NS	(+)NS	(+)NS	(-)*	(-)NS	(+)**	(-)**			
	Never	(-)NS	(-)**	(+)**	(+)NS	(-)NS	(+)NS	(-)**	(-)NS	(+)**	(-)**	(-)**	(+)**			
Tap	Always	(+)NS	(+)NS	(-)NS	(+)NS	(+)NS	(-)NS	(-)NS	(+)NS	(-)NS						
	Sometime	(+)NS	(+)**	(-)**	(-)NS	(+)*	(-)NS	(+)NS	(+)**	(-)**						
	Never	(-)NS	(-)**	(+)**	(+)NS	(-)**	(+)NS	(-)NS	(-)**	(+)**						
Garden	Always	(-)NS	(-)NS	(+)NS	(+)NS	(+)NS	(-)NS									
	Sometime	(+)NS	(+)NS	(-)NS	(-)NS	(+)NS	(+)NS									
	Never	(+)NS	(+)NS	(-)NS	(+)NS	(-)NS	(+)NS									
Toilets	Always	(-)NS	(-)NS	(+)NS												
	Sometime	(+)NS	(+)NS	(-)NS												
	Never	(+)NS	(-)NS	(+)NS												

See Table 2 for the significance of the signs

Table 11. Saving Water Profile - Khi-2 test

5.2.4.3. *MCA and Classification*

The MCA realise on the three previous variable leads to the following results. The distance between individuals is explained at 31% on the first two axes (Table 12).

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Valeur propre	0,40	0,35	0,24	0,23	0,22	0,20	0,18	0,16	0,14	0,13	0,11	0,01
% variance	16,74	14,71	10,31	9,86	9,38	8,43	7,52	6,82	5,78	5,58	4,61	0,26
% cumulé	16,74	31,45	41,75	51,62	60,99	69,42	76,95	83,76	89,55	95,12	99,74	100,00

Table 12. Saving Water Profile - MCA

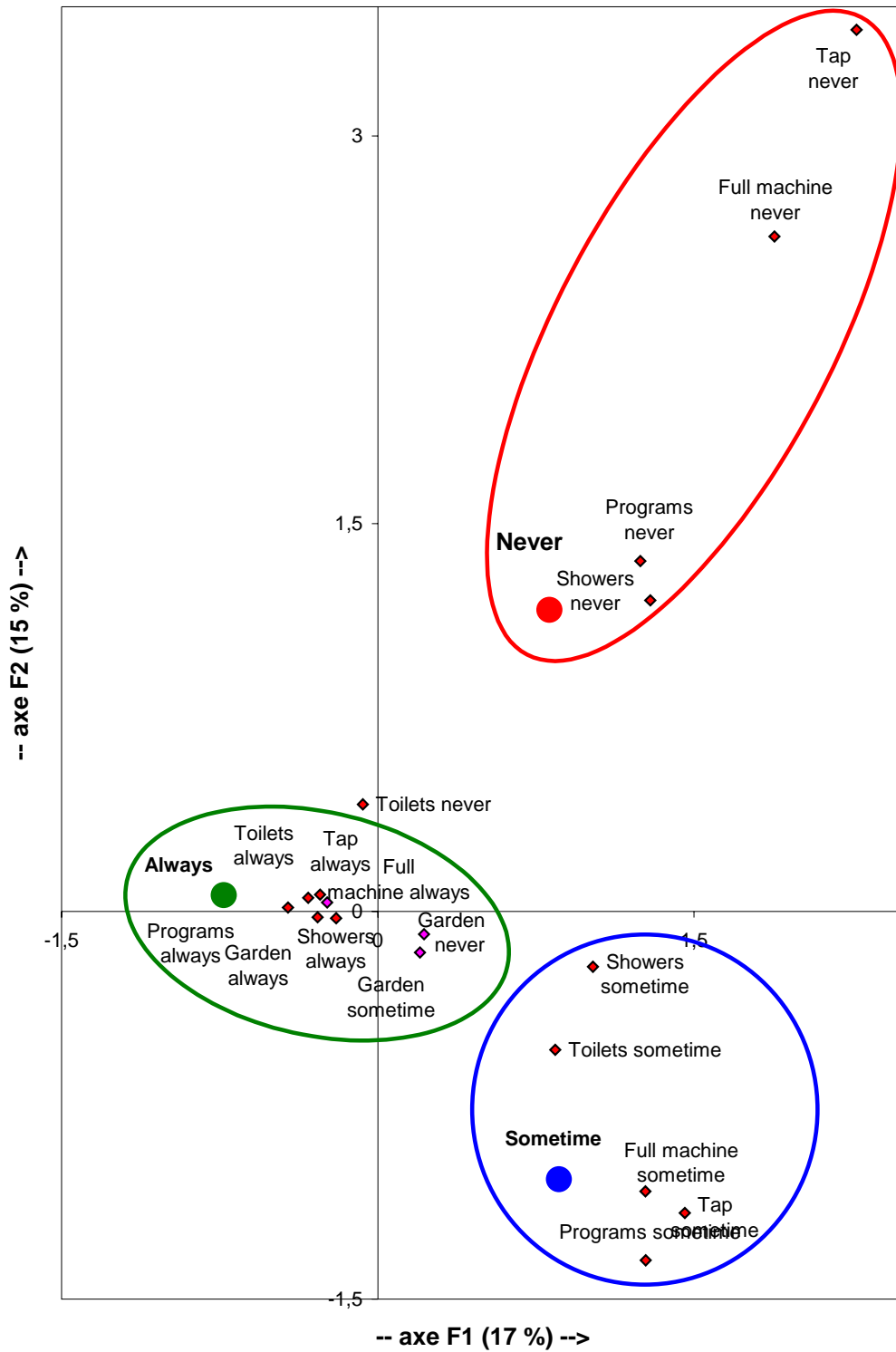


Figure 11. SWP Graphic representation on the first two factorial axis

5.2.4.4. Socio-economic analyse

Always SWP

Individuals between 40 and 50 years olds are more represented in the “always” Saving Water Profile and live mainly in village. The secondary education levels are over-represented as well as the Middle valley inhabitants.

Never SWP

Individuals of the Never SWP have frequently higher level of education as well as the revenue. This class is over-represented in the upstream (Cévènes mountain region).

Sometime SWP

The Sometime SWP seems to be younger, live more frequently in towns and are under-represented in the middle valley.

5.2.5. Alternative Water Resource Profile (AWRP)

5.2.5.1. Selection of the variable

Four attitude variables are selected of which 2 specific French questions. The questions and the response modality are the following:

- If it were possible would you be willing to accept lower water quality in your toilet with no effect on your normal household water bills if you knew it would be helping the environment?

Yes / No / Don't know

- A 'grey water reuse' system filters, treats and reuses bath and sink water (known as grey water) to flush your toilet and water your garden. This system can be installed into individual homes and into blocks of homes and can be located inside or outside beneath the ground. This lower quality water is perfectly safe but does not reach the very high standards needed for tap water. Given that this lower quality recycled water is safe would you be willing to install such a system in your house?

