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Tap water awareness in the Netherlands and Flanders

The development of an empirically-based framework

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Bridging Science to Practice

Report

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Management summary

Tap water awareness: head, heart and hands

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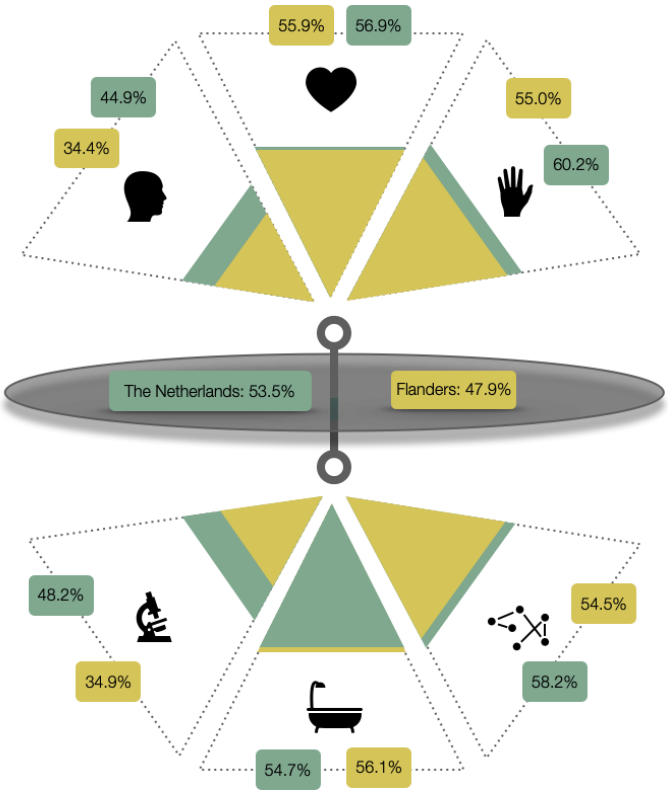
Since 2014, when the Organization for Economic Cooperation and Development (OECD) published a study warning of the lack of public awareness in the Netherlands regarding too little, too much and too polluted water, the concept of 'water awareness' has become an integral part of numerous public campaigns. At the same time, however, we find that most studies do not define the concept, let alone operationalise water awareness into measurable units. The key objective of this study is to conceptualise, operationalise and assess Tap water awareness; in doing so, it distinguishes between cognitive awareness (head), affectional awareness (heart) and behavioural awareness (hands). Based on the analysis of the results of the first empirical application of our Tap water awareness assessment framework, we conclude that Tap water awareness in both the Netherlands and Flanders is, indeed, generally rather low. The most significant variations in awareness scores are observed between people with different customer perspectives. The results stress the need for a more targeted approach in both awareness-raising campaigns and evaluations.



Tap Water Awareness	
	Head (cognition)
	Heart (affection)
	Hands (behavior)
	Quality
	Quantity
	System

Tap water awareness scores for both the Netherlands and Flanders.

Relevance BTO': lack of clarity

Although the importance of public water awareness is often emphasised, and notwithstanding the fact that calls for increased water awareness are becoming commonplace, most studies do not define the concept, let alone operationalise it into

measurable units. But these efforts need to be made, since they are essential for the measurement and evaluation of initiatives related to water awareness, such as public campaigns, customer communication and other interventions. To address this need, this study conceptualises, operationalises and assesses Tap water awareness, both in the Netherlands and Flanders.

Method: literature study, interviews and large scale surveys

The assessment framework was developed by building on a variety of contemporary conceptual insights in the literature and on a series of expert interviews. A cohesive set of nine awareness components are identified in the framework and operationalised into a set of tangible questions, which were put to the test in a large-scale online survey in both the Netherlands (n=1003) and Flanders (n=502). The survey applied both traditional and modern segmentation approaches, the latter differentiating between four types of customer perspectives: 'quality- & health-concerned', 'aware & committed', 'egalitarian & solidary', and 'down-to-earth & confident'.

Result: low awareness

Our conceptualisation of Tap water awareness comprises three dimensions: (I) cognitive awareness (e.g., knowledge on the composition of tap water), (II) affectional awareness (e.g., the extent to which people take tap water for granted), and (III) behavioural awareness (e.g., spillage prevention). This holistic, three-dimensional approach is consistent with the organising principle of 'head, heart and hands'. In parallel, we also differentiate between the Tap water quality, quantity and system.

The resulting assessment framework consists of nine awareness components, ranging from (I) 'water quality comprehension', relating to cognition and water quality, (V) 'caring for water', relating to affection and water quantity, to (IX) 'Tap water source protection', relating to behaviour and the water system.

Based on the analysis of the results of the first empirical application of our Tap water awareness assessment framework, we conclude that Tap water awareness in both the Netherlands and Flanders can be considered low from an absolute point of view. Interestingly, most of the significant variations in awareness are generally not related to sociodemographic factors, but to the four customer perspectives on drinking water, which reflect people's subjective views and preferences.

Implementation: effective implementation and evaluation

The combined insight of the tap water assessment framework and the different customer perspectives may facilitate both the effective implementation and evaluation of future tap water awareness raising campaigns. After all, it is important that policy-makers recognise that efforts aimed, for instance, at enhancing people's knowledge of water-quality issues require a very different approach than those aimed at changing behaviour regarding water quantity. It is also important that they be aware that techniques that may work well for customers with, for instance, an 'aware & committed' perspective, may have an entirely different effect on customers holding a 'quality- & health-concerned' perspective.

The Report

This research is presented in the *Tap water awareness in the Netherlands* (BTO-2020.034) report.

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Contents

1 The conceptualisation of tap water awareness

1.1 Introduction

Global access to drinking water and the combined importance of the management of freshwater resources and the access to drinking water and sanitation, identified as a Sustainable Development Goal (SDG6), have improved over the last decades (UN, 2018, Essex et al., 2020). At the same time, many freshwater resources are shrinking irreversibly due to increasing water demands, large-scale pollution, seawater intrusion, and changing precipitation patterns and temperatures (e.g. Schyns et al., 2019, Veldkamp et al., 2015). Indeed, water scarcity is recognized as one of the most important global risks, both in terms of likelihood and impact (Howell, 2013). In many world regions, including Europe, the projected rise in temperatures will bring drier soils and more frequent and severe heatwaves, likely leading to a sharp increase in the number of people living under water stress and causing severe damage to ecosystems and agricultural practices (Teuling, 2018). Perhaps less distressing, but no less important, is the fact that such drought episodes often lead to large peaks in water demand. Because of abrupt changes in pressure, such peaks occasionally result in tap water discolouration and require expensive infrastructure augmentation as well as high energy costs to treat, pump and maintain the water supply network (Rathnayaka et al., 2015, Beal et al., 2016). In addition to water quantity stress, also the quality of drinking water sources are increasingly under pressure. Beyond water scarcity, the emission of pesticides, biocides and nutrients from agriculture, the release of hazardous chemicals from households (e.g. pharmaceuticals, detergents and other consumer products) and industrial processes, as well as the increasing number of emerging substances form a growing threat affecting water resources (Ligtvoet et al., 2014, van Leeuwen and Vermeire, 2007). Against this backdrop, public awareness about freshwater availability, environmental impact, the need for more sophisticated and more costly treatment processes, and consequently the necessity to use water more efficiently, now becomes more important than ever before. This urgency is for instance reflected in the influential work on water governance of the Organization for Economic Cooperation and Development (OECD), warning for a lack of public awareness in, for instance the Netherlands, with respect to too little, too much and too polluted water (OECD, 2014, OECD, 2015).

Despite the often emphasized importance of water awareness, and notwithstanding the fact that calls for increasing public awareness are becoming commonplace, most studies, including previous work of the authors of this report, do not unequivocally define the concept, let alone, operationalise their definition into measurable units (e.g. Wang et al., 2018, Petrescu, 2008, Jalan et al., 2009, Brouwer and Hessels, 2019, Koop et al., 2017). Awareness is often referred to in broad terms and used in an exchangeable fashion across different water-related elements and goals such as surface water improvements (Brouwer, 2004, RWS, 2008, Anderson et al., 2007, De Boer et al., 2003), drinking water quality (Doria, 2010, Gholson et al., 2018), and water quantity (Willis et al., 2011, Petrescu, 2008). The concept of awareness itself is multifaceted, and found to encompass different things, including, but certainly not limited to, cognitive knowledge, the degree of involvement and having a specific attitude. In this report, we will focus on tap water awareness specifically. The key objective of this report is to conceptualise, operationalise and assess tap water awareness. To this end, we build on a variety of contemporary conceptual insights, develop an assessment framework, and empirically test and apply this framework in the context of both the Netherlands and Flanders. This last step, wherein we assess the tap water awareness of drinking water customers, involves the division of respondents into different segments, both classical, based on ‘hard’ sociodemographic differences such as gender, age and educational background, as well as modern, based the more ‘soft’ differences on the basis of subjective views and perspectives (Brouwer et al., 2019). In doing so, we also intend to further explore the value of perspective-based customer segmentation versus the more classical approaches of segmentation.

1.2 Head, heart & hands

The development of an empirically-based assessment framework for analysing tap water awareness was primarily guided by a conceptual and theoretical reflection on water awareness, as well as an exploration of how this concept has been used and translated in everyday awareness campaigns. The underlying assumption in many awareness campaigns is grounded in the premise that awareness is determined by cognitive knowledge, and that raising awareness is about increasing public understanding. Also in the literature, the cognitive narrative of tap water awareness seems prevailing (Anderson et al., 2007). An example of such a cognitive focus is provided by Ntengwe (2004: p.1303), who defines awareness of tap water customers as "a condition whereby customers know what it takes to produce water and have it delivered at the tap near or in households".

Beyond a merely cognitive conceptualization of awareness, other scholars embrace a broader rationale by incorporating the notions of perception and attitude, hereby acknowledging the growing importance of subjective experience in the drinking water domain (Brouwer et al., 2019). Such a more inclusive notion of awareness merges cognition with how this information is understood, interpreted and perceived. Since many studies, including Doria (2006) and Doria (2010), suggest that beyond traditional quality standards, more perceptive-oriented parameters such as taste, odour, colour and turbidity or trust in water utilities have become decisive in how people regard and trust the quality of their tap water, we regard this an important element too. Petrescu (2008) is one of the studies that operationalised such a broader conceptualisation of awareness, and accordingly, also assessed people's attitude towards the utility's service delivery, water quality and price, next to people's knowledge about, for instance, the water utility and water sources.

In their study of surface water awareness, (De Boer et al., 2003) principally define awareness as the realisation of the existence of something. Moreover, along with cognition and affection they identified a third component of awareness: behavioural intention. Next to the physical and social-cultural environment, they argue that people's cognition, affection and desired behaviour influences the way they act. As such, the effects of people's actions can reinforce or lessen their awareness. Whereas (De Boer et al., 2003) conceptualise water awareness merely as preceding and feeding behaviour, others regard behaviour as a pivotal element of awareness itself, for instance in the field of pro-environmental behaviour (Zabkar and Hosta, 2013). In this domain, the idea of environmentally conscious behaviour, which can be defined as human action motivated by a concern for the environment, is well established (Solér, 1996). In the domain of water this more inclusive conceptualisation of awareness is for instance reflected in the work of Wang et al. (2018). In their review of public tap water awareness in the Chinese province Hainan, they not only assessed people's knowledge of contamination accidents (cognition), their degree of trust in drinking water safety (attitude), but also included behavioural questions, such as people's use of bottled water.

Building on the work of these scholars, our conceptualisation of tap water awareness is composed of three dimensions: (I) cognitive awareness (e.g. knowledge on the composition of tap water), (II) affectional awareness (e.g., the extent to which people take tap water for granted), and (III) behavioural awareness (e.g., a conscious use of tap water and the preventing spilling). This holistic three-dimensional approach is consistent with the organising principle of head (cognitive), heart (affective), and hands (behavioural). This head, heart & hands approach is not only a pivotal element in the Waldorf model of education (Easton, 1997), but has also been widely used in transformational learning theory (Singleton, 2015), and holistic approaches on ecoliteracy and sustainability education (Sipos et al., 2008, Orr, 1992). For instance, in the description of Orr (1992) of how to approach education for sustainability, he suggests that the head, heart, and hands approach integrates intellect, emotion and body, whereas Singleton (2015) uses this approach to illustrate how people may progress from knowing to caring, to loving, and to doing. The same head, heart & hands approach has also been applied in other fields, including research on engagement (Geiger et al., 2017), and is consistent with the three dimensions of attitudes identified in social psychological research (Breckler, 1984). In parallel to this threefold conceptualisation of tap water awareness, we propose an additional more practical

classification that is based on substantive characteristics of drinking water: water quality, water quantity and water system.

From a substantive point of view, two rather separated strands can be distinguished from the literature: awareness about tap water quality and awareness about tap water quantity and consumption. Water quality literature focusses mainly on people's knowledge or ignorance of water quality (Gleick, 2006, Espinosa-García et al., 2015, Gholson et al., 2018) and their risk perception (Turgeon et al., 2004). Studies on awareness related to water quantity, instead, predominantly stem from conservation psychology, where behavioural aspects regarding the efficient use of energy and resources are studied. Here awareness is regarded as an element of conservative behaviour (Willis et al., 2011, Russell and Fielding, 2010, Gabarda Mallorquí et al., 2018, Petrescu, 2008). A third, yet rather overlooked strand which we consider important in our conceptualisation, relates to awareness of tap water in its broader context: the water system. Do people know where their tap water originates from? Do they understand the interrelatedness of the water cycle? Do they know the name of their water utility? Do they care, and, if so, do they translate this knowledge into a more conscious behaviour? Petrescu (2008) is one of the studies that already appreciated the importance of this water system element, and accordingly included questions on people's knowledge about, for instance, their water utility and source of tap water. Accordingly, in this study we define tap water awareness as the subjective reflection and practice about tap water in its broad context. Chapter 2 will further detail this conceptualisation, and introduce the actual operationalisation of tap water awareness in a three-by-three dimensioned assessment framework. This framework is designed to assess individual and (specific) group tap water awareness profiles. The next section will first elaborate on the methodology that this study applies.

1.3 Methods

The development of this study's tap water awareness assessment framework was primarily dictated by the theoretical considerations as outlined in Chapter 2, which will be substantiated and applied in the following chapters. This process was strengthened by the outcomes of three semi-structured face-to-face expert interviews (conducted in the summer of 2019) with professionals in the field of drinking water. The interviews were recorded, summarized and shared with the interviewees for review and approval. The interviewees consisted of one head of communications, one senior strategist and one programme manager working on the topic of tap water awareness. Both the theoretical study and the expert interview analysis were used to define and to elaborate the conceptual categories (i.e., head, heart and hands) and substantive categories (i.e., water quality, water quantity and water system), as well as to formulate and specify survey questions. Furthermore, three additional content experts (including one head communications, and two customer managers based at three different Dutch water utilities) generated items for inclusion in the questionnaire. In the final draft stage, the same experts modified and refined some questions, and helped to further improve the flow of the questionnaire. The questionnaire was pre-tested during seven individual interviews with a varied group customers of mixed gender, age and educational level (including one non-native speaker) to evaluate the clarity of each question and to assess the questionnaire's comprehensiveness (Campanelli, 2008). Based on their advice and suggestions, the questionnaire was revised to its final form.

The final instrument was an online-survey questionnaire consisting of 33 questions. The first section of the questionnaire asked for sociodemographic information including gender, age, residence, annual household income, and highest level of education attained. In order to elicit the respondents' subjective views on drinking water, we built on the work Brouwer et al. (2019) who in their modern segmentation approach distinguished four different customer perspectives on drinking water presented in Table 1. Accordingly, in order to determine to which perspective the respondents feel most connected to, we used their matrix question consisting of four sets of

propositions, numbered A to D, and asked respondents which set of propositions best represented their individual perceptions.

Table 1. Customer perspectives

Perspective	Description
(I) Quality & health concerned	Customers characterised by a focus on personal preferences and needs, especially regarding their own health and tap water quality
(II) Aware & committed	Customers characterized by pro-environmental values and collective sustainability ideals
(III) Egalitarian & solidary	Customers characterized by great sense of solidarity with less-favoured households, low-income countries, and future generations
(IV) Down to earth & confident	Customers characterized by a great confidence in the responsibility of drinking water utilities, along with the desire not to be bothered about drinking water

The second section of the questionnaire contained a mix of head (cognitive), heart (affective), and hands (behavioural) statements and questions on tap water quality, quantity and system issues. The questionnaire contained mostly close-ended questions with limited response choices, such as nominal (yes/no) questions, multiple choice questions with four to five answers, or questions with ordinal responses (strongly disagree, somewhat disagree, neutral, somewhat agree or strongly agree). All survey questions were compulsory, with exception of the sociodemographic questions and, as to avoid incorrect answers, the question about the volume record on the respondents' latest water bill.

To calculate the awareness profiles, the questionnaire was accompanied with an elaborate scoring system. For each of the three dimensions - head (cognitive), heart (affective) or hands (behavioural) – an equal sum of maximum of 36 points could be scored, whereby questions were awarded with between 2 and 8 points. Accordingly, one could score maximal 108 awareness points. The number of points per question was divided in such a way that the maximum score for all three components - water quality, water quantity, and water system - is also 36 points. No scores were assigned to the questions regarding sociodemographic information and the perspective matrix. The results of this study's analysis are consistently reported as the percentages of point scored compared to the maximum score overall or the maximum score in each group.

The survey was conducted in both the Netherlands (n=1003) and Flanders, Belgium (n=502). The survey was conducted in October 2019, and executed in collaboration with a marketing research agency. An individual version of the survey was created for both the Flemish and Dutch survey. Main differences were the references of place (e.g. questions referring to the Dutch or Flemish context), as well as the applied language. Although Flanders and the Netherlands share most words, some wording is slightly different (e.g. the word for tap water differs between these regions). Indeed, applying a Dutch of Flemish focus in these questionnaires also effects the correct answers to the cognitive questions. These differences were taken into account and further elaborated upon in chapter 4. The timing of the survey was aligned with the drinking water utilities. To avoid bias, a period of time was chosen when there were no foreseen major press releases on tap water issues or awareness raising campaigns. Participants were recruited via an online panel and received a small monetary reward to participate. Only participants of age 15 years or older were selected. The descriptive statistics of the survey respondents are presented in Table 2.

Table 2 Descriptive statistics for the Netherlands (n=1001) and Flanders (n=506).

	Gender	Age (years)							Education			Perspective			
		≤17	18 -24	25 - 34	35 - 44	45 - 54	55 - 64	≥65	Low	Medium	High	Quality & health concerned	Aware & committed	Egalitarian & solidary	Down to earth & confident
The Netherlands (%)	♀54.4 ♂45,6	3.0	11.7	16.9	15.4	15.7	19.8	17.4	23.9	39.2	36.9	12.6	32.6	28.1	26.3
Flanders (%)	♀46.5 ♂52.9	4.7	8.8	15.4	15.0	16.6	16.8	22.7	32.2	34.6	32.0	26.4	24.6	26.8	22.3

Three persons did not specify their gender and six persons did not specify their level of education.

Based on the scoring methodology shown in Table 3, a score was assigned to each respondents' answer. Next, the fraction of the maximum score was calculated and expressed as a percentage. For example, a 50% total awareness implies that a respondent has achieved half of the maximum attainable score. In this way, respondent's scores could be clustered to scores of individual questions, components and dimensions. The total sample and each category (i.e., gender, age, education and customer perspectives) were tested for normality (using the independent samples Kolmogorov-Smirnov test). In addition, Levene's test was conducted to test for the assumption of the homogeneity of variance between groups. Two-tailed ANOVA tests with planned contrasts have been conducted to test the null hypothesis that all groups are equal. An individual sub-group is consistently compared with the total of other sub-groups. For example, the scores within the age category ≤17 years was compared with all other age categories. Hence, the statistical analysis enables an exploration of which categories have significantly higher or lower scores in total, with respect to dimensions and components.

The remainder of this report is organized into four chapters. Chapter 2 presents the actual operationalisation of the tap water assessment framework, distinguishing between cognitive, affectional and behavioural awareness of tap water. The results of the first empirical application of our tap water awareness assessment framework in the Netherlands are presented in Chapter 3. Chapter 4 presents the awareness scores for Flanders, along with an comparison with the Netherlands. Finally, Chapter 5 provides a discussion and concluding remarks on our framework and the awareness results, as well as a reflection on the strengths and imitations of our approach.
The report also contains four appendices (in Dutch): (1) the detailed operationalisation of the assessment framework; (2) detailed results on each individual question for both the Netherlands and Flanders; (3) statistical analysis per component; and (4) the interview outline.

2 Tap water awareness assessment framework

As explained, this study's conceptualisation of tap water awareness distinguishes between cognitive awareness (head), affectional awareness (heart), and behavioural awareness (hands), and the elements water quality, quantity and system. Table 3 shows the resulting framework consisting of nine components, ranging from (I) 'water quality comprehension', relating to cognition and water quality, (V) 'caring for water', relating to affection and water quantity, to (IX) 'tap water source protection', relating to behaviour and water system. All nine components, as well as their operationalisation into research questions, are derived from an in-depth literature review as described below. In Appendix I the Dutch version of Table 3 is included.

Table 3 Tap water awareness framework constituting of the dimensions cognition (head), attitude (heart), and behaviour (hands) and the substantive elements water quality, quantity and system. The nine combined components deriving from these dimensions and substantive elements are operationalised into survey questions.

Dimension	Component	Operational questions		Weighing	
Cognition	(I) Water quality comprehension	*I.1*	*My tap water contains… (none; a small quantity; or a large quantity of anthropogenic substances*)*	4	10 points
		I.2	*To your knowledge, is chlorine added to your tap water?*	2	
		I.3	*Are the quality requirements stricter for tap water or bottled water?*	4	
	(II) Water consumption knowledge	*II.1*	*Estimate the average daily water consumption of one person in the Netherlands/Flanders?*	4	8 points
		II.2	*Estimate how much water conventional shower head uses per minute?*	4	
	(III) Water system understanding	*III.1*	*What is the name of your drinking water utility?*	4	18 points
		III.2	*Drinking water utilities are responsible for the quality of tap water (up to the pumping station; the meter; the tap)*	4	
		III.3	*Which responsibilities do you think belong to the tasks of your drinking water utility (swimming water management; sewage treatment; tap water purification etcetera)*	4	
		III.4	*What is the source of your tap water? (surface water, ground water, etcetera)*	2	
		III.5	*What is the price for 1,000 litres (1 m^3) of tap water, excluding taxes?*	4	
Affection		*IV.1*	*How safe do you perceive tap water in the Netherlands/Flanders?*	8	16 points
		IV.2	*In my view, clean tap water is something obvious*	4	

	(IV) Water quality perception	*IV.3*	*How often do you think about the quality of your tap water?*	4	
	(V) Caring for water	*V.1*	*I would like to conserve (more) tap water at home*	4	12 points
		V.2	*Every single day I experience 24 hours running tap water as special*	4	
		V.3	*How often do you think about your water consumption?*	4	
	(VI) Sense of responsibility	*VI.1*	*I sometimes think about the origin of my tap water*	4	8 points
		VI.2	*I feel a personal responsibility for protecting the quality of water in rivers, lakes, ditches and subsurface*	4	
Behaviour	(VII) Quality driven behaviour	*VII.1*	*In the past 24 months, have you ever actively looked for information on the quality and safety of Dutch/ Flemish tap water (e.g. via the Internet or by contacting your drinking water utility)?*	4	10 points
		VII.2	*How often do you drink bottled non-sparkling water at home?*	6	
	(VIII) Curtailment & efficiency behaviour	*VIII.1*	*What do you do with the tap while tooth brushing?*	4	16 points
		VIII.2	*Which of the following water efficient appliances have you installed in your home? (water-saving shower heads; high-efficiency washing machine; water saving device on kitchen tap)*	4	
		VIII.3	*What is the volume record on your latest water bill?*	8	
	(IX) Tap water source protection	*IX.1*	*In the past 24 months, how did you dispose of your old medicines?*	6	10 points
		IX.2	*In the past 24 months, how did you dispose of products such as old or used white spirit, stripper, brush softener or old weed killer?*	4	
	(*) This question included the following explanation: *Anthropogenic substances end up in the environment through societal activities, and include substances originating from industry, agriculture, and households, such as pesticides, cleaning products, medicines and cosmetics.*				

2.1.1 Cognition (Head)

Cognitive tap water awareness refers to knowledge, inquiry and understanding. Accordingly, it relates to the components (I) water quality comprehension, (II) water consumption knowledge, and (III) water system understanding. The leading assumption related to the cognitive dimension is that the more people know about tap water, be it in terms of quality, quantity, and/or system, the higher their awareness.

Our framework contains three questions to assess peoples' ***water quality comprehension*** (component I). Building on the work of Gholson et al. (2018) and Wang et al. (2018), one question asks about the presence of anthropogenic substances in drinking water. Unlike, for instance the work of Gholson et al. (2018) who in their study on consumer evaluations of public and private wells in Texas (United States), ask respondents which of a list of pollutants they

knew (or suspected) to be threatening the water quality, it concerns a more general question, with the answer categories of “none”, “a small quantity”, or a “large quantity” (see Table 3). Furthermore, the survey contains one cognitive question about the purification procedure and the use of chlorine. The latter question is especially relevant in the Netherlands where, in contrast to most other countries, tap water is distributed without disinfectant residuals (Van der Kooij et al., 1999). In Flanders, however, chlorine is added to the water, leading to a difference in “correct” answers for the two regions. One last question related to the water quality comprehension of customers is, among others, based on the work of Doria (2006) and is about quality requirements of tap water versus bottled water.

Water consumption knowledge (component II) is assessed by incorporating questions addressing both societal water use and the use of specific household appliances. Although the relation between water consumption knowledge, environmental issues, attitudes and behaviour is not always causal (Mondéjar-Jiménez et al., 2011), Koop et al. (2019) observe that having a solid knowledge base on individual and societal water consumption is generally considered to have a positive effect on conservation. At the same time, they identified an overall contradictory pattern of well-educated people stating to be more committed to water conservation compared to less formally schooled people, whilst consuming more water (i.e., the knowledge-behaviour gap). By assessing cognition, attitude and behaviour, our assessment framework helps to further elucidate this relationship. Building on the work of Willis et al. (2011), our framework includes one question about the water use of a conventional shower head, and one question about the societal average daily water consumption.

In addition to assessing customers’ knowledge on water quality and water consumption issues, the framework also includes a number of questions about ***water system understanding*** (component III)**.** Knowledge on the water supply system was also an integral aspect of the study of Petrescu (2008), who studied environmentally-oriented behaviour in Romania. Building on this study, our framework assesses how well-informed people are about their drinking water utility’s name and responsibilities. Other aspects linked to water system understanding are incorporated in our framework through a knowledge question on the price and origin of tap water.

2.1.2 Affection (Heart)

In the framework of Sipos et al. (2008), heart refers to the enablement of the affective domain in forming values and attitudes, and also in our framework affective tap water awareness relates to emotions, attitudes, interests, and feelings of belonging. Notwithstanding that tap water may not be well-known to elicit a variety of affective responses, we consider affection an integral element of tap water awareness. Indeed, it is claimed that affection and emotions determine what we pay attention to, what we value, and, connected with the third element of our framework, how we behave (Singleton, 2015). Whereas the cognition (head) dimension relates to the question how much people know about tap water, the affective (heart) dimension is about how much people actually care about water. Accordingly, affective tap water awareness relates to the components (IV) water quality perception, (V) caring for water consumption, and (VI) sense of responsibility. The leading associated assumption is that the less people take tap water for granted, the higher their tap water awareness.