Yes / No / Don't know / No answer

- If it were possible, would you like to be connected to a raw water or an old irrigation network?

Yes / No / Already connected / Don't know

- If you do not have well or boring, do you envisage to realise one?

Yes / No / Don't know

In order to get some comparable results for the last two question, we add the modality "already equipped" to the well / boring opportunity question.

5.2.5.2. *Khi-2 independence tests*

		Raw or irrigation network				Well / boring				Recycling		
		Already connected	Don't know	No	Yes	Already equipped	Don't know	No	Yes	Don't know	No	Yes
Double network	Don't know	(+) NS	(+) NS	(+) NS	(-) NS	(-) NS	(-) NS	(+) NS	(-) NS	(+) **	(+) NS	(-) **
	No	(+) NS	(-) NS	(+) **	(-) *	(+) NS	(-) NS	(+) NS	(-) NS	(+) NS	(+) ***	(-) ***
	Yes	(-) NS	(+) NS	(-) **	(+) **	(-) NS	(+) NS	(-) NS	(+) NS	(-) **	(-) ***	(+) ***
Recycling	Don't know	(+) ***	(+) NS	(-) **	(-) NS	(+) **	(-) NS	(-) NS	(-) NS			
	No	(-) NS	(-) NS	(+) ***	(-) ***	(-) NS	(-) **	(+) **	(-) NS			
	Yes	(-) NS	(-) NS	(-) *	(+) ***	(-) NS	(+) **	(-) NS	(+) NS			
Well / boring	Already equipped	(+) NS	(+) NS	(+) NS	(-) *							
	Don't know	(+) NS	(+) NS	(-) **	(+) NS							
	No	(-) NS	(-) NS	(+) NS	(-) NS							
	Yes	(-) NS	(-) NS	(-) NS	(+) *							

See Table 2 for the significance of the signs

Table 14. *Alternative Water Resource Profile - Khi-2 test*

5.2.5.3. *MCA and Classification*

The MCA realise on the three previous variable leads to the following results. The distance between individuals is explained at 27% on the first two axes (Table 15).

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Valeur propre	0,43	0,39	0,33	0,30	0,28	0,28	0,24	0,23	0,22	0,19	0,13	0,00
% variance	14,18	13,03	10,82	9,99	9,20	9,11	7,92	7,74	7,20	6,32	4,43	0,06
% cumulé	14,18	27,22	38,03	48,02	57,23	66,34	74,26	82,00	89,19	95,51	99,94	100,00

Table 15. *Alternative Water Resource Profile - AWRP*

Using Agglomerative Hierarchical Clustering method apply to the coordinates of the 400 individual on each factorial axis, we determine 3 classes.

Class	Individual number	Double network			Recycling			Well / boring				Raw or irrigation network			
		Don't Know	No	Yes	Don't Know	No	Yes	Already equipped	Don't Know	No	Yes	Already connected	Don't Know	No	Yes
1	169	(-) ***	(-) ***	(+) ***	(-) ***	(-) ***	(+) ***	(-) ***	(+) ***	(+) NS	(+) ***	(-) ***	(-) ***	(-) ***	(+) ***
2	44	(+) *	(-) NS	(-) NS	(+) ***	(-) NS	(-) ***	(+) **	(-) NS	(-) NS	(-) NS	(+) ***	(+) ***	(-) ***	(-) ***
3	187	(+) ***	(+) ***	(-) ***	(-) ***	(+) ***	(-) ***	(+) **	(-) *	(+) NS	(-) **	(-) ***	(-) ***	(+) ***	(-) ***

See Table 2 for the significance of the signs

Table 16. Alternative Water Resource Profile – Classification Khi-2 test

The Khi-2 test between the initial set of four variables and the synthetic one (class variable) allows to verify some correlation between modalities (Table 16).

- Class 1, which regroup 169 individuals can be named “**favourable class**». These individuals are more subject to accept all the four alternative water resource systems: recycling, raw water network connection, double network and envisage to realise a well or a boring.
- Class 2 accounting for 44 individual is “**undecided class**” where persons are either connected to a raw water network and own a well or are undecided about the opportunity to adopt double water network or recycling systems.
- Class 3 is a “**unfavourable class**” since its 187 individuals are more likely subject to refuse any alternative water resource system.

The following MCA graph allows to visualised theses 3 Alternative Water Resource Profile.

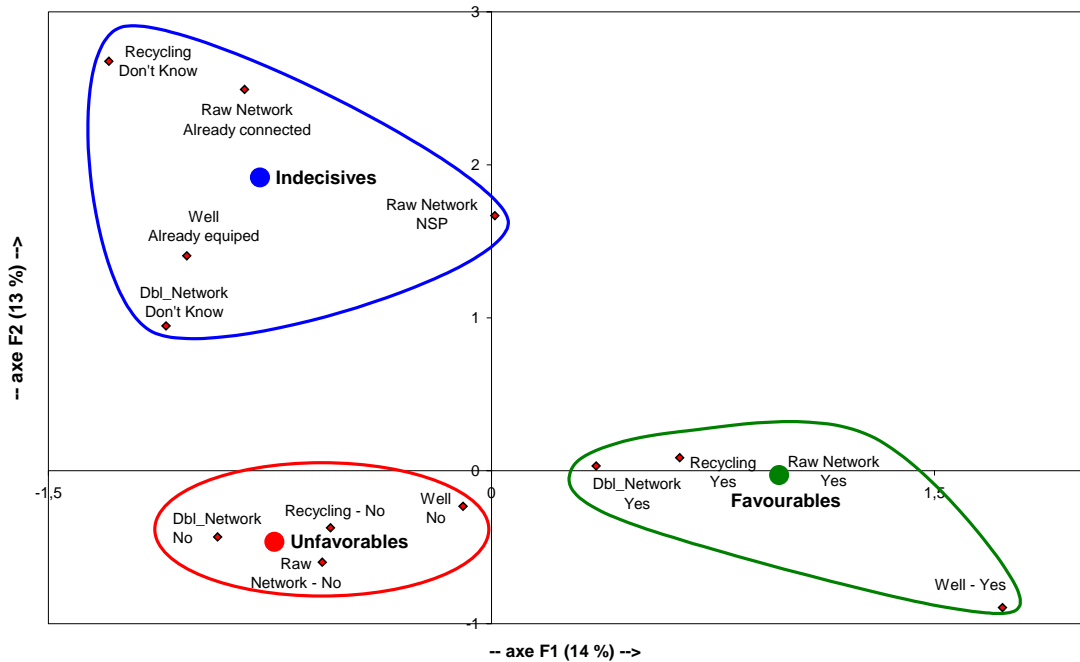


Figure 12. AWRP Graphic representation on the first two factorial axis

5.2.5.4. Socio-economic analyse

Favourable AWRP

The persons belonging to the Favourable Alternative Water Profile seems to be younger than the average age of the sample, have a medium education level, are more frequently working in craft industry or agriculture, are over-represented down stream and within the renters and have higher level of revenue by consumption units.

Undecided AWRP

Individuals of the Undecided AWRP often live in the middle valley and are more subject to be women and to have rather high levels or revenue by unit of consumption.

Unfavourable AWRP

The Unfavourable AWRP is older (often single or couple of retired) and have lower revenue and education level. Those people are over-represented in the Karst Plateau, among men, owners and households with children from 6 to 15 years old.

	EFFECTIF	SWP			DWP			EWP			PWP			AWRP		
		Always	Some time	Never	Satisfied	Medium	Unsatisfied	Satisfied	Medium	Unsatisfied	Réactive	Indecisive	Réfractory	Favourable	Undecided	Unfavorable
		208	81	111	121	138	141	60	145	195	181	117	102	169	44	187
INDIVIDUAL	- Ens. primaire	64					(-)**				(-)*	(+)**		(-)**		(+)**
	- Ens. secondaire	251		(-)*										(+)**		(-)**
	- Enseignement Sup	72	(-)*				(-)*				(+)**					(-)**
	- refus	13					(+)*				(-)*	(+)**				(+)**
	- Age1	121	(-)*	(+)*		(-)*	(+)*				(+)*	(-)**		(+)**		(-)**
	- Age2	133		(-)**											(+)**	
	- Age3	92												(-)*		(+)**
	- Age4	54				(+)**	(-)**							(-)**		(+)**
	- 30 ans et moins	55		(+)*										(+)**		(-)**
	- 31 à 40 ans	75												(+)**		
	- 41 à 50 ans	79	(+)**	(-)**							(+)*	(-)**		(+)**		
	- 51 à 60 ans	59														
	- 61 à 70 ans	55			(-)*											
	- plus de 71ans	77				(+)**	(-)**							(-)**		(+)**
	- Agri. Artis. Ouvrier	41					(+)**							(+)**		(-)*
	- Chomeur	9														
	- Elus, cadre, prof.intel.	25					(+)**									
	- Etudiant	2														
	- Inactif	12														
	- Pers S. Venduer, Ouvrier	67														
	- Prof. Inter. Adm.	64					(+)**									(-)*
	- Retraité	144						(-)**						(-)**		(+)**
	- refus	36									(-)*	(+)*		(-)**		(+)**
	- Apt_Mdv	214												(-)**		(+)**
	- Villa	186												(+)**		(+)**
	- LOC	131				(-)**	(+)**					(-)**		(+)**	(-)**	(-)**
	- PRO	269				(+)**	(-)**					(+)**		(-)**	(+)**	(+)**
	- F	207				(-)*										(-)**
	- H	193				(+)*										(+)**
	- BAC	84	(+)*									(+)*	(-)*	(+)**		(-)**
	- College_CAP_BEP	167														
	- DEUG	21			(+)*							(+)*				
	- IUT_BTS	27							(-)**							
	- Maternelle	1														
	- Primaire	63						(-)*				(-)*	(+)**	(-)**		(+)**
	- Refus_Educ	13					(+)*					(-)*	(+)**	(-)**		(+)**
	- Univ	24					(+)*	(-)**				(-)*	(+)**	(+)**		(+)**
	- R1	10				(+)*								(-)**		(+)**
	- R2	53				(+)**								(-)**		(+)**
	- R3	78	(+)**													
- R4	64	(+)*											(+)**		(-)*	
- R5	53							(+)**					(+)**			
- R6	22			(+)*									(+)**		(-)*	
- R7	12							(+)*		(-)**						
- R8	5									(-)*						
- R9	3															
- R10	2			(+)*												
- R11	2			(+)*												
- Refus_Revenu	96	(-)*	(+)**		(-)**					(+)*	(-)**		(-)**			

Table 17. *Khi2 test on individual characteristics and the five water profiles*

		SWP			DWP			EWP			PWP			AWRP			
		Always	Some time	Never	Satisfied	Medium	Unsatisfied	Satisfied	Medium	Unsatisfied	Reactive	Indecisive	Refractory	Favourable	Undecided	Unfavorable	
EFFECTIF		208	81	111	121	138	141	60	145	195	181	117	102	169	44	187	
FAMILY	- Foy1	94															
	- Foy2	135					(-)*					(+)*					
	- Foy3	71											(+)*				
	- Foy4	59								(+)*				(+)*		(-)*	
	- Foy5	30												(+)**		(-)**	
	- Foy6+	11												(+)**		(-)**	
	- Foyer 3 à 5	160												(+)**		(-)**	
	- Foyer 6 et +	11												(-)*		(+)**	
	- Foyer <=2	229												(-)*		(+)**	
	- Active Single or Widow	32									(+)**	(-)**					
	- Active couple	43															
	- Children 6 to 15	68													(+)**		(-)*
	- Children <5	81				(-)**		(+)**									
	- Other with old children	34															
- Other with old person	14										(+)**	(-)**					
- Retired Single or Widow	45										(-)**		(+)*	(-)**		(+)**	
- Retired couple	83						(-)**							(-)**		(+)**	
R/UC - 1	51										(-)*			(-)**		(+)**	
R/UC - 2	125	(+)**															
R/UC - 3	128										(+)**	(-)**		(+)**		(-)*	
R/UC - _Refus	96	(-)*	(+)**		(-)**			(+)*	(-)*	(+)*	(-)**	(-)**		(+)**		(-)*	

Table 18. *Khi2* test on the family characteristics and the five water profiles

		SWP			DWP			EWP			PWP			AWRP			
		Always	Some time	Never	Satisfied	Medium	Unsatisfied	Satisfied	Medium	Unsatisfied	Reactive	Indecisive	Refractory	Favourable	Undecided	Unfavorable	
EFFECTIF		208	81	111	121	138	141	60	145	195	181	117	102	169	44	187	
COMMUNITY	- Village	256	(+)**	(-)**	(+)**		(-)**									(+)*	
	- Ville	144	(-)**	(+)**	(-)**		(+)**									(-)*	
	- Causses	42					(+)*				(-)**		(+)**	(-)**		(+)**	
	- Littoral	155		(+)**	(-)**	(-)**		(+)**		(+)**				(+)**	(-)**	(-)**	
	- Lodevois	24					(+)*	(-)**		(-)*	(+)**	(-)**		(+)*		(-)**	
	- MVH	101	(+)**	(-)**						(-)*				(-)*		(+)**	
	- Peyne	34														(+)**	
	- Viganais	44			(+)**	(+)**			(+)**			(-)**	(+)**				
	- AMONT	44				(+)**			(+)**		(-)**	(+)**					(-)*
	- AVAL	189				(-)**			(+)**	(-)*				(-)**	(+)**	(-)**	(-)*
- Cœur d'Hérault	167							(-)**	(+)**				(-)**	(+)**	(+)**		

Table 19. *Khi2* test on the communities characteristics and the five water profiles

5.3. ATTEMPT FOR THE DETERMINATION OF A GENERAL TRANSVERSAL PROFILE

The data analysis provide five water profiles either related to behaviours (saving water profile), perceptions (drinking and environment water profiles) and attitudes (pricing and alternative water resource profile).