To assess peoples’ affection for tap water quality, our framework in the first place asks for the ***perceived quality of water*** (component IV), and accordingly determines the possible gap between actual and perceived water quality, i.e. to the extent to which the public believes that water is safe and of good quality (Dupont et al., 2010). Whereas experts approach risks with logic, reason, and scientific analysis, the general public relies more on heuristics, feelings, and quick, instinctive and intuitive responses to risk (Slovic et al., 2004). Accordingly, it is of no surprise that most people

evaluate water quality differently than experts (Lou et al., 2007). Nonetheless it is argued that it is of paramount importance not to disregard these public perceptions; ignoring them may result in public dissatisfaction or even undermine public confidence (Kher et al., 2013, Doria, 2010). Research suggests that the perceived quality and safety of water is dependent on a combination of several interrelated variables, including: (I) the organoleptic qualities of water, i.e. the characteristics of water that affect our senses of taste, smell and sight; (II) personal experiences, including personal memories of (health) problems; and (III) information from third parties, including media (Doria, 2010, Doria et al., 2009). In addition, (IV) research indicates that the level of trust in water utilities and regulatory authorities can have a significant impact on public trust in the quality and safety of drinking water (Bratanova et al., 2013, Doria, 2010, Doria et al., 2009, Mahler et al., 2015). Along with the perceived quality of water, our framework contains two questions related to the extent that people take access to clean drinking water for granted. Research suggests that access to clean drinking water is taken for granted in most high-income nations (Crampton and Ragusa, 2010). In the same vein, Hegger et al. (2011) argue that tap water is considered a low-interest product. Building on this line of research, our framework assesses how frequently people ponder on the quality of their tap water, as well as to what extent they take the availability of clean tap water for granted.

Questions addressing the extent that people take drinking water for granted are also incorporated in ***caring for water*** (component V), in this case with respect to water quantity. More specifically, our framework includes a question to what extent people take it for granted that their tap provides safe potable water 24 hours a day. In addition, our framework assesses the degree to which people care and are aware about their water consumption. To this end, one question is included on how often people think about how much water they consume. Finally, caring for water is assessed by looking at their so-called intentional conservation behaviour. In the literature, knowledge and attitudes are frequently causally linked to behaviour. A leading theory in this respect is the Theory of Planned Behaviour (TPB), which postulates behaviour attitudes, subjective norms, and perceived behavioural control as major factors affecting behavioural intentions (Ajzen, 1991). Given that this *behavioural intention* is regarded as a direct antecedent for the actual behaviour, from a TPB perspective, behavioural intention would be an important predictor of actual water saving behaviour.

In addition to assessing peoples' perceived quality of water and caring for water, the framework also includes two tap water system questions under the denominator of ***sense of responsibility*** (component VI)**.** This sensed responsibility may be conveyed into responsible action of consumers themselves to act in a water conserving or non-polluting way, as normative pressures are found to appeal pro-social behaviours (Ferraro et al., 2011, Koop et al., 2019). Our framework assesses whether people reflect on the origin of their water (Gholson et al., 2018), and the degree to which they feel a personal responsibility to contribute to the protection of their drinking water sources. The underlying assumption related to sense of responsibility is that the more people feel associated and personally responsible, the higher their awareness is.

2.1.3 Behaviour (Hands)

Besides determining the knowledge of and attitudes towards tap water quantity, quality and system issues, the framework also considers consumer behaviour as pivotal. Behavioural components of tap water awareness relate to people's action in practice, and pertain to behaviour and practices, consumption patterns as a part of daily life. Accordingly, it relates to the components (VII) quality-driven behaviour, (VIII) curtailment & efficiency behaviour, and (IX) tap water source protection. The explicit consideration of actual behaviour in our framework is in line with the most recent insights from the behavioural science literature. It is increasingly recognised that behavioural intention may not be the primary determinant of behaviour, but just one of the many factors that determine behaviour (Thaler and Sunstein, 2008, Kahneman, 2003). Accordingly, Kahneman (2003) posits that two distinct cognitive systems (System 1 and System 2) are invoked during human decision-making: system 1, which is automatic, energy efficient,

quick, and based on intuition, emotions and rules of thumb; and system 2, which is reflective, energy consuming, slow, intentional and based on ratio.

Our framework contains two questions to assess peoples' ***quality-driven behaviour*** (component VII). One question relates to the active search for water quality information, with the underlying assumption that the more active people are in this respect, the smaller the gap between the actual risks and the risks they perceive. The lower this risk-perception gap, the higher their awareness. Building upon the work of Wang et al. (2018), the second question asks about the consumption of bottled non-sparkling water at home. Bottled water is not only more expensive and less convenient, but more importantly, particularly troubling from an environmental perspective (Van Der Linden, 2015, Leal Filho et al., 2019). Studies exploring the beliefs and motives that lead people to purchase bottled water suggest that a combination of factors, including lifestyle, trust in water utilities, and perceived alternatives, are all correlated with bottled water consumption, whereby organoleptics and concerns about health and water quality are particularly salient (Zivin et al., 2011, Doria, 2006, Van Der Linden, 2015). This study's associated underlying assumption is clear: the higher one's consumption of non-sparkling bottled water, the lower their tap water awareness.

Curtailment & efficiency behaviour (component VIII) is in the first place assessed by incorporating a question about a daily water-use pattern: tooth brushing. The question asks whether people close the tap during this activity. Previous study indicates that the annual wasted amount of water during tooth brushing may be relatively low in litres (Karaibrahimoğlu et al., 2017), but at the same time it is a common habit (Gabarda Mallorquí et al., 2018). For instance, Ahmed (2013) reports about a survey conducted in Britain showing that 72% of age group of 18-24 admits for water wastage while brushing teeth daily. In addition to this water-use pattern, and building on the work of Russell and Fielding (2010), our framework refers to in-house water-saving appliances, and asks what types of appliances the respondent has installed at home, including a water-saving shower head and a high-efficiency washing machine. As to avoid a false distinction between tenants and buyers, we have opted for appliances that can be installed without major modifications or investments. Also, we have only included installations that do not apply for a specific type of housing. As such we have not included installations such as rainwater harvesting in gardens. Finally, the framework asks respondents to report the volume record on their latest water bill, as was also done by Willis et al. (2011) and Fan et al. (2014). The associated underlying assumption is clear: a higher efficient and water-saving behaviour equals a higher tap water awareness.

The last component of our tap water awareness framework looks at behaviour from a water system perspective, and specifically focusses on ***tap water source protection*** (component IX), with the underlying assumption that the more people act protective and responsible, the more aware they are. To assess the extent to which people behave and act according to a consequence awareness in relation to water sources, the framework asks about disposal behaviour in relation to old medicines and products such brush softener or old weed killer, which are known to endanger the sources of drinking water (Sjerps et al., 2017). The underlying reasoning resonates with some key elements of the Value-Belief-Norm model, which assumes that individual norms are key for adopting (altruistic) behaviour (Stern et al., 1999).

3 Analysis of Dutch tap water awareness

3.1 Overall scores

As shown in Table 4, the results of this study show that the average Dutch citizen has a relatively low drinking water awareness. The overall drinking water awareness score of drinking water customers is 53.5%, meaning that, on average, people reached 53.5 points of the maximum total awareness points within the systematics of our framework. Especially people's cognitive tap water awareness, relating to one's (I) water quality comprehension, (II) water consumption knowledge, and (III) water system understanding is, with an average score of 44.9%, relatively limited. For instance, about one third (30%) of all people lack basic familiarity with the name of their water utility, and a larger part (70.6%) does not know that the quality requirements for tap water are substantially more strict than for bottled water in the Netherlands. Slightly better are the scores for both affective (56.9%) and behavioural (60.3%) tap water awareness, respectively relating to (IV) one's water quality perception, (V) caring for water consumption, (VI) sense of responsibility, and people's action in practice (components VII, VIII & IX). At this point it should be noted that relatively few respondents filled out the only non-compulsory question in our framework about their volume record on their latest water bill. In addition, a large share of the answers provided were considered improbably high or low (above 400 or below 60 litres per household), so that from a reliability point of view they had to be disregarded. Given that after this correction, only 33.0% of the respondents provided a reliable answer to the question of water use, this questions was disregarded in the analysis of Dutch water customers. Consequently, in the tap water awareness assessment presented in this study, both the maximum number of points for the behavioural dimension and the water quantity component was lowered with 8 points. In consequence, the maximum score of awareness points was lowered from 108 to 100.

Table 4. Customer dimension awareness scores in the Netherlands.

Dimension	Total score	Gender n=1001	Age (n=996)							Education (n=1000)			Perspective (n=999)			
			≤17	18 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65≥	Low	Medium	High	Quality & health concerned	Aware & committed	Egalitarian & solidary	Down to earth & confident
Descriptive statistics[1] (%)		♀54.4 ♂45,6	3.0	11.7	16.9	15.4	15.7	19.8	17.4	23.9	39.2	36.9	12.6	32.6	28.1	26.3
Total	53.5	♀57.7 *** ♂48.6 t = 8.76	53.1	52.5	51.7	52.6	55.6	53.9	52.0 * t = -2.52	52.0 ** t = -3.72	53.1	55.1** t = 2.68	52.2	56.9*** t = 6.85	53.7	50.0*** t = -5.71
Cognition	44.9	♀48.3 ♂41.0	41.0	46.3	42.7	43.0	45.5	45.1	47.9	40.8 *** t = -5.72	44.1	48.4** t = 4.69	41.0** t = -2.90	46.9** t = 3.12	43.2	46.2* t = 2.17
Affection	56.9	♀59.8 *** ♂53.6 t = 9.50	60.1 [2]	59.3 * t = 2.02	55.5	55.1	60.3	58.0	55.4 * t = -2.06	55.6	56.3	58.4* t = 2.50	58.9* t = 2.14	62.0*** t = 7.54	58.4* t = -2.16	48.1*** t = -11.96
Behaviour	60.3	♀67.2 *** ♂52.0 t = 7.58	59.6* t = -2.08	55.5	58.4	61.7	62.5	60.1	62.5 *** t = 3.33	61.7	60.3	59.3	58.0	63.0*** t = 3.48	61.1	57.1** t = -2.99
Significance: *= p < .05; **= p < .01; ***= p < .001																

Depicted are percentages of maximum number of points.

[1] Descriptive statistics for the survey conducted in the Netherlands (n=1003). The lower n for some categories reflects the fact that respondents were permitted not to answer the sociodemographic question.

[2] Even though the average tap water affection score is very similar for the age groups ≤17 years and 18-24 years, only the latter score is significant. This can be explained by the low variation in this group (STD 3.14; average 20.16) as compared to a higher variation amongst ≤17 group (STD 5.74).

3.2 Awareness components scores

As the differences between men and women in Table 4 shows, the latter have a substantial and significantly higher tap water consciousness ($p < .001$). This difference relates to both a substantial higher score on the affection dimension ($p < .001$) and the behavioural dimension ($p < .001$). Most differences between age groups are negligible, except for two. Firstly, people aged 65 or older show a significantly lower tap water awareness compared to the joint average of the other groups ($p < .05$). Secondly, people between 18 and 24 years old show a significantly higher affectional tap water awareness ($p < .05$), whereas people aged 17 years or younger show a lower behavioural tap water awareness ($p < .05$). As expected, significant differences were also found in the educational background of respondents. Respondents with a low education show a significantly lower overall tap water awareness ($p < .01$). This lower awareness score, however, can solely be explained by a significant lower cognitive tap water consciousness ($p < .001$), and does not relate to the affective nor to the behaviour dimension. By contrast, citizens with a high education show a significantly higher overall tap water awareness ($p < .001$). This difference relates most strongly to a significantly higher cognitive tap water awareness ($p < .001$) and to a lesser extent to a significantly higher affectional tap water awareness ($p < .05$).

From a modern segmentation perspective, and an analysis on the possible differences on the basis of the four earlier introduced customer perspectives on drinking water presented in Table 1, we find that the respondents with the 'aware & committed' perspective show a significantly higher overall tap water awareness ($p < .001$). On the contrary, respondents with the 'down to earth & confident' perspective show a significantly lower overall tap water consciousness ($p < .001$). Indeed, and in support of the work of Brouwer et al. (2019), this study shows that respondents with the 'aware & committed' perspective highly value sustainable behaviour, including, for instance, water-saving efforts, whereas respondents with the 'down to earth & confident' perspective are characterized by great confidence in the responsibility of drinking water utilities, along with the desire not to be bothered about drinking water. When zooming in further on the results depicted in Table 4, it can be observed that not only the total awareness scores reach this significance, but also all three separate awareness dimensions. Indeed, respondents with the 'aware & committed' perspective show a significantly higher cognitive ($p < .01$), affective ($p < .001$), and behavioural awareness ($p < .001$). By contrast, respondents with the 'down to earth & confident' perspective show both a highly significantly lower affectional tap water awareness ($t = -11.961$, $p < .001$) and a lower behavioural tap water awareness ($p < .01$). Interestingly, respondents with the 'down to earth & confident' perspective do not show a lower cognitive tap water awareness. On the contrary, although respondents with the 'aware & committed' perspective show the highest score, respondents with the 'down to earth & confident' perspective show a significantly higher cognitive tap water consciousness ($p < .05$). This is a telling result, for it suggests that respondents with the 'down to earth & confident' perspective show a relative low behavioural tap water awareness. Not because they have less water knowledge, inquiry or understanding than respondents with the other perspectives, but simply because they care less. A partly opposite result can be seen in respondents with the 'quality & health concerned' perspective, characterised by their focus on personal preferences and needs, especially regarding their own health. These customers show a significantly lower cognitive tap water consciousness ($p < .01$). However, at the same time they show a significantly higher affectional tap water consciousness ($p < .05$).

Table 5 depicts the scores of Dutch drinking water customers for the nine different awareness components of our three-by-three dimensioned tap water awareness assessment framework, organised around the principles head (cognition), heart (affection), and hands (behaviour), and the substantive themes water quality, water quantity and system. As explained, the scores along the layout of the dimensions shows that the average scores are highest for behavioural and affective tap water awareness, and relatively low for cognitive tap water awareness. As shown in Appendix A, from a thematic point of view, we find that people's water quality awareness is, with an average score of 48.2%, relatively low, followed by water quantity with an average score of 54.7%. People's water system awareness, relating to awareness of tap water in its broader context, scores relatively best with an average score of 57.9%.