Each profile is characterise by three modalities: 2 extremes and an intermediary.

The objective of this section is to look at potential correlation between those profiles using Khi2 independence tests (Table 20).

	ARWP - Favourable	ARWP - Undecided	ARWP - Unfavourable	SWP - Always	SWP - Never	SWP - Some time	DWP - Medium	DWP - Satisfied	DWP - Unsatisfied	EWP - Medium	EWP - Satisfied	EWP - Unsatisfied
PWP - Indecisive	(-) ***	(+) ***	(+) NS	(+) *	(-) **	(+) NS	(+) NS	(+) NS	(-) NS	(+) NS	(-) NS	(-) NS
PWP - Reactive	(+) ***	(-) **	(-) ***	(+) NS	(+) NS	(-) NS	(-) NS	(-) NS	(+) NS	(-) NS	(+) **	(-) NS
PWP - Refractory	(-) ***	(-) NS	(+) ***	(-) ***	(+) **	(+) NS	(-) NS	(+) NS	(-) NS	(-) NS	(-) NS	(+) NS
EWP - Medium	(-) NS	(+) NS	(-) NS	(-) NS	(-) NS	(+) NS	(+) NS	(+) NS	(-) NS			
EWP - Satisfied	(-) *	(-) NS	(+) **	(+) NS	(+) NS	(-) NS	(+) NS	(+) NS	(-) *			
EWP - Unsatisfied	(+) *	(+) NS	(-) **	(-) NS	(+) NS	(-) NS	(-) NS	(-) **	(+) ***			
DWP - Medium	(+) NS	(-) NS	(-) NS	(-) NS	(-) NS	(+) NS						
DWP - Satisfied	(-) NS	(+) NS	(+) NS	(+) NS	(+) NS	(-) NS						
DWP - Unsatisfied	(+) NS	(+) NS	(-) NS	(+) NS	(-) NS	(-) NS						
SWP - Always	(+) *	(-) NS	(-) NS									
SWP - Never	(-) ***	(+) NS	(+) **									
SWP - Some time	(+) NS	(+) NS	(-) NS									

Table 20. *Khi2 test between the five water profiles*

The analyse doesn't highlight any correlation between the behavioural profile and the two perception ones as well as between the drinking water perception and the two attitude profiles.

Among perception profiles, persons who are unsatisfied by drinking and environmental water tend to be the same ones.

Correlation among attitudes are richer since the unfavourable persons to the alternative water resources seems to be the same as the refractories to a water pricing change and inversely, the reactive persons are rather favourable to any alternative water resource. Indecisive persons tend also to be the same ones.

The alternative water resource profile is also correlated with the perception of the water in the environment and with the saving water behaviour. The persons who are favourable to alternative resources tends also to be unsatisfied about the water in the environment and to always adopt saving behaviours and inversely for the unfavourable persons who feel satisfied about water in the environment and who never save water.

It is also rather interesting to highlight that refractory persons face to water pricing changes tends to be the same as those who do never adopt saving behaviours whereas the indecisive ones are those who already have saving behaviours. The reactive persons face to water pricing changes have no specific saving behaviour but feel more satisfied than others about the water in the environment.

A few correlations exist between the five studied profiles but no general trends emerge. In order to carry on with the research, new profiles would be needed. At this point of the research, we can just realise a prospective analysis of future water profiles according to the socio-economic changes in the catchement area.

5.4. ATTEMPT FOR THE DETERMINATION OF TRENDS IN WATER PROFILES

The production of future water vision is quite difficult using such data sets. However, some general socio-economic trends emerge in the Hérault river basin. Using a brief prospective analyse, it is possible to assess the relative evolution of the five previous water profiles.

The three most important socio-economic trends are the following.

- The increase of the population due to the high attractiveness of the basin should maintain what leads to an increase of land prices (especially in the middle valley and in the Lodève region). Newcomers are generally 40 to 60 years old and are able to buy expensive land or houses. This situation should generate a relative scarcity of building lands and also favoured collective buildings. We should then assist to both an increase of high revenue population buying or constructing detached houses and an increase in collective housing mainly composed by renters with lower revenues.

The second major trend concerns the ageing of the population. Newcomers are mainly 40 to 60 years old and this situation seems to be durable because of the previous property situation. The actual situation were the average age of the population is almost old should get worse. So retired persons and the attached profiles should be

over-represented within the river basin. This supposes an assumption: profiles of individual changes according to their age instead of keeping the same profile all along their life.

- The third trend follows the previous. The average revenue as well as the revenue by unit of consumption should increased since newcomers are experimented, and often living in couple and then contribute also to an increase of the revenue by unit of consumption.

No trends in term of water quality, prices, consumption are considered. So, the following analyse consist in an assessment of the relative changes in the proportion of each profile within the river basin population and between present time and future.

The impact of the three previous socio-economic trends are represented in Table 21 where sign + means that the number of person belonging to a specific profile should increase, decrease for sign “-“ and uncertain for “+/-“.

	SWP			DWP			EWP			PWP			AWRP		
	Always	Some time	Never	Satisfied	Medium	Unsatisfied	Satisfied	Medium	Unsatisfied	Réactive	Indecisive	Réfractory	Favourable	Undecided	Unfavorable
Population	+	-		+	-			-	+		+		-	+	
Revenue	-		+	-	-	+	+	-	-	+	-		+		-
Ageing	+	-	-	+	-		+	-		+/-	+/-	+/-	+/-	+/-	+/-

Table 21. Profile changes

5.4.1. Saving water profile

Under the influence of population and ageing trends, individuals should be relatively most numerous than nowadays to always take care to their water consumption and less numerous to only take care sometime. The influence of revenue trend is in the other way but could be compensate by an increase of water price. The saving behaviour should then be more frequent even though we do not consider the increase of investment in saving equipment.

5.4.2. Drinking water profile

The perception of drinkable water should also improved under the ageing and demographic effect whereas the increase of revenues would have the inverse effect.

This leads to a polarisation of perception since people moderately satisfied will be less numerous.

5.4.3. Environmental water profile

The revenue and ageing increase should also improve the part of the population satisfied about water within the environment. But the concentration of the newcomers population in the middle valley could also contribute to an increase of dissatisfaction since individuals of this region are more subject to be unsatisfied by water within the environment.

5.4.4. Pricing water profile and alternative water resource profile

The impact of ageing on the evolution of the relative importance on pricing and alternative water resource profiles is unclear. The increase of revenue should both improve the reactive pricing profile and the favourable alternative water resource profile as well as the indecisive profile. In return, this should reduce the part of refractories and unfavourable persons.

6. Conclusion

The Hérault river basin opinion pool highlight various perceptions, attitudes and behaviours related to water which can be linked together but also to socio-economic and geographic characteristics.

We show that both; environment and water issues are not a major concern for the Hérault inhabitants. Their low propensity to participate in discussions and debates and the fact that they perceived water within the environment as rather good quality attest for that and justify it. Water within the environment seems to be more a latent or emergent issue since 41% think that water within the environment has deteriorated during the last 10 years and two third that this is an issue to be address urgently. This environment water profile has been specifically analysed. This analyse highlight that half of the sample population feel unsatisfied in terms of water quality, quality evolution and relative urgency to deal with water protection and management. This is only 15% who feel satisfied. These profiles also reveal geographic determinants since people seems to be more unsatisfied in the middle Hérault river basin and inversely for the satisfied ones which are mainly located up-stream (Cévènes mountains) and down-stream (coast).

In reality, according to various stakeholders and experts interviews, water quality within the Hérault catchement is rather good, has regularly improved and specific local water commissions are dealing with water management and protection.

This reveal a certain lack of knowledge related to water within the environment and water management and protection institutions. Efforts must be done to improve the communication effectiveness to really base perceptions on reliable information.

In the same way, and contrary to what inhabitants think, drinkable water cycle is poorly known. Knowledge about fees levels and volume consumed are not an exception since 40% know the first and 29% the second. Concerning drinkable water profile, the analyse reveal that population is equally distribute among three groups: the satisfied, the unsatisfied and moderately satisfied in terms of drinkable water fees, fees evolution, trust and information received. Frequently, unsatisfied people are younger, renters, live in town, have children under five years and have higher responsibilities occupations. Drinkable water perceptions are mainly based on emotion variable and not on factual data. We can then conclude that an increase in water price should necessary be accompanied by an information campaign to prevent perception to be based on emotion instead of facts.

This is confirmed when we look at water pricing profile. When the pricing scenario is well presented, half of the sample seems to be reactive and accept them. Those people are younger, have higher levels of education and also higher revenue by unit of consumption. Refractory people represent a quarter of the sample.

But the relative acceptance of such pricing systems is partly due to the saving behaviour profile. A cross analysis highlight that the water pricing refractory profile is correlated with the never water saving behaviour profile. However, half of the population already has saving behaviours.

The consumption behaviour of individuals is different according to the access they have to alternative water resource. For example, people who declare never taking care at the garden watering, have frequently access to an alternative – cheap or free – water resource, and inversely, those who always take care declare doing so for environmental and not for budgetary reasons. This reveal a rather high propensity to protect water within the environment even if the acceptance of several solutions deteriorate when it is suppose to increase the price paid.

The analyse of the water profiles highlight some individual, familial, community and whole catchement characteristics but also that some of them are correlated. This is for example the case of people who never have saving behaviours, who are unfavourable to alternative water resource and who are refractory to any changes in water pricing system.

We also highlight that the trends in water perception, behaviours and attitudes should improved under the ageing of the population, the wealth effect and the concentration of the population increase in the middle Hérault valley.

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7. Appendix: Survey questionnaire



NOM de l'enquêteur : _____

Zone : 1 2 3 4 5 6

Nom de la commune : _____

Code de la commune : _____




Caractéristiques de la personne interrogée :

- Age : 1 (20 à 39) 2 (40 à 59) 3 (60 à 75) 4 (+75)

- Sexe : 1 Homme 2 Femme

- Type de résidence : 1 Villa 2 Appartement

- Occupation à titre de : 1 Propriétaire 2 Locataire

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Zone : 1 2 3 4 5 6
Code commune :
Type d'habitation : 1. Villa (jardin) 2. Appartement ou maison de ville ou village
Statut de l'interviewé : 1. Propriétaire 2. Locataire
Age de l'interviewé : 1 (20 à 39) 2 (40 à 59) 3 (60 à 75) 4 (+75)
Sexe de l'interviewé : 1. Homme 2. Femme

1. Parmi les sujets de société qui sont proposés sur la CARTE 1, choisissez les deux qui sont pour vous les plus importants au niveau national.
 1. La sécurité des biens et des personnes
 2. Education
 3. Economie
 4. Emploi
 5. Santé et retraites
 6. Environnement
 7. Politique internationale
 8. Autre(s)
 9. NSP

2. Parmi les sujets environnementaux qui sont proposés sur la CARTE 2, choisissez les deux qui vous semblent les plus importants au niveau mondial ?
 1. Déchets radioactifs
 2. Qualité, pollution de l'air
 3. Changement climatique
 4. Déforestation, désertification
 5. Réduction de la biodiversité
 6. Déchets domestiques
 7. Inondations, rareté ou pollution de l'eau
 9. NSP

3. Au niveau local et en matière d'environnement, citez les deux principaux problèmes qui vous affectent le plus :
 1.
 2.




4. Parmi les deux phrases de la CARTE 3, quelle est celle qui reflète le plus votre point de vue ?
 1. La principale fonction de l'eau est de satisfaire les besoins humains
 2. La principale fonction de l'eau est d'être un support de vie pour la nature
 9. NSP

5. A votre avis, la gestion de l'eau dans votre environnement immédiat est un sujet :
 1. Sans urgence
 2. Qu'il faudra traiter dans les années à venir
 3. Qu'il est urgent de traiter
 9. NSP

6. Selon vous, l'eau dans votre environnement immédiat (rivières, lacs, canaux, mer...) est plutôt de bonne qualité, de qualité moyenne ou de mauvaise qualité ?
 1. De bonne qualité
 2. De qualité moyenne
 3. De mauvaise qualité
 9. NSP

7. Au cours des 10 années passées, diriez vous que la qualité de l'eau dans votre environnement immédiat...
 1. s'est améliorée
 2. est restée inchangée
 3. s'est dégradée
 9. NSP

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8. A votre avis, existe-t-il des organismes en charge de la gestion et de la protection de l'eau ?
 1. Oui (→ Q9) 2. Non (→ Q117) 9. NSP (→ Q11)

9. A votre avis ce sont des organismes...

Européens	1. Oui	2. Non	9. NSP	0. Refus
Nationaux	1. Oui	2. Non	9. NSP	0. Refus
Régionaux	1. Oui	2. Non	9. NSP	0. Refus
Départementaux	1. Oui	2. Non	9. NSP	0. Refus
Locaux (villes, villages, cantons)	1. Oui	2. Non	9. NSP	0. Refus
D'autres organismes	1. Oui	2. Non	9. NSP	0. Refus
Si oui lesquels.....			