Table 5. Customer component awareness scores in the Netherlands – gender and age.

Dimension	Component	Total score	Gender (n = 1000)	Age (n = 996)						
				≤17	18 -24	25 - 34	35 - 44	45 - 54	55 - 64	65<
Cognition	(I) Water quality comprehension	40.7	♀42.9** ♂38.2 t = 2.57	32.0	41.9	38.7	42.2	40.0	38.8	44.6* t = 2.18
	(II) Water consumption knowledge	34.2	♀35.7** ♂32.4 t = 2.58	30.0	33.0	30.9	32.4	37.1	35.9	36.9
	(III) Water system understanding	52.0	♀56.8*** ♂46.3	50.9	54.7	50.1	48.2	52.2	52.7	54.6*

			t = 7.76							t = 2.55
Affection	(IV) Water quality perception	55.7	♀56.7** ♂54.5 t = 2.66	57.5	56.5* t = 2.07	54.4	54.5	57.0	55.6	55.8
	(V) Caring for water	57.8	♀61.9**** ♂52.9 t = 6.78	62.5	55.9	55.6	55.3	63.1	60.9	53.9
	(VI) Sense of responsibility	58.2	♀62.8**** ♂52.7 t = 6.26	61.7	56.7	57.4	56.2	62.9	58.3	56.6* t = -2.44
Behaviour	(VII) Quality-driven behaviour	43.8	♀44.4 ♂43.2	46.0	44.3	42.6	42.6	46.2	43.3	44.3
	(VIII) Curtailment & efficiency behaviour	70.7	♀74.3*** ♂66.5 t = 6.00	72.1	66.7	71.2	69.4	71.1	70.9	73.4
	(IX) Tap water source protection	68.3	♀84.5*** ♂49.2 t = 20.16	63.3* t = -1.97	57.7** t = -2.87	64.1	74.6	72.0	68.3	72.1

Depicted are percentages of maximum number of points.

Looking at the individual awareness components as detailed in Table 5 and Table 6, we find a rather wide variation in maximum awareness scores, ranging from 34.2% for component (II) water consumption knowledge to 70.7% for component (VIII) curtailment & efficiency behaviour. Indeed, based on the survey answers on the questions about the water use of a conventional shower head and the societal average daily water consumption, it appears that customers generally have “cognitive gaps” in their understanding of water consumption knowledge. For one illustration, on the open question of estimating how much water a conventional shower head uses per minute was only 8.4% able to give the correct answer of seven litres (with a margin of one litres). Most citizens, however, estimate this consumption below six litres (25.9%), between 9-17 litres (30.0%), or between 18-24 litres per minute (9.7%). A little more than a quarter (26.2%) estimates that a conventional shower head uses more than 25 litres of water per minute. We found that women ($p < .01$) and respondents with a medium level of education ($p < .05$) have a significantly higher tap water consumption knowledge. Water consumption knowledge is the only water awareness component without a significant correlation with one of the four water customer perspectives.

The component with the highest awareness scores relates to (VIII) **curtailment & efficiency behaviour**, assessed by asking people about their daily tooth brushing water-use pattern, their water-saving appliances installed in-house and in theory, but as explained above disregarded, the volume record on their latest water bill. The high score can mainly be explained by the tap water use while tooth brushing. 76.4% states to always close the tap while brushing their teeth and another 15.8% almost always does so. Moreover, people also stated to have (several) water saving appliances installed in their homes. 54.6% has a water saving showerhead and 59.4% has a water saving washing machine. Women show significant and substantial higher levels of curtailment & efficiency behaviour than men ($p < .001$).

A third awareness component worth singling out is component (IV) **water quality perception**. Not because this component has resulted necessary in deviant scores but because, next to quality perception and a question on the frequency of thinking about the quality of water, it assessed to what extent respondents perceive clean tap water as something that can be taken for granted. A small majority of 50.6% of the respondents 'fully agrees' and a further 37.4% 'agrees' with the statement that clean tap water is something obvious. The percentage of respondents that instead do not regard clean tap water as something obvious, but instead for instance as rather special, is very small.

Only 4.9% does not agree with the former statement; 0.8% does not agree at all. Overall, we find that again women score significantly higher on water quality perception than men do ($p < .01$.). Also citizen aged between 18 and 24 years old have an overall significantly higher water quality perception ($p < .05$). Again the differences are bigger when looking at the different customer perspectives. Respondents with the 'aware & committed' perspective show a significantly higher water quality perception ($p < .001$). On the other end, customers classified according to the 'down to earth & confident' ($p < .001$) and to a lesser extent also the 'quality & health concerned' perspective ($p < .05$), have a significantly lower water quality perception. The reason why these two groups score low on this aspect, however, differs per perspective. Respondents with the 'down to earth & confident' perspective score especially low because they overwhelmingly consider it self-evident that clean water runs out of the tap. Respondents with the 'quality & health concerned' perspective, on the other hand, score particularly low because they - unjustly – relatively often have the idea that the quality of their tap is uncertain.

Table 6. Customer component awareness scores in the Netherlands – education and perspective.

Dimension	Component	Total score	Education (n=1000)			Perspective (n = 999)			
			Low	Medium	High	Quality & health concerned	Aware & committed	Egalitarian & solidary	Down to earth & confident
Cognition	(I) Water quality comprehension	40.7	44.9	38.5	37.9	35.8* t = -2.14	45.5*** t = 3.80	38.9	39.2
	(II) Water consumption knowledge	34.2	29.9	34.5* t = 2.41	36.7[1]	32.7	35.2	33.3	34.8
	(III) Water system understanding	52.0	47.2	51.5	55.6	47.6 ** t = -2.63	52.9	49.9	55.3*** t = 3.41
Affection	(IV) Water quality perception	55.7	52.4	55.7	57.7	53.3 * t = -1.97	58.9*** t = 5.74	55.8	52.6 *** t = -3.76
	(V) Caring for water	57.8	58.5	57.4	57.6	61.4* t = 2.50	63.6*** t = 5.62	61.8*** t = 3.67	44.5 *** t = -12.11
	(VI) Sense of responsibility	58.2	57.8	56.0	60.8	66.1*** t = 4.19	65.9*** t = 5.68	58.5	44.5*** t = -10.58
Behaviour	(VII) Quality-driven behaviour	43.8	39.4*** t = -3.33	43.1	47.6*** t = 4.01	41.7	48.0*** t = 3.71	41.7	42.0
	(VIII) Curtailment & efficiency behaviour	70.7	69.9 [2]	71.8	70.1** t = -2.57	70.6	72.8 [3]	72.1* t = 2.05	66.8
	(IX) Tap water source protection	68.3	77.5*** t = 5.03	68.4	62.4*** t = -4.77	64.1	70.0	71.9* t = 2.25	64.5

Depicted are percentages of maximum number of points.

[1] Even though the high educated customers have a higher average water consumption knowledge score than respondents with a medium high education, this score did not reach significance. This can be explained by the difference in standard deviation. With an average of 2.744 the standard deviations are respectively 0.25259 for the high educated group and 0.24855 for the medium educated group.

[2] Although respondents with low education score lower on curtailment & water efficiency behaviour than respondents with high education, only the latter segment reaches significance. With an average of 5.656, the low educated group has a standard deviation of 0.24680 whereas the standard deviation of the high educated group is lower with 0.22097.

[3] The average curtailment and efficiency behaviour score of respondents with 'aware & committed' perspective is higher, though not significant, as compared to respondents with the 'egalitarian & solidary' perspective. This can be explained by the difference in standard deviation. With an average of 5.656, the former segment has a standard deviation of 0.35521, whereas the latter segment has a standard deviation of 0.35047.

Overall it is remarkable that women score higher than men on all components, only on the component quality-driven behaviour this difference is not significant. The individual scores for the head (cognitive), heart (affective), and hands (behavioural) dimension are presented in Table 5 and Table 6. Figure 1 illustrates these different scores into a tap water awareness profile. The strongest difference between women and men relates to the tap water source protection (IX) scores (84.5% versus 49.2%, t = 20.161, p < .001), in our framework assessed by asking respondents about their medicine and chemical products disposal behaviour.

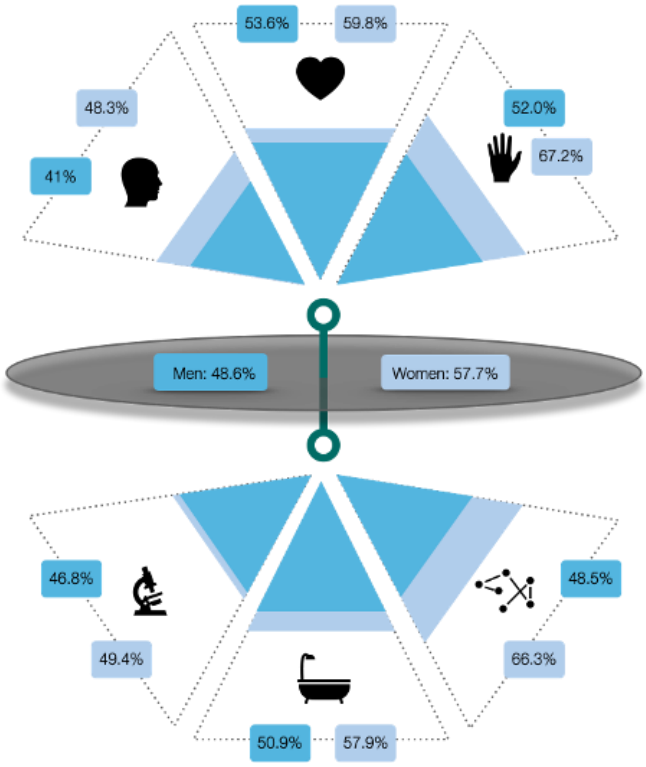

Figure 1. Illustration of the aggregated tap water awareness profile for both women and men.

Next to the gender difference, the biggest differences relate to the different perspectives. Indeed, respondents with the 'aware & committed' perspective have a significantly higher tap water awareness (p < .001). This finding is reflected in Table 6, depicting that this segment shows a significantly higher (p < .001) water quality comprehension (I) and water quality perception (IV; p < .001). Furthermore, the results of this study show that respondents with the 'aware & committed' perspective care significantly more for water, depict a higher sense of responsibility (VI), and have significantly higher levels of quality-driven behaviour (VII; for all three, p < .001). The segment with relative the lowest tap water awareness are respondents with the 'down to earth & confident' perspective. Table 6 shows that this particularly relates to a lower affectional scores. Indeed, we find that these customers not only have significantly lower water quality perception (VI), but also care significantly less for water (v), and feel a significantly lower sense of responsibility (for all three, p < .001). As indicated in the above, this result is not related to a lower

cognitive score, if only because this very segments shows a significantly higher water system understanding (III; $p < .001$).

As already noted, a partly opposite result can be seen in respondents with the 'quality & health concerned' perspective. These customers show both a significantly lower water quality comprehension (I; $p < .05$), as well as a significantly lower water system understanding (III; $p < .01$). At the same time, they care significantly ($p < .05$) more for water (V), and alike have significantly ($p < .001$) higher sense of responsibility (VI). The solely affectional component where respondents with the 'quality & health concerned' perspective show a significantly ($p < .05$) lower score is tap water quality perception (IV). This finding can, however, be fully explained by the elemental position of the profile itself, in which care for and concern about the quality of water in relation to their health are central (Brouwer et al., 2019). Finally, we find that respondents with the egalitarian & solidary have a significant higher score on two components of the behavioural dimension, i.e. curtailment & efficiency behaviour (VIII) and tap water source protection (IX; both, $p < .05$). In addition, they also show significantly more care for water, but this relates more to the very low score of respondents with the ‘down to earth & confident’ perspective than to a remarkably high score for ‘egalitarian & solidary’ customers.

Looking at the differences between respondents with different educational backgrounds, depicted in Table 6, especially the behavioural component is noteworthy. Here we find that respondents with a low level education have significantly lower levels of quality-driven behaviour ($p < .001$) but substantially higher levels of tap water source protection (IX; $p < .001$). Interestingly, we find the reversed patterns when looking at respondents with a high education. Indeed, they show significantly higher levels of quality-driven behaviour (VII; $p < .001$) and significantly lower levels of tap water source protection (IX; $p < .001$). This contradiction is also observed in other studies (Fan et al., 2014, Koop et al., 2019).

4 Analysis of Flemish tap water awareness

4.1 Overall scores

To map out the tap water awareness of the Flemish citizens, the same conceptualization is used as presented in the previous chapters, distinguishing between cognitive awareness of tap water (head), affective awareness of tap water (heart), and behavioural awareness of tap water (hands), and the elements water quality, quantity and system. The operational questions presented in Table 3 however, have been tailored to the Flemish context. This mainly comprises of applying the question to Flanders, rather than the Netherlands (e.g. (II) Water consumption knowledge: Estimate the average daily water consumption of one person in Flanders?). However, for some questions also the answers, or the answer categories have been changed. For instance the question (I) Water quality comprehension: To your knowledge, is chlorine added to your tap water? For the Dutch context the correct answer would have been that no chlorine is added, whilst in Flanders chlorine is added to the water.

As shown in Table 7, the results of this study show that the average Flemish citizen has a relatively low drinking water awareness, also in comparison to Dutch citizens. The overall drinking water awareness score of drinking water customers is 47.9%. Especially the cognitive awareness of the Flemish citizens is found to be low (34.4%), relating to people's understanding of and knowledge of the water quality, water consumption and the water system. The score for behaviour, relating to people's action in practice, is substantially higher (55.0%), as well as the scores for affection (55.9%), relating to people's water quality perception, caring for water and sense of responsibility.