10. Pensez vous que ces organismes sont composés de...

Fonctionnaires	1. Oui	2. Non	9. NSP	0. Refus
D'élus	1. Oui	2. Non	9. NSP	0. Refus
De représentants ou d'usagers d'eau potable	1. Oui	2. Non	9. NSP	0. Refus
De représentants ou De compagnie d'eau potable	1. Oui	2. Non	9. NSP	0. Refus
D'industriels ou de leurs représentants	1. Oui	2. Non	9. NSP	0. Refus
De pêcheurs ou de leurs représentants	1. Oui	2. Non	9. NSP	0. Refus
D'association de défense et protection de la nature	1. Oui	2. Non	9. NSP	0. Refus
De représentants du tourisme	1. Oui	2. Non	9. NSP	0. Refus
D'autres personnes ou représentants	1. Oui	2. Non	9. NSP	0. Refus
Si oui lesquels.....			

11. Aimerez-vous être impliqué dans les discussions et débats sur la gestion présente et future de la ressource ?
 1. Oui (→ Q13) 2. Non (→ Q12) 9. NSP (→ Q12) 0. Refus (→ Q12)

12. Donner mon avis ne changera rien au problème ! Diriez-vous que vous êtes plutôt d'accord, ni d'accord ni pas d'accord ou pas d'accord avec cette affirmation ?

1. D'accord	→ Q15
2. Ni d'accord ni pas d'accord	→ Q15
3. Pas d'accord	→ Q15
9. NSP	→ Q15
0. Refus	→ Q15

13. Préférez-vous participer à un niveau ...

National	1. Oui	2. Non	9. NSP	0. Refus
Régional	1. Oui	2. Non	9. NSP	0. Refus
Départemental	1. Oui	2. Non	9. NSP	0. Refus
Communal ou cantonal	1. Oui	2. Non	9. NSP	0. Refus

14. En regardant la CARTE 4, dites moi sous quelle forme vous aimeriez participer ?

1. Indirectement au travers de représentants
2. Directement en participant à des débats et consultations publiques
3. Directement en étant consulté avant les prises de décisions
4. En participant aux votes des décisions finales
5. Autre
9. NSP

15. Savez-vous où est prélevée l'eau de votre robinet ?
 1. Oui 2. Non (→ Q17) 0. Refus (→ Q17)

16. En regardant la CARTE 4, pouvez vous me dire où est prélevée l'eau de votre robinet (plusieurs solutions possibles) ?

1. De la surface (rivières, lacs, sources...)
2. De la mer avant d'être dessalée
3. D'une station d'épuration après traitement
4. Du sous-sol (nappe phréatiques)
5. Du stockage d'eau de pluie
6. Autre →
9. NSP

17. Savez vous ce que deviennent les eaux usées de votre habitations ?
 1. Oui 2. Non (→ Q19) 0. Refus (→ Q19)

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18. En regardant les propositions qui vous sont faites sur la CARTE 5, pouvez-vous me dire ce deviennent les eaux usées de votre habitation ?

1. Elles vont dans une fosse septique
2. Elles vont directement dans la nature
3. Elles vont à une station d'épuration puis dans la nature
4. Elles vont à une station d'épuration avant de retourner dans le réseau d'eau potable
5. Elles vont à une station d'épuration avant d'être utilisée pour l'irrigation agricole
6. autre →
9. NSP

19. Parmi les secteurs économiques qui vous sont proposés sur la CARTE 6, indiquez et classez les deux qui selon vous consomment le plus d'eau dans votre environnement immédiat.

- 1. Agriculture
- 2. Tourisme
- 3. Industrie
- 4. Ménages
- 5. Loisirs
- 9. NSP

20. Citez le nombre de fois que vous lavez votre voiture dans l'année ?

- Nombre 2. Pas de voiture 9. NSP 0. Refus

21. Le nombre de machine à laver le linge que vous faites tourner par semaine

- Nombre 2. Pas de machine 9. NSP 0. Refus

22. Le nombre de lave-vaisselle que vous faites tourner par semaine

- Nombre 2. Pas de lave vais. 9. NSP 0. Refus

23. Le nombre de vaisselles que vous faites à la main par semaine

- Nombre 9. NSP 0. Refus

24. Le nombre de bouteilles d'eau d'1 litre que votre ménage consomme par semaine

- Nombre 9. NSP 0. Refus

25. Le nombre total de douches prises par semaine, pour votre foyer

- Nombre 2. Pas de douche 9. NSP 0. Refus

26. Le nombre total de bains pris par semaine, pour votre foyer

- Nombre 2. Pas de baignoire 9. NSP 0. Refus

Les questions 27 à 30 ne concernent que les ménages qui ont un jardin.

27. Arrosez vous votre jardin ?

1. Oui 2. Non (→Q31) 9. NSP (→Q31) 0. Refus (→Q31)

28. En été vous l'arrosez tous les (combien de jours)?

-jours Fréquence 9. NSP 0. Refus

29. En regardant la CARTE 7, pouvez-vous me dire quel système d'arrosage utilisez-vous le plus souvent?

1. L'arrosoir
2. Tuyau d'arrosage
3. Goutte à goutte
4. Asperseur (tourniquet...)
5. Arrosage par submersion à partir d'un canal
6. Arrosage à partir d'eau de pluie récupérée
7. Autre système →
9. NSP

30. Avez-vous une piscine ?

1. Oui 2. Non

31. Pensez-vous que votre foyer consomme...

1. Peu d'eau
2. Ni peu ni beaucoup d'eau
3. Beaucoup d'eau
9. NSP



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- 32. A propos de la qualité de l'eau de votre robinet, diriez-vous que vous avez...**
1. Totalemnt confiance
 2. Pas vraiment confiance
 3. Pas du tout confiance
 9. NSP
- 33. Prenez la CARTE 8 et dites moi, à propos de la qualité de l'eau de votre robinet, si vous vous sentez...**
1. Bien informé
 2. Ni bien ni mal informé
 3. Mal informé
 4. Pas informé du tout
 9. NSP
- 34. En regardant la CARTE 9, diriez-vous que l'eau de votre robinet est ...**
1. De très bonne qualité (→Q36)
 2. De bonne qualité (→Q36)
 3. De qualité ni bonne ni mauvaise (→Q36)
 4. De mauvaise qualité (→Q35)
 5. De très mauvaise qualité (→Q35)
 9. NSP (→Q36)
- 35. Pour quelles raisons dites-vous que l'eau de votre robinet est de mauvaise qualité ?**
(Noter les première commentaires)

- (Maintenant, en regardant la CARTE 10, pouvez-vous préciser vos raisons ?)*
1. Elle est calcaire, elle crée des dépôts
 2. Elle a mauvais goût
 3. Elle sent mauvais, elle sent le chlore
 4. Elle contient des nitrates
 5. Elle contient des pesticides
 6. Elle contient du plomb
 7. Elle n'est pas incolore
 9. NSP
- 36. A votre domicile, vous buvez le plus souvent ... (comportement le plus fréquent)**
1. De l'eau du robinet (→Q38)
 2. De l'eau en bouteille (→Q37)
 3. De l'eau du robinet mais filtrée (→Q38)
 4. Une autre eau → (→Q38)
 9. NSP (→Q38)
- 37. En regardant la CARTE 11, pouvez-vous m'indiquer les raisons pour lesquelles vous buvez de l'eau en bouteille ? (plusieurs réponses possibles)**
1. Par habitude
 2. Car l'eau du robinet est de mauvaise qualité
 3. Car c'est une boisson différente, alternative à l'eau du robinet
 4. Car c'est bon pour la santé
 5. Autres raisons : →
 9. NSP
- 38. Etes vous équipé d'un compteur d'eau individuel ou collectif si vous habitez un immeuble ?**
1. Oui
 2. Non
 9. NSP
 0. Refus
- 39. Connaissez-vous la quantité moyenne d'eau que consommé par votre foyer ?**
1. Oui _____ mètre cubes par _____ (→ Q41)
 2. Non (→ Q40)
- 40. A partir des consommation indiquées sur la CARTE 12, diriez vous que c'est...**
1. Moins de 50 m³
 2. De 50 et 120 m³
 3. De 120 à 200 m³
 4. Plus de 200 m³
 9. NSP



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41. Connaissez-vous le montant de votre dernière facture d'eau ?

1. Oui _____ € ou F par _____ (→ Q43)
2. Non _____ (→ Q42)

42. Diriez-vous que votre facture d'eau est ...

1. Inférieure à 150€ (1000F)
2. Comprise entre 150 et 300€ (1000 et 2000F)
3. Comprise entre 300 et 500€ (2000 et 3300F)
4. Comprise entre 500 et 1000€ (3300 et 6600F)
5. Supérieure à 1000€ (6600F)
9. NSP

43. Diriez-vous que l'eau de votre robinet est...

1. Bon marché
2. Ni bon marché ni chère
3. Chère
9. NSP

44. Au cours des 10 dernières années, diriez-vous que le montant de votre facture...

1. A augmenté
2. Est resté inchangé
3. A diminué
9. NSP

45. Si, comme pour l'électricité, un système de tarification de l'eau basé sur les heures creuses et pleines était mis en place, seriez-vous prêt(e) à avancer ou retarder certaines consommation en dehors des heures pleines si cela vous permettait de réduire votre facture de 25% ?

1. Oui
2. Non
9. NSP
0. Refus

46. Si le prix de l'eau augmentait de 25%, prendriez-vous des mesures pour réduire votre consommation ?

1. Oui (→Q47)
2. Non (→Q48)
9. NSP (→Q48)
0. Refus (→Q48)

47. Pouvez-vous me citer 2 des mesures que vous pourriez prendre ?

1.
2.

48. Regardez la CARTE 13 et donnez moi votre sentiment à propos de l'affirmation suivante. « Je serais prêt à payer plus cher l'eau si j'étais sûr que ce supplément soit directement affecté à la protection des ressources en eau ». Vous êtes ...

1. Tout à fait d'accord
2. D'accord
3. Ni d'accord ni pas d'accord
4. Pas d'accord
5. Pas d'accord du tout
9. NSP

49. Regardez à nouveau la CARTE 13 et donnez moi votre sentiment à propos de la phrase suivante. « Dans ma région, l'eau est abondante et il n'est pas utile de l'économiser ». Vous êtes...

1. Tout à fait d'accord
2. D'accord
3. Ni d'accord ni pas d'accord
4. Pas d'accord
5. Pas d'accord du tout
9. NSP




50. Parallèlement au réseau d'eau potable, un second réseau d'eau de moins bonne qualité peut être mis en place pour alimenter les chasses d'eau. Par respect pour l'environnement, accepteriez-vous un tel système chez vous si cela était techniquement possible ?

1. Oui
2. Non
9. NSP
0. Refus

A votre domicile, que faites-vous pour économiser l'eau ?

51. Vous vous assurez que la machine à laver le linge ou la vaisselle est pleine avant de la faire tourner

1. Toujours
2. Parfois
3. Jamais

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52. Vous utilisez une chasse d'eau double bouton
 1. Toujours 2. Parfois 3. Jamais 4. Pas équipé

53. Vous réduisez la contenance de la chasse d'eau
 1. Oui 2. Non 3. NSP

54. Vous faites attention à l'arrosage du jardin
 1. Toujours 2. Parfois 3. Jamais 4. Pas de jardin

55. Vous faites attention aux choix de programme des machines à laver
 1. Toujours 2. Parfois 3. Jamais 4. Pas équipé

56. Vous fermez aussi souvent que possible les robinets
 1. Toujours 2. Parfois 3. Jamais

57. Vous prenez des douches au lieu de baigns
 1. Toujours 2. Parfois 3. Jamais

58. Faites-vous autre chose pour économiser l'eau ? :.....

59. Sur la CARTE 14, un système de recyclage de l'eau à l'intérieur des habitations vous est présenté. Il peut aussi bien s'adapter dans des appartements que dans des villas. Ce système est particulièrement intéressant du point de vue de la recherche car il permet d'économiser d'importants volumes d'eau. (PRÉSENTER LE SYSTÈME) Maintenant que je vous ai présenté le système, pouvez vous me dire si vous accepteriez de l'installer chez vous ?
 1. Oui (→ Q60) 2. Non (→ Q61) 9. NSP (→ Q62) 0. Refus (→ Q62)

60. Quelle serait votre principale motivation ?
 1. Réduire votre facture d'eau (→ Q62)
 2. Contribuer au respect de l'environnement en consommant moins d'eau (→ Q62)
 3. Autre raison (→ Q62)
 9. NSP (→ Q62)

61. Quelles sont les deux principales raisons qui font que vous n'êtes pas prêt à installer un tel système ?
 1. Système trop coûteux
 2. Nécessite trop de travaux
 3. Trop encombrant
 4. Peur d'insécurité sanitaire
 5. Autre raison :.....
 9. NSP

Les questions 62 à 72 ne doivent être posées qu'aux personnes ayant un Jardin.