Similar to the Netherlands, it should be noted that also relatively few Flemish respondents filled out the only non-compulsory question in our framework about their volume record on their latest water bill. In addition, a large share of the answers provided were considered improbably high or low (above 400 or below 60 litres per household), so that from a reliability point of view they had to be disregarded. Given that after this correction, only 23% of the respondents provided a reliable answer to the question of water use, this questions was disregarded in the analysis of Flemish water customers (as was also decided for the Dutch analysis). Consequently, in the tap water awareness assessment presented in this study, both the maximum number of points for the behavioural dimension and the water quantity component was lowered with 8 points. In consequence, the maximum score of awareness points was lowered from 108 to 100.

Table 7 Customer dimension awareness scores in Flanders, Belgium.

Dimension	**Total score**	**Gender** (n=506)	**Age** (n=504)							**Education** (n=502)			**Perspective** (n=501)			
			≤17	**18 - 24**	**25 - 34**	**35 - 44**	**45 - 54**	**55 - 64**	**65≥**	**Low**	**Mediu m**	**High**	**Quality & health concerned**	**Aware & committed**	**Egalitarian & solidary**	**Down to earth & confident**
Total	47.9	♀47.0 ♂48.8	45.5* t = -2.45	42.5* t = -2.336	44.5	45.8	49.8** t = 3.01	50.0* t = 2.26	51.3** t = 4.35	47.0	47.0	50.0** t = 3.17	47.5*** t = -3.90	50.6*** t = 5.29	49.1*** t = 3.26	44.1*** t = -4.40
Cognition	34.4	♀32.4** ♂36.5 t = -3.02	27.3* t = -2.63	27.2** t = -3.436	32.5** t = -3.32	33.8	37.0*** t = 3.47	35.5* t = 2.92	37.8** t = 6.54	32.8	33.6	37.5	32.6	35.5** t = 2.81	35.1	34.6** t = 2.68
Affection	55.9	♀55.8 ♂55.9	57.1	56.5	54.7	53.1	56.0	56.7	57.3	54.3	55.1	58.1** t = 2.84	57.6*** t = 8.02	59.9*** t = 6.16	56.8*** t = 7.12	48.3*** t = -4.65

Behaviour	55.0	♀54.5 ♂55.6	54.0	44.3	46.9	51.7	58.3	59.9	61.1	55.9** t = 3.04	53.7	55.7*** t = 3.74	53.5	58.2*** t = 3.97	57.1	50.8** t = -2.80

Depicted are percentages of maximum number of points.

As is shown in Table 7, a difference in tap water awareness exists between men and women, with the latter having an overall lower (yet not significant) tap water awareness. This difference is significant for the cognitive dimension ($p < .01$). Considering the different age groups, it stands out that significant differences are observed between the age groups. Flemish citizens aged 17 or younger and between 18-24 years old have a significantly lower awareness than the joint average of the other age groups (both $p < .05$). The age groups 45-54, 55-64 and 65<, on the other hand, all show a significantly higher tap water awareness (with respectively $p < .01$, $p < .05$ and $p < .001$). This division between generations is mirrored for the cognitive dimension, with the age groups below 34 years old showing a significantly lower cognitive awareness and those older than 45 significantly higher awareness (see Table 7). Relating to the other dimensions, no significant differences between age groups are found. The educational background of people seems to correlate to tap water awareness. People who have enjoyed higher education were found to have a significantly higher score ($p < .01$). This difference is mirrored in all dimensions of awareness, although not always significant. Interestingly, particularly the dimension expected to be influenced directly through education, cognition, shows no significant difference for higher educated citizens.

From a modern segmentation perspective, and an analysis on the possible differences on the basis of the four earlier introduced customer perspectives on drinking water, we find that the identified perspectives are all four significantly explanatory for the tap water awareness of Flemish citizens. The respondents with the 'aware & committed' perspective show a significantly higher tap water awareness ($p < .001$), just like the citizens with an 'egalitarian & solidary' perspective ($p < .001$). The citizens with a 'quality & health concerned' perspective ($p < .001$) and 'down to earth & confident' perspective ($p < .001$) on the other hand score both significantly lower than the joint average of the others. These differences are largely in line with the findings of Brouwer et al. (2019). Indeed, this study shows that respondents with the 'aware & committed' perspective score significantly high on all three components, making them relatively tap water aware. Citizens with the 'down to earth & confident' perspective on the other hand score significantly lower on cognition, affection and behaviour. Particularly considering affection, the scores are substantially lower than the joint average ($p < .001$), indicating that this group cares less about tap water awareness. Also, regarding the 'quality & health concerned' and the egalitarian & solidary' perspectives, the main difference between these perspectives and the joint average of the others originates in their tap water affection. Both perspectives score significantly higher on affection compared to the joint average of all others. However, whilst people with the egalitarian & solidary' perspective seem to score relatively high on all dimensions, people with a 'quality & health concerned' perspective only score high on affection. This resonates with their description, as was provided by Brouwer et al. (2019), as being more concerned with tap water (especially in relation to their own health).

4.2 Awareness components scores

Table 8 depicts the scores of Flemish drinking water customers for the nine different awareness components of our three-by-three dimensioned tap water awareness assessment framework, organized around the principles head (cognition), heart (affection), and hands (behaviour), and the substantive themes water quality, water quantity and system. As explained, the scores along the layout of the dimensions shows that the average scores are highest for behavioural and affective tap water awareness, and relatively low for cognitive tap water awareness. From a thematic point of view, we find that people's water quality awareness is, with an average score of 34.9%, relatively low, followed by the water system awareness with an average score of 54.5%. People's water quantity awareness, relating

to knowledge on water consumption, caring for water and curtailment and efficiency behaviour, scores relatively best with an average score of 56.1%. The distribution of the different dimensions is visualized in Figure 2.

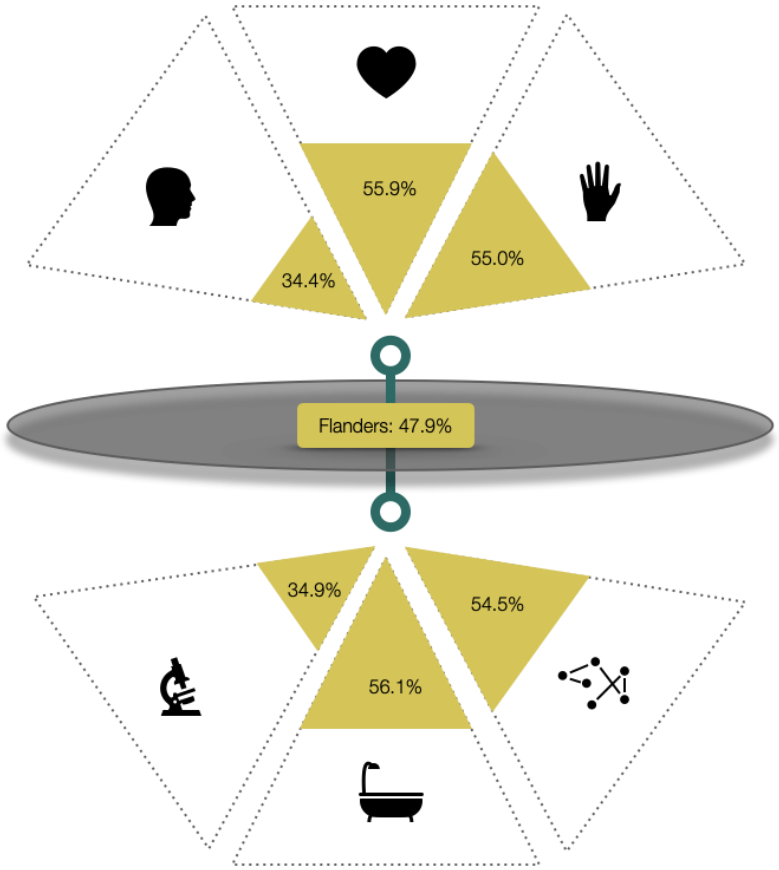

Figure 2 Visualization of the distribution of scores over the different dimensions of tap water awareness for Flanders. Scores are visualized as percentage of the maximal score per dimension.

Table 8 Customer component awareness scores – gender and age in Flanders, Belgium.

Dimension	Component	Total score	Gender (n=506)	Age (n=504)						
				≤17	18 -24	25 - 34	35 - 44	45 -54	55 -64	65≥
Cognition	(I) Water quality comprehension	20.3	♀ 18.0 ♂ 22.4	15.8	15.3* t = -2.30	19.7	19.2	25.2** t = 3.17	22.6	18.9
	(II) Water consumption knowledge	36.5	♀ 36.1 ♂ 36.9	35.9	43.1	38.6	35.4	36.5	34.6	34.6
	(III) Water system understanding	41.4	♀ 38.7 ♂ 44.3	29.9* t = -2.66	26.8*** t = -3.36	36.8	41.2	43.9** t = 2.79	43.2	49.7*** t = 5.06
Affection	(IV) Water quality perception	48.7	♀ 48.5 ♂ 48.8	50.0	49.2	50.9	49.7	47.8	48.5	46.7
	(V) Caring for water	60.7	♀ 61.9 ♂ 59.6	57.6	62.6	56.5	56.5	62.4	60.2	65.5** t = 2.86
	(VI) Sense of responsibility	63.0	♀ 61.2 ♂ 64.4	70.3	61.9	59.7	54.9** t = -2.87	63.1	67.9	65.9

Behaviour	**(VII) Quality driven behaviour**	27.6	♀ 28.2 ♂ 27.0	31.3	23.6	28.1	29.4	26.9	28.4	26.6
	(VIII) Curtailment & efficiency behaviour	69.0	♀ 69.9 ♂ 68.4	70.8	62.8	69.0	63.1	71.9	72.8* t = 2.32	69.8
	(IX) Tap water source protection	71.3	♀ 68.7** ♂ 73.9 t = -3.16	63.3	50.2*** t = -4.70	48.0*** t = -5.47	64.9	78.8*** t = 3.89	81.2*** t = 4.56	88.5*** t = 8.42

Depicted are percentages of maximum number of points.

As is shown in Table 8 the awareness scores differs substantially over the nine individual awareness components, ranging from 20.3% for water quality comprehension (I) to 71.3% for tap water source protection (IX). Overall the questions relating to cognition and water quality show particularly low scores. Indeed, based on the survey answers on the questions about the quality requirements for tap water in comparison to bottled water, the addition of chlorine to tap water and the appearance of non-natural substances in tap water, Flanders' citizens showed a gap in tap water quality comprehension. For example, when asked which type of water was subject to stricter water quality demands, only 18.0% of Flemish citizens knew that the demands are higher for tap water compared to bottled water. Looking at the different segments here, it shows that the water quality comprehension is relatively highest for the age group 45-54 years old, as they score significantly higher ($p < .01$). Moreover, citizens in the age group 18-24 show the lowest water quality comprehension with a significantly lower score than all other groups ($p < .05$).

Looking into the components constructing the behavioural dimension, Flemish citizens score relatively high on curtailment and efficiency behaviour and tap water source protection compared to other dimensions. To map out the former, citizens were asked if they left the tap open whilst brushing teeth and whether they have installed water saving appliances such as a water saving shower head in their home. The overall score for this behaviour is 69.0%, indicating that most people act to avoid the spillage of water. The only age group showing a significantly higher score on this compared to the joint average of the others is the age group 55-64 ($p < .05$).

Considering the tap water source protection behaviour of citizens, the overall score is relatively high (71.3%). Looking into this behaviour citizens were asked how they discard old medicines and old chemical products such as paint or turpentine. The assumption here is that more aware citizens would discard these at appropriate waste processing locations, and would not flush these though the sink or toilet. In contrast to the former, the different age groups, as well as gender show a clear and significant difference for this component. First of all women show a significantly lower score for this component compared to men ($p < .01$). Moreover, also a significant difference between age groups can be observed, with a general higher score for older citizens, compared to younger citizens. Another interesting difference related to this component is the significantly higher score low educated people have ($p < .01$), whilst this group generally has lower scores for most components.

Indeed, regarding the third component of the behavioural dimension, Flemish citizens show less behavioural awareness. To test the quality driven behaviour of the Flemish citizens, they were asked whether they have actively looked up information on the water quality and whether they drink bottled water at home. Although no significant differences were found for the different age groups and genders, a significantly higher score can be observed when taking a modern segmentation approach. As is shown in Table 9, citizens with the 'aware & committed' perspective score significantly higher on quality driven behaviour than the joint average of the others ($p < .05$). Interesting is that the perspective known for their emphasis on water quality, the 'quality & health concerned' perspective, shows the lowest score of al perspectives on this component. A possible explanation could be that this group consumes more bottled water compared to the other aspects because they are assuming this more save than tap water.

A further component worth singling out is the water consumption knowledge. Based on the survey answers on the questions about the water use of a conventional shower head and the societal average daily water consumption, it appears that customers generally have "cognitive gaps" in their understanding of water consumption. To illustrate

this, regarding the open question of estimating how much water a conventional shower head uses per minute only 7.1% of Flemish respondents was able to give the correct answer of 7 litres (with a margin of one litre). Most citizens, however, estimate this consumption to be lower than 6 litres per minutes (39.2%) or to be between 9-24 litres per minute (36.2%) or even 25 litres or more per minute (17.5%) (See Figuur 5, in Appendix II.I). It might be valuable to point out here that the ability to answer these questions may also relate to the ability to make an estimation and think in an abstract manner. As such it is expected that higher educated people would score higher on this question. In Tabel 9 (Appendix II.I) it is shown that, although high educated people score higher on these questions (II.1 & II.2) compared to lower educated people, this difference is not significant. This indicates that, for the Flemish, the level of education did not influence the ability to answer these individual questions. Looking into the component of water consumption knowledge as a whole however, Table 9 shows a significant difference between the overall scores of high educated people and medium educated people when compared to the joint average of the others.

Table 9 Customer component awareness scores – education and perspective in Flanders, Belgium.