62. Regardez la CARTE 15 et dites moi si vous accédez à une autre ressource que l'eau potable ?
 2. Non (→ Q64)
 3. Forage (→ Q63)
 4. Puits (→ Q63)
 5. Réseau d'eau brute, d'irrigation (→ Q63)
 6. Récupération d'eau de pluie (→ Q63)
 7. Autre ressource → (→ Q63)
 9. NSP (→ Q64)

63. Quel usage en faites-vous ?
 0. Arrosage de jardin
 1. Remplissage de piscine
 2. Lavage de voiture
 3. Usage domestique
 4. Autre usage →
 5. Aucun
 9. NSP

64. Si vous n'avez pas de puits ou de forage, envisagez vous d'en faire un ?
 1. Oui (→ Q65) 2. Non (→ Q66) 9. NSP (→ Q66) 0. Refus (→ Q66)

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- 65. En regardant la CARTE 16, pouvez-vous me dire quelle serait votre principale motivation ?**
1. Réduire la facture d'eau (→ Q67)
 2. Contribuer au respect de l'environnement (→ Q67)
 3. Arroser plus abondamment (→ Q67)
 4. Avoir ma propre ressource / être autonome (→ Q67)
 5. Autres raisons (→ Q67)
 9. NSP (→ Q67)
- 66. En regardant la CARTE 17, pouvez vous me donner la principale raison pour laquelle vous n'envisagez pas de faire de forage ou de puits ?**
1. Parce que vous êtes locataires (→ Q67)
 2. Parce que vous n'en voyez pas l'utilité (→ Q67)
 4. Parce que c'est trop cher (→ Q67)
 5. Parce que, techniquement, ce n'est pas faisable (→ Q67)
 6. Pour une autre raison →(→ Q67)
 9. NSP (→ Q67)
- 67. Connaissez-vous le coût d'un forage ?**
1. Oui
 2. Non
 0. Refus
- 68. Pensez-vous qu'il existe une réglementation particulière en matière de forage ?**
1. Oui (→Q69)
 2. Non (→Q70)
- 69. Connaissez-vous cette réglementation ?**
1. Oui
 2. Non
 0. Refus
- 70. Si vous en aviez la possibilité, vous raccorderiez-vous à un réseau d'eau brute ou à un ancien réseau d'irrigation ?**
1. Oui (→ Q71)
 2. Non (→ Q72)
 3. Déjà raccordé (→ Q73)
 9. NSP (→ Q73)
 0. Refus (→ Q73)
- 71. En regardant la CARTE 16, pouvez-vous me dire quelle serait votre principale motivation ?**
1. Réduire la facture d'eau (→ Q73)
 2. Contribuer au respect de l'environnement (→ Q73)
 3. Arroser plus abondamment (→ Q73)
 4. Avoir ma propre ressource / être autonome (→ Q73)
 5. Autres raisons (→ Q73)
 9. NSP (→ Q73)
- 72. En regardant la CARTE 17, pouvez vous me donner la principale raison pour laquelle vous n'envisagez pas de vous raccorder à un réseau d'eau brute ou d'irrigation ?**
1. Parce que vous êtes locataires
 2. Parce que vous n'en voyez pas l'utilité
 3. Parce que c'est trop cher
 4. Parce que, techniquement, ce n'est pas faisable
 5. Pour une autre raison →
 9. NSP
- 73. La croissance de la population dans la région fait craindre des pénuries d'eau potable dans une vingtaine d'années. Ce scénario vous semble-t-il :**
1. Optimiste
 2. Réaliste
 3. Pessimiste
- 74. Dans 20 ans, compte tenu du changement climatique, les principales rivières de l'Hérault pourraient être à sec une année sur deux. Ce scénario vous semble-t-il :**
1. Optimiste
 2. Réaliste
 3. Pessimiste
- 75. La généralisation des équipements économes en eau et de la pratique du recyclage, permettront d'ici 20 ans de réduire considérablement la consommation en eau potable. Ce scénario vous semble-t-il :**
1. Optimiste
 2. Réaliste
 3. Pessimiste



Commission Européenne



76. La Commission Européenne a demandée au BRGM d'effectuer des recherches pour étudier diverses formes de participation des citoyens à la gestion locale de l'eau. Pour cela, il est envisagé de former de petits groupes de citoyens pour les faire discuter de la gestion de l'eau.

Accepteriez-vous de faire parti de ces citoyen et si OUI m'autorisez-vous à communiquer votre Nom et vos coordonnées au BRGM ? (entourer)

OUI NON

Si OUI : NOM : _____

Prénom: _____

Adresse: _____

N° téléphone: _____

	Age	Sexe H=1 ; F = 2
Personne interviewée		
Autres membres du foyer		

77. En regardant la CARTE 18, pouvez-vous me dire quelle est le numéro correspondant à votre profession ? [...] (0 si refus de répondre)

78. En regardant la CARTE 18, pouvez-vous me dire quelle est le numéro correspondant à la profession du chef de famille ? [...] (0 si refus de répondre)

79. En regardant la CARTE 19, pouvez-vous me dire quel numéro correspond à votre plus haut niveau d'étude ? [...] (0 si refus de répondre)

80. A partir de la CARTE 20, pouvez-vous m'indiquer le numéro qui correspond à la tranche de revenu moyen pour l'ensemble de votre foyer? [...] (0 si refus de répondre)



Feuille de contrôle

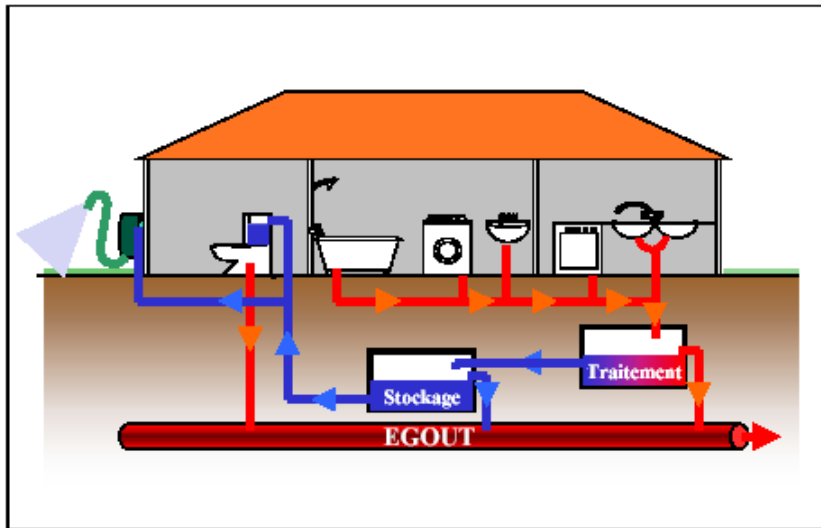
NOM : _____

Prénom: _____

Adresse: _____

N° téléphone (obligatoire): _____

CARTE 14



Pourquoi l'utiliser ?

- ❖ Réduire votre facture d'eau potable
- ❖ Contribuer à une meilleure gestion de la ressource en eau

Les Résultats

- ❖ Réduction de 30% de la consommation d'eau potable
- ❖ Investissement initial: 1500 à 2000€
- ❖ Rentabilisé en 15ans
- ❖ Encombrement: 1 à 2m³ enterré ou en sous-sol
- ❖ Pas d'odeurs ni de bruits

CARTE 19

1. Ecole Maternelle
2. Ecole primaire
3. Enseignement secondaire (Collège / CAP / BEP)
4. Enseignement secondaire – Lycée (BAC et BAC Pro)
5. BTS / IUT
6. Enseignement universitaire 1^{er} Cycle (DEUG)
7. Enseignement universitaire 2nd Cycle et plus



Géosciences pour une Terre durable

brgm

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