Dimension	Component	Total score	Education (n=502)			Perspective (n=501)			
			Low	Medium	High	Quality & health concerned	Aware & committed	Egalitarian & solidary	Down to earth & confident
Cognition	(I) Water quality comprehension	20.3	16.6** t = -3.15	19.8	24.6*** t = 3.50	20.1	21.3	19.4	20.4
	(II) Water consumption knowledge	36.5	36.4	33.1* t = -2.16	40.4* t = 2.27	32.0** t = -3.09	41.7* t = 2.28	40.6* 2.28	30.9
	(III) Water system understanding	41.4	40.2	41.5	43.3	39.9	40.7	41.4	44.1
Affection	(IV) Water quality perception	48.7	46.1** t = -2.77	48.6	51.0** t = 2.63	46.1*** t = -3.79	52.7*** t = 4.49	49.5	46.2
	(V) Caring for water	60.7	61.1	58.5	63.0	62.9	65.1*** t = 3.76	61.9	51.9*** t = -4.86
	(VI) Sense of responsibility	63.0	60.7	63.1	65.0	72.6** t = 3.17	66.3** t = 2.61	63.9	47.0*** t = -6.77
Behaviour	(VII) Quality driven behaviour	27.6	24.5	27.9	30.0	23.3	32.6* t = 2.18	28.1	26.3
	(VIII) Curtailment & efficiency behaviour	69.0	68.4	68.1	70.8	68.9	70.9	71.6	63.7
	(IX) Tap water source protection	71.3	77.4** t = 2.91	67.9	69.2	71.4	73.6	74.5	64.9

Depicted are percentages of maximum number of points.

In Flanders, men score higher than the women on six out of nine components (for the overall difference between men and women see Figure 3). Nonetheless, this difference is only significant related to the cognitive dimension ($t = 3.020$, $p < .01$) and when looking at the tap water source protection behaviour specifically ($t = 3.158$, $p < .01$). The latter also beholds a substantial difference (73.9% for men versus 68.7% for women) and was assessed in our framework by asking respondents about their medicine and chemical products disposal behaviour.

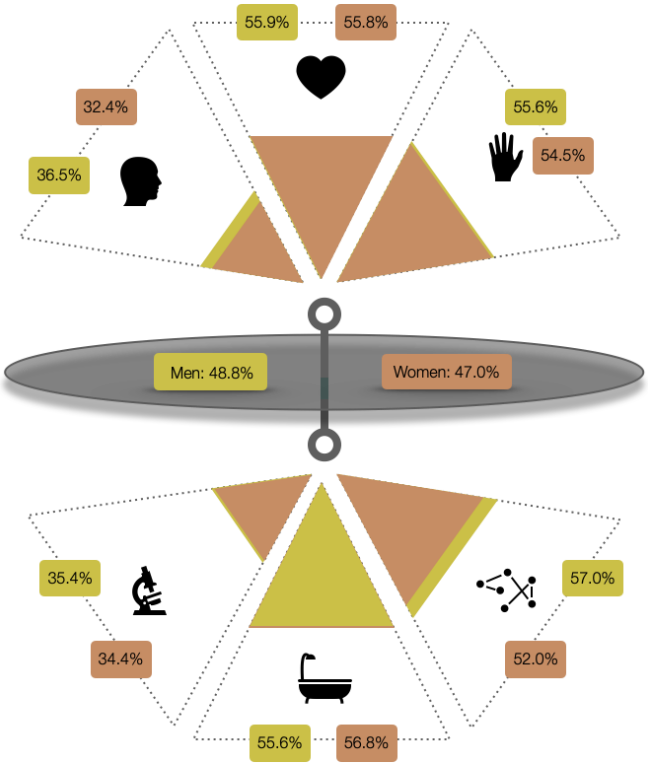

Figure 3 Visualization of the distribution over the different tab water awareness components for both men and women in Flanders.

Besides gender difference also a generational difference can be observed, with the age groups 45< scoring relatively high on many components including water system understanding and tap water source protection. Regarding the different educational backgrounds of the respondents, Table 9 shows a significant difference for two of the three quality related components. Citizens with low education have a significantly lower water quality comprehension and water quality perception (both $p < .01$). Moreover, the citizens with a higher education have a significantly higher comprehension and perception of the water ($p < .001$ and $p < .01$). In addition another interesting observation to be made here is that although citizens with lower education show less quality driven behaviour and curtailment and efficiently behaviour (not significant), they show a significantly higher tap water source protective behaviour ($p < .01$). This contradiction is also observed in other studies (Fan et al., 2014, Koop et al., 2019).

Yet, besides these more traditional segmentation uses, also the modern segmentation applied provides interesting insights into the awareness of different citizen groups. Indeed, respondents with the 'aware & committed' perspective have a significantly higher tap water awareness ($p < .001$). This finding is reflected in Table 7, depicting that aware and committed water users shows a significantly higher water consumption knowledge ($p < .05$), water quality perception ($p < .001$), caring for water ($p < .001$), sense of responsibility ($p < .01$) and quality driven behaviour ($p < .05$). The segment with relative the lowest tap water awareness are respondents with the 'down to earth & confident' perspective. Table 7 shows that this particularly relates to a lower affectional scores. Indeed, we find that these customers care significantly less for water and feel a significantly lower sense of responsibility compared to the joint average of the other groups (both $p < .001$).

The citizens with a 'quality & health concerned' perspective, on the other hand, are showing a significantly high sense of responsibility ($p < .01$). The sole affectional component where this groups shows a significantly ($p < .001$) lower score than the joint average of the other groups is tap water quality perception. This finding can, however, be fully

explained by the elemental position of the profile itself, in which care for and concern about the quality of water in relation to their health are central (Brouwer et al., 2019).

4.3 Comparing the Dutch and Flemish tap water awareness

Although one always must be careful when comparing two countries, and regardless of context bound differences that may limit the comparability, we believe that a comparison between the Dutch and Flemish awareness scores may generate some valuable insights, if only to better understand the individual awareness scores. Accordingly, when comparing the tap water awareness scores of Dutch and Flemish customers we find that the latter have an overall lower score than the former: 53.5% for the Dutch customers versus 47.9% for the Flemish customers. This difference mainly originates in a substantial difference in cognitive awareness between the two. Whilst the Dutch show an average cognitive awareness of 44.9%, this is only 34.4% for the Flemish citizens. When taking a closer look into this dimension, we find the largest difference related to water quality comprehension (component I), in which the Dutch scored considerably higher (40.7%) compared to the Flemish (20.3%) ($p < .001$, $t = 12.164$). In addition, we find that both show a relatively high water system understanding (component III), with the Dutch scoring significantly higher (52.0%) compared to the Flemish (41.4%) ($p < .001$, $t = 9.055$, see Table 10). The scores for component II (water consumption knowledge) are about equal. Among other things, this knowledge was tested by asking respondents on the average water consumption of citizens and the water use of a regular shower. Whilst Flemish citizens reached 36.5% of the total score, this was only 34.2% for the Dutch citizens. This difference, however, was not significant.

Table 10 A statistical comparison of the Dutch and Flemish tap water awareness scores per individual component.

Dimension	Component	Score The Nederlands	Score Flanders	Paired Samples Test
Cognition	(I) Water quality comprehension	40.7***	20.3	Dutch respondents score significantly higher ($p < .001$; $t =$ **12.164**) than Flemish respondents
	(II) Water consumption knowledge	34.2	36.5	Flemish respondents score higher than the Dutch respondents. This difference is not significant
	(III) Water system understanding	52.0***	41.4	Dutch respondents score significantly higher ($p < .001$; $t =$ **9.055**) than Flemish respondents
Affection	(IV) Water quality perception	55.7***	48.7	Dutch respondents score significantly higher ($p < .001$; $t =$ **6.679**) than Flemish respondents
	(V) Caring for water	57.8	60.7***	Flemish respondents score significantly higher ($p < .001$; $t =$ **5.541**) than Dutch respondents
	(VI) Sense of responsibility	58.2	63.0***	Flemish respondents score significantly higher ($p < .001$; $t =$ **4.716**) than Dutch respondents
Behaviour	(VII) Quality driven behaviour	43.8***	27.6	Dutch respondents score significantly higher ($p < .001$; $t =$ **10.408**) than Flemish respondents
	(VIII) Curtailment & efficiency behaviour	70.7	69.0	Flemish respondents score higher than Dutch respondents. This difference is not significant
	(IX) Tap water source protection	68.3	71.3***	Flemish respondents score significantly higher ($p < .001$; $t =$ **3.287**) than Dutch respondents

Looking into the other components, it is noteworthy that although the Flemish citizens show a more or less equal overall tap water affection (55.9% for the Flemish compared to 56.9% for the Dutch), they do show a significantly higher sense of responsibility (component VI, $p < .001$) and care for water (component V, $p < .001$).

Finally, also the difference in quality driven behaviour (component VII) between the two regions stands out, as the Dutch show a substantially higher score compared to the Flemish ($p < .001$, $t = 10.408$). The difference between them mainly originates in their consumption of bottled water. Whilst 37.5% of Flemish citizens consumes bottled (non-sparkling) tap water on a daily basis, only 12.8% of the Dutch do so. Moreover, 45.8% of the Dutch never consume bottled tap water, while this is only 21.5% of the Flemish citizens (see appendix II.III, Figuur 22).

Furthermore, the results show that Flemish customers score relatively well on components related to tap water quantity (component II, V & VIII). Both the water consumption knowledge and the care for water of the Flemish are higher than the Dutch. For the latter this difference is also significant. When looking into the questions operationalizing the care for water, Flemish citizens both significantly more often wish to conserve more water at home, as well as consciously use water at home ($p < .001$, see Appendix II.V, questions V.1 & V.3). Looking into the behavioural component related to quantity, curtailment & efficiency behaviour, the Flemish only score slightly lower compared to the Dutch (not significant). The overall awareness scores of both Flemish and Dutch drinking water customers is shown in Figure 4.

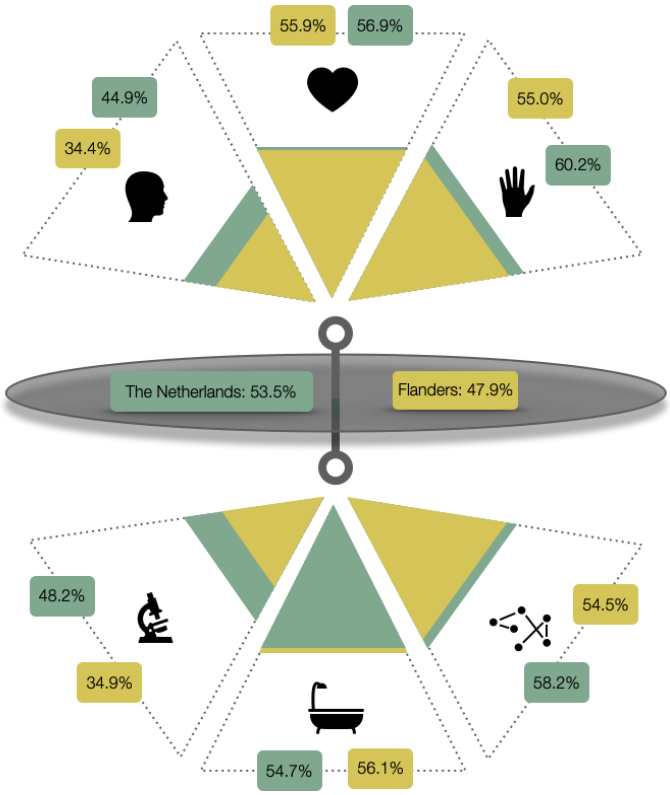

Figure 4 Tap water awareness profile of the Dutch and Flemish citizens compared.

Another aspect worthy of pointing out here relates to the segmentation. For both the Netherlands and Flanders the customer perspectives seem very useful to explain the differences in awareness between different types of customers. Indeed, in both regions we find that the perspectives show bigger and significant stronger differences compared to the more traditional, socio-demographic, segmentation. The significance of these components is even larger for Flanders, as for them the overall tap water awareness of all perspectives is significantly different ($p < .001$), whilst this only accounts for the 'aware & committed' and the 'down to earth & confident' perspectives in the Dutch case ($p < .001$).

5 Discussion and conclusion

This study on tap water awareness shows that a complex and multifaceted concept such as tap water awareness, which seems to have become a catch-all term, can be conceptualised and operationalised into a practicable empirically-based assessment framework consisting of nine awareness components. Consistent with the organizing principle of head, heart, and hands, this three-by-three dimensioned assessment framework in the first place distinguishes between cognitive, affective and behavioural awareness of tap water. In addition to this threefold conceptualisation of tap water awareness, a second distinction was made based on the substantive characteristics of drinking water: water quality, water quantity and water system.

In order test the practicability of the assessment framework, this study empirically applied it in the context of both the Netherlands and Flanders. The assessment in the Netherlands has demonstrated that the average Dutch citizen has, as previously observed by the OECD (2014), indeed a relatively low tap water awareness, especially on the cognitive dimension, relating to one's water quality comprehension (I), water consumption knowledge (II), and water system understanding (III). The scores for both affective and behavioural tap water awareness, respectively relating to one's water quality perception (IV), caring for water consumption (V), sense of responsibility (VI), and people's action in practice are slightly better, with the components 'tap water source protection' (IX) and 'curtailment & efficiency behaviour' (VIII) as positive outliers. The overall tap water awareness score for citizens in Flanders is a little lower compared to Dutch citizens, especially on the cognitive dimension this difference is rather substantial. The same goes for the components (I) water quality comprehension, (III) water system understanding, (IV) water quality perception, and (VII) quality driven behaviour. Flemish citizen, however, score higher awareness scores for the components (V) care for water, (VI) sense of responsibility, and (IX) tap water source protection.

The tap water assessment analysis becomes even more interesting when we break down the scores for the different dimensions and components to different types of customers. It is striking that in the Netherlands women score higher than men on almost all aspects of tap water awareness, whereas other socio-demographic variables were not or hardly distinctive. Segmentation based on customer perspectives on drinking water, on the other hand, shows clear differences, whereby customers with the 'aware & committed' perspective have a significantly higher and customers holding a 'down to earth & confident' perspective a significantly lower tap water awareness. The combined insight into the different customer perspectives and the proposed assessment framework may facilitate both the effective implementation and evaluation of future tap water awareness raising campaigns. After all, it is important that policy-makers recognise that efforts aimed, for instance, at enhancing people's knowledge of water-quality issues require a very different approach than those aimed at changing behaviour regarding water quantity. It is also important that they be aware that techniques that may work well for customers with, for instance, an 'aware & committed' perspective, may have an entirely different effect on customers holding a 'quality- & health-concerned' perspective.

Future research is needed to determine which strategies can best be used to increase tap water awareness of different types of customers. For the cognitive dimension strategies may include the roll-out of smart water meters in combination with frequent user feedback in terms of both litres and costs (Anda et al., 2013). For the affective dimension the implementation of citizen science projects in the field of tap water could cause customers to experience that the self-evidence of constant clean tap water may, in fact, be rather special (Brouwer et al., 2018). For the behavioural dimension, finally, the use of smart behavioural techniques such as the use of emotional shortcuts and nudging (Koop et al., 2019) may form promising strategies. In addition, it is interesting to work towards a comparable - and eventually integrated assessment framework – for also surface and groundwater.

Additional challenges that need to be addressed in the future, relate to the fact that the current study and the framework is not without limitations. First, while the gap between intentional and actual behaviour is acknowledged, the present study builds on self-reported behaviour. Second, relatively many respondents did not report their actual water consumption by checking the volume record on their latest water bill, impeding an analysis of actual consumption patterns in relation behavioural intentions, i.e. the so-called "intention-behaviour gap" (Novak et al., 2018, Willis et al., 2011).[1] Third, the context in which this research was conducted – that is, a small and wealthy country marked by its high quality of tap water and publicly owned utilities - might have influenced our results. After all, Koop et al. (2018) suggest that local contextual factors, such as the different risks, probabilities and impacts, past experiences, existing institutions and policies may considerably impact people's water awareness. Future studies could constructively build on the current research by (a) assessing actual behaviour, (b) with consent of respondents, coupling survey results to actual user data provided by utilities, and (c) applying the assessment framework in other contexts and cultures.

[1] An additional methodological reflection, i.e. an analysis whether the individual components differ statically from each other, is provided in Appendix III.

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I Appendix: Raamwerk kraanwaterbewustzijn

I.I Hoofd (kennis)

Ons hoofd staat voor kennis en weten.

Assumptie voor alle kennis vragen: Hoe meer mensen weten over de kwaliteit, hoe hoger hun bewustzijn.

Tabel 1 Operationalisering van de dimensie 'hoofd (kennis)' voor de verschillende elementen

Element	Survey vragen		Antwoorden
(I) Begrip waterkwaliteit	*I.1*	*Niet-natuurlijke stoffen zijn stoffen die door de samenleving in het milieu terecht komen. Bijvoorbeeld stoffen vanuit de industrie, de landbouw/veeteelt, ziekenhuizen en huishoudens zoals bestrijdingsmiddelen, schoonmaakmiddelen, medicijnen en cosmetica.* In kraanwater zitten …	- geen niet-natuurlijke stoffen - een kleine hoeveelheid niet-natuurlijke stoffen - een grote hoeveelheid niet-natuurlijke stoffen - weet ik niet
	I.2	Denkt u dat er aan uw kraanwater chloor wordt toegevoegd?	- ja - nee - weet niet
	I.3	Denkt u dat in Nederland/Vlaanderen de kwaliteitseisen hoger liggen voor kraanwater of voor flessenwater?	- Flessenwater - Kraanwater - De kwaliteitseisen liggen gelijk - Weet ik niet
(II) Kennis waterkwantiteit	*II.1*	Spontaan, zonder op te zoeken. Schat in hoeveel kraanwater een persoon in Nederland/Vlaanderen gemiddeld per dag gebruikt	… liter per dag
	II.2	Spontaan, zonder op te zoeken. Schat in hoeveel kraanwater er wordt gebruikt met 1 minuut douchen (standaard douchekop, geen bespaar, comfort of regendouche).	… liter per minuut
(III) Begrip watersysteem	*III.1*	Uit welke bron denkt u dat uw kraanwater wordt gemaakt?	- Grondwater - Oppervlaktewater (bijv. uit een rivier of meer) - Duinwater - Zeewater - Anders, namelijk… - Weet niet
	III.2	Wat is volgens u de naam van uw drinkwaterbedrijf?	Open vraag, met ‘weet niet’ optie
	III.3	Welke onderstaande verantwoordelijkheden behoren volgens u tot de taken van uw drinkwaterbedrijf? *Meerdere antwoorden mogelijk.*	- Beheer van zwemwater - Zuivering van rioolwater - Schoonhouden grond- en oppervlaktewater - Voorkomen van dijkdoorbraken - Zuivering van kraanwater - Levering van kraanwater - Aanleg en beheer riolering

	III.4	Wat is volgens u het juiste antwoord? Drinkwaterbedrijven zijn verantwoordelijk voor de kwaliteit van het kraanwater…	- tot het pompstation - tot en met de voordeur (watermeter) - tot het uit de kraan komt - weet niet
	III.5	Wat denkt u dat de prijs is voor 1.000 liter (1 m3) kraanwater, exclusief belastingen? *Maak een zo goed mogelijke schatting.* [Vlaanderen: Wat denkt u dat het basistarief* is voor 1.000 liter (1 m3) kraantjeswater, exclusief belastingen? ** U betaalt het basistarief voor het basisverbruik. Dat is 30 m³ per wooneenheid plus 30 m³ per inwonende per jaar.]*	…,… euro per 1000 liter

I.II Hart (voelen)

Ons hart staat voor emotie, gevoelens maar ook passie en bezieling, beleving, vertrouwen, betrokkenheid, ervaren en ervaring. Ook onze motivatie en innerlijke drijfveren komen voort uit ons hart of uit ons gevoel.

Assumptie voor alle attitude vragen: hoe minder vanzelfsprekend kraanwater is, hoe bewuster mensen zijn.

Tabel 2 Operationalisering van de dimensie 'hart (voelen)' voor de verschillende elementen

Element	Survey vragen		Antwoorden
(IV) Perceptie van de waterkwaliteit	*IV.1*	Hoe veilig ervaart u het kraanwater in Nederland/ Vlaanderen?	- Zeer veilig - Veilig - Niet veilig, maar ook niet onveilig - Onveilig - Zeer onveilig
	IV.2	Voor mij is het vanzelfsprekend dat er schoon drinkwater uit de kraan komt.	- Helemaal mee eens - Mee eens - Neutraal - Niet mee eens - Helemaal niet mee eens
	IV.3	Hoe vaak staat u stil bij de kwaliteit van uw kraanwater?	- Dagelijks - Wekelijks - Maandelijks - Een aantal keer per jaar - (Bijna) nooit
(V) Geven om water	*V.1*	Ik zou thuis graag (nog) meer kraanwater willen besparen.	- Helemaal mee eens - Mee eens - Neutraal - Niet mee eens - Helemaal niet mee eens
	V.2	24 uur per dag water uit de kraan ervaar ik iedere dag weer als bijzonder	- Ja - Nee - Wel nu ik er over nadenk
	V.3	Hoe vaak denkt u er over na hoeveel water u gebruikt?	- Bij ieder gebruik - Dagelijks

			- Wekelijks - Maandelijks - Bijna nooit
(VI) Verantwoordelijk-heidsgevoel	*VI.1*	Ik denk wel eens na over de herkomst van mijn kraanwater	- Helemaal mee eens - Mee eens - Neutraal - Niet mee eens - Helemaal niet mee eens
	VI.2	Ik voel een persoonlijke verantwoordelijkheid voor de bescherming van de waterkwaliteit van de ondergrond, sloten, rivieren en meren	- Ja - Nee - Enigszins

I.III Handen (gedrag)

Onze handen staan voor praktisch, aarden, concretiseren, uitvoeren, implementeren, in de praktijk toepassen. De ontwikkeling van de wil, het vermogen om eigen keuzes te maken en voorgenomen besluiten uit te voeren.

Assumptie voor alle handelingsvragen: Hoe meer mensen besparend, beschermend en verantwoordelijk handelen, hoe bewuster ze zijn.

Tabel 3 Operationalisering van de dimensie 'handen (gedrag)' voor de verschillende elementen

Element	Survey Vragen		Antwoorden
(VII) Kwaliteits-gestuurd gedrag	*VII.1*	Bent u in de afgelopen 24 maanden wel eens actief op zoek gegaan naar informatie over de kwaliteit en veiligheid van Nederlands/ Vlaams kraanwater (bijv. via internet of door contact op te nemen met het drinkwaterbedrijf)?	- Ja - Nee
	VII.2	Hoe vaak drinkt u thuis flessenwater zonder prik?	- Dagelijks - Meermaals per week - Meermaals per maand - Een aantal keer per jaar - Nooit
(VIII) Efficiëntie gedreven waterconsumptie	*VIII.1*	Wat doet u met de kraan tijdens het tandenpoetsen?	- Ik draai de kraan altijd dicht - Ik draai de kraan bijna altijd dicht - Ik draai de kraan soms dicht - Ik draai de kraan nooit dicht
	VIII.2	Welke van de onderstaande opties om kraanwater te besparen heeft u in uw woonhuis? (meerdere antwoorden mogelijk)	- Besparende douchekop - Waterbespaarder op de keukenkraan - Zuinige wasmachine - Anders, namelijk… - Weet niet - Geen
	VIII.3	Bekijk uw laatste periodeafrekening van uw drinkwaterbedrijf. Hoeveel kraanwater heeft u de afgelopen periode gebruikt? Noteer de hoeveelheid water, en de 2 data waartussen deze hoeveelheid water is gebruikt.	Hoeveelheid water: … m3 water Startdatum periodeafrekening: … (dd/mm/yyyy) Einddatum periodeafrekening … (dd/mm/yyyy)

(IX) Bescherming van kraanwater-bronnen	*IX.1*	Wat heeft u de afgelopen 24 maanden gedaan met uw oude medicijnen? *(als u de afgelopen 24 maanden geen oude medicijnen in huis heeft gehad, geef dan antwoord op de vraag: "Wat zou u doen met oude medicijnen?) Meerdere antwoorden mogelijk*	- Thuis laten liggen/niks - Ingeleverd bij de apotheek, winkel of milieustraat [Voor Vlaanderen: Ingeleverd bij de winkel, recyclagepark of inzamelpunt klein gevaarlijk afval (kga)] - Weggegooid in de vuilnisbak - Doorgespoeld door de gootsteen of het toilet.
	IX.2	Wat heeft u de afgelopen 24 maanden gedaan met producten zoals oude of gebruikte terpentine, afbijtmiddel, kwastontharder of oude onkruidverdelger? *(als u de afgelopen 24 maanden niet dit soort producten in huis heeft gehad, geef dan antwoord op de vraag: "Wat zou u doen met producten zoals oude of gebruikte terpentine, afbijtmiddel, kwastontharder of oude onkruidverdelger?) Meerdere antwoorden mogelijk*	- Thuis laten liggen/niks - Weggooien in de vuilnisbak - Doorspoelen door de gootsteen of het toilet - Ingeleverd bij de apotheek, winkel of milieustraat [Voor Vlaanderen: Ingeleverd bij de winkel, recyclagepark of inzamelpunt klein gevaarlijk afval (kga)]

Wel onderdeel van de vragenlijst, maar niet meegenomen in het bewustzijnsprofiel:

Tabel 4 Survey vragen die geen onderdeel zijn van het bewustzijnsprofiel

Kennis (Hoofd)	Kwantiteit	Is volgens u in Nederland/Vlaanderen het gemiddeld waterverbruik per huishouden in vergelijking met 10 jaar geleden verminderd, vermeerderd of stabiel gebleven?	- Verminderd - Stabiel gebleven - Vermeerderd - Weet niet
Handen (gedrag)	Kwantiteit	Denkt u dat uw huishouden thuis meer, minder of ongeveer hetzelfde aantal liters water verbruikt dan/als een gemiddeld Nederlands/Vlaams huishouden met dezelfde samenstelling?	- Meer - Minder - Ongeveer hetzelfde

II Appendix: Resultaten per vraag

Om het kraanwaterbewustzijn van Nederlandse en Vlaamse drinkwaterklanten te toetsen op het gebied van kraanwaterkwaliteit, kraanwaterkwantiteit en het onderliggende watersysteem zijn respondenten een set vragen gesteld zoals weergegeven in Appendix I. In onderstaande paragrafen zijn de scores voor ieder van deze vragen verder uitgewerkt. Iedere vraag heeft een individueel nummer dat als volgt is opgebouwd: component [I-IX], vraagnummer. Ter illustratie, de twee vragen over de kraanwaterkwantiteit (component II, Kennis Waterkwantiteit) zijn hier dus genummerd als II.1 & II.2. In Tabel 6 t/m 17 zijn daarnaast de vragen met betrekking tot de kwaliteit, kwantiteit en het systeem onderscheiden met verschillende kleuren (respectievelijk oranje, lichtgroen en wit). In felgroen zijn de scores weergegeven die significant verschillen van het gemiddelde van de anderen. Voor de p-waarde, die de kans *(probability)* weergeeft dat er ten onrechte een relatie tussen variabelen wordt verondersteld, geldt de legenda zoals aangeven in

Tabel 5. Een p-waarde van bijvoorbeeld 0,01 is de kans op een ten onrechte relatie tussen variabelen 1%. Bij alle significante scores is tevens de t-waarde (toetsingsgrootheid) vermeld. Hoe groter de t-waarde, des te kleiner is de kans dat het verschil op toeval berust, dus hoe groter de kans dat deze statistisch significant is.

Tabel 5 Legenda significantie: p-waarde

	p-waarde
*	p < .05
**	p < .01
***	p < .001

II.I Resultaten Hoofd (Kennis)

Nederland

Tabel 6 Behaalde scores van de Nederlandse respondenten voor alle individuele kennisvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	**Vraag**	**Totaal Score**	**Geslacht** (n=1001)	**Leeftijd** (n=996)						
				≤17	**18 -24**	**25 - 34**	**35 - 44**	**45 -54**	**55 -64**	**65≥**
Hoofd (Kennis)	**I.1**	63.9	♀ 66.5 ♂ 60.9	66.7	62.4	62.9	57.4	67.5	64.0	68.4
	I.2	40.5	♀ 40.6 ♂ 40.4	30.0	42.7	37.1	43.2	40.8	37.0	44.6
	I.3	29.4	♀ 33.5 ♂ 24.7	16.7	30.8	28.2	33.5	25.5	28.0	32.8
	II.1	23.5	♀ 25.8 ♂ 20.7	19.2	19.0	20.0	26.9	25.5	23.0	26.8
	II.2	44.9	♀ 45.6 ♂ 44.1	40.8	47.0	41.8	37.9* t = -2.351	48.7	48.8	46.9
	III.1	70.1	♀ 89.3 ♂ 47.6	65.5	74.8	61.8* t = -2.183	63.6	73.1	75.5	74.1

	III.2	26.6	♀ 24.7 ♂ 29.0	23.3	35.9* t = 2.276	26.5	23.2	22.9	28.5	24.9
	III.3	52.1	♀ 54.2 ♂ 49.8	57.8	51.9	49.6	51.1	53.5	48.9	57.0
	III.4	56.8	♀ 58.3 ♂ 54.8	58.6	54.3	55.9	54.5	60.3	55.5	59.2
	III.5	57.8	♀ 60.1 ♂ 55.1	58.3	58.5	59.9	52.7	56.2	56.5	62.7

Tabel 7 Behaalde scores van de Nederlandse respondenten voor alle individuele kennisvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	**Vraag**	**Totaal score**	**Opleiding** (n=1000)			**Klantperspectief** (n=999)			
			Laag	**Middel**	**Hoog**	**Kwaliteits- & Gezondheids-gericht (Ik)**	**Bewust & Betrokken (Wij)**	**Egalitair & Solidair (Zij)**	**Nuchter & Vol Vertrouwen (Jullie)**
Hoofd (Kennis)	**I.1**	63.9	54.6*** t = -3.411	62.5	71.4*** t = 4.159	58.1	69.8** t = 2.895	64.1	59.2
	I.2	40.5	36.3	37.0	46.93** t = 3.018	33.3* t = -2.117	46.3** t = 2.945	36.6	40.8
	I.3	29.4	31.3	28.1	29.6	27.1	32.6	28.5	27.5
	II.1	23.5	19.0** t = -2.689	24.8	25.1	27.7	24.0	22.7	21.8
	II.2	44.9	40.9* t = -2.086	44.2	48.2* t = 2.533	37.6* t = -2.095	46.4	43.8	47.8
	III.1	70.1	68.5	68.6	72.8	62.2	71.3	71.5	71.1
	III.2	26.6	15.4*** t = -5.201	25.3	35.3*** t = 5.046	23.3	31.4* t = 2.343	22.5	26.8
	III.3	52.1	50.4	51.5	53.8	46.7	52.5	49.4	57.2** t = 3.005
	III.4	56.8	55.9	55.7	58.4	58.3	60.2	51.4* t = -2.082	57.6
	III.5	57.8	51.3** t = -3.016	59.4	60.4* t = 2.028	55.0	54.6	55.5	65.7*** t = 3.930

Vlaanderen

Tabel 8 Behaalde scores van de Vlaamse respondenten voor alle individuele kennisvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	**Vraag**	**Totaal score**	**Geslacht** (n=506)	**Leeftijd** (n=504)						
				≤17	**18 -24**	**25 - 34**	**35 - 44**	**45 -54**	**55 -64**	**65≥**
Hoofd (Kennis)	**I.1**	45.1	♀ 42.9 ♂ 47.2	37.5	40.0	41.8	45.5	51.8	48.8	43.1
	I.2	10.2	♀ 9.3 ♂ 11.0	8.3	5.0** t = -3.262	8.2	8.4	13.5** t = 3.064	13.4** t = 2.954	10.1
	I.3	18.0	♀ 14.3 ♂ 21.4* t = 2.108	12.5	13.3	20.3	16.9	23.5	18.6	15.5
	II.1	26.8	♀ 28.0 ♂ 25.9	29.2	32.2	25.3	23.7	30.0	25.6	25.9
	II.2	46.1	♀ 44.2 ♂ 47.8	42.7	53.9	51.9	47.1	42.9	43.6	43.3
	III.1	46.0	♀ 46.8 ♂ 45.9	29.2	20.9*** t = -3.633	49.4	37.7	50.6	51.8	54.8** t = 2.774
	III.2	28.5	♀ 21.0 ♂	25.0	17.8	25.3	32.5	30.6	25.6	33.6

			35.4*** t = 3.665							
	III.3	48.3	♀ 48.3 ♂ 48.8	35.4	44.8** t = -2.650	36.0	48.4	53.8* t = 2.360	45.9	58.0*** t = 4.281
	III.4	57.6	♀ 51.7 ♂ - 63.3** t = 2.633	34.8	41.9	57.1	62.3	51.8	57.6	69.6*** t = 3.626
	III.5	36.3	♀ 34.7 ♂ 37.8	28.1	20.0** t = -3.138	29.4	35.7	36.5	43.6** t = 2.692	43.8** t = 2.944

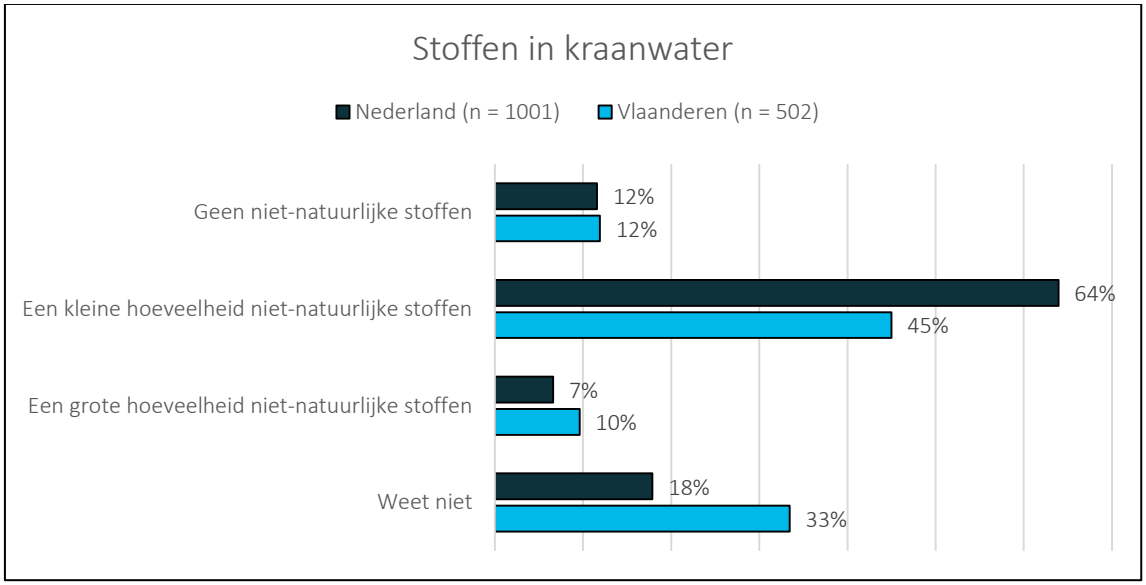
Tabel 9 Behaalde scores van de Vlaamse respondenten voor alle individuele kennisvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	**Vraag**	**Totaal score**	**Opleiding** (n=502)			**Klantperspectief** (n=501)			
			Laag	**Middel**	**Hoog**	**Kwaliteits- & Gezondheids-gericht (Ik)**	**Bewust & Betrokken (Wij)**	**Egalitair & Solidair (Zij)**	**Nuchter & Vol Vertrouwen (Jullie)**
Hoofd (Kennis)	**I.1**	45.1	37.0* t = -3.088	44.1	54.4** t = 2.537	45.2	42.1	47.4	45.6
	I.2	10.2	9.7	9.5	11.3	10.6	9.1	10.9	9.9
	I.3	18.0	13.3* t = -2.072	18.1	23.2	17.0	23.0	13.9	18.4
	II.1	26.8	26.5	23.7	30.6	20.7* t = -2.270	33.1* t = 2.227	31.9	20.8* t = -2.269
	II.2	46.1	46.4	42.5	50.2	43.3	50.2	49.3	41.0
	III.1	46.0	46.3	45.7	47.2	46.3	39.2	49.6	49.1
	III.2	27.1	35.4	28.5	24.2* t = -2.177	35.6* t = 2.011	27.8	24.1	26.3
	III.3	51.4	46.9	48.3	46.3	39.0*** t = -3.862	48.6	50.4	56.5** t = 3.127
	III.4	53.8	61.3	57.6	57.9	56.0	57.6	56.7	60.7
	III.5	38.6	35.4	36.3	35.6	31.5	39.5	36.1	38.6

(I) Begrip waterkwaliteit

I.1 In kraanwater zitten …

- geen niet-natuurlijke stoffen
- een kleine hoeveelheid niet-natuurlijke stoffen
- een grote hoeveelheid niet-natuurlijke stoffen
- weet ik niet

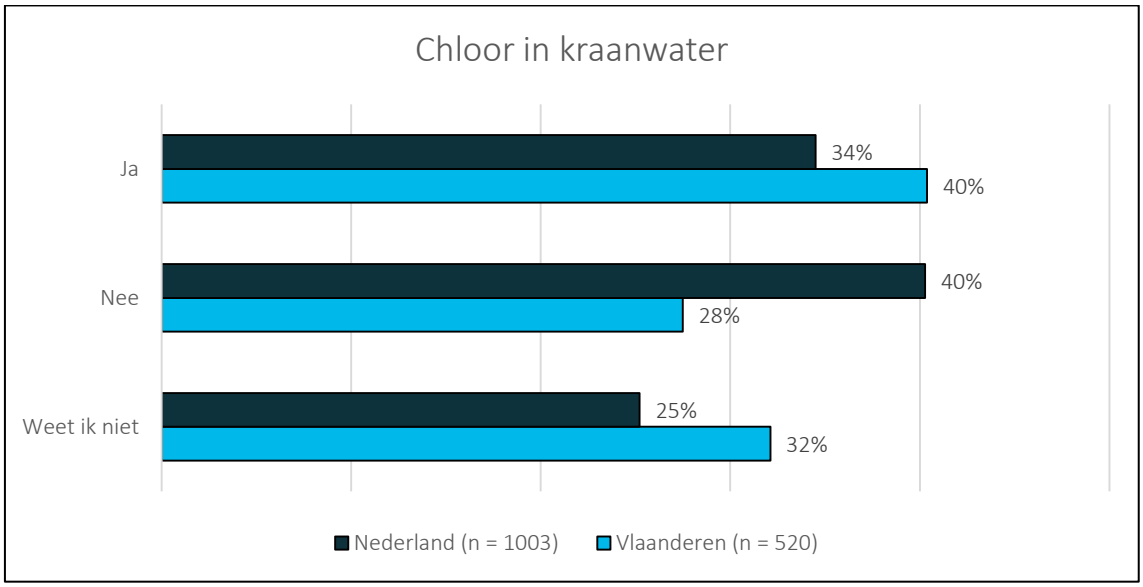


Figuur 1 Aanwezigheid niet-natuurlijke stoffen in kraanwater

I.2 Denkt u dat er aan uw kraanwater chloor wordt toegevoegd?

NB: het goede antwoord op deze vraag verschilt tussen Nederland in Vlaanderen. In Nederland wordt er geen chloor aan het water toegevoegd, terwijl dit in Vlaanderen wel het geval is.

- Ja
- Nee
- Weet ik niet

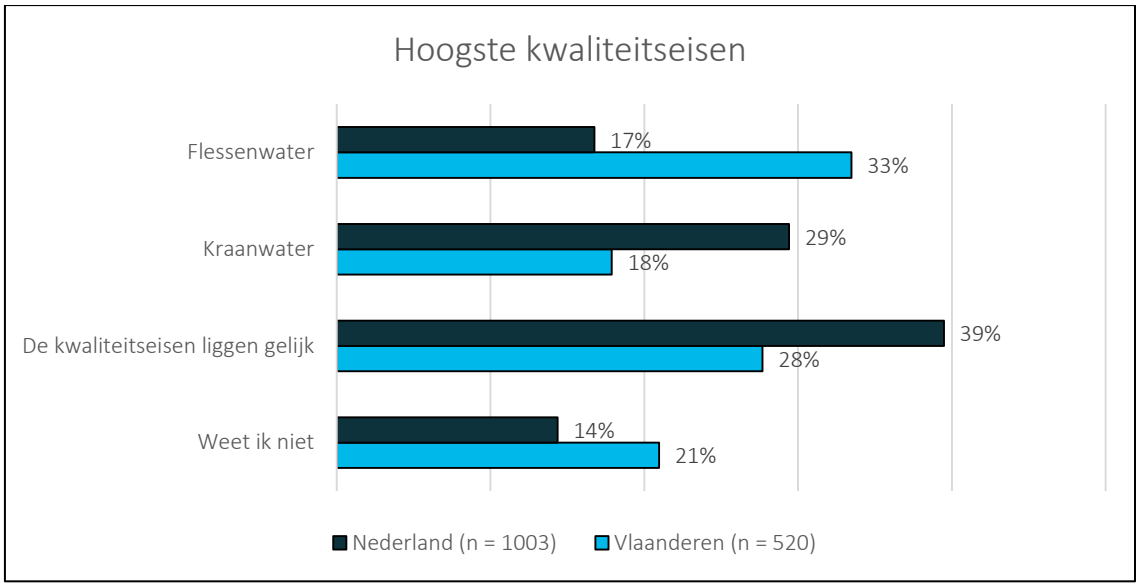


Figuur 2 Aanwezigheid chloor in kraanwater

I.3 Denkt u dat in Nederland/Vlaanderen de kwaliteitseisen hoger liggen voor kraanwater of voor flessenwater?

- Flessenwater
- Kraanwater

- De kwaliteitseisen liggen gelijk
- Weet ik niet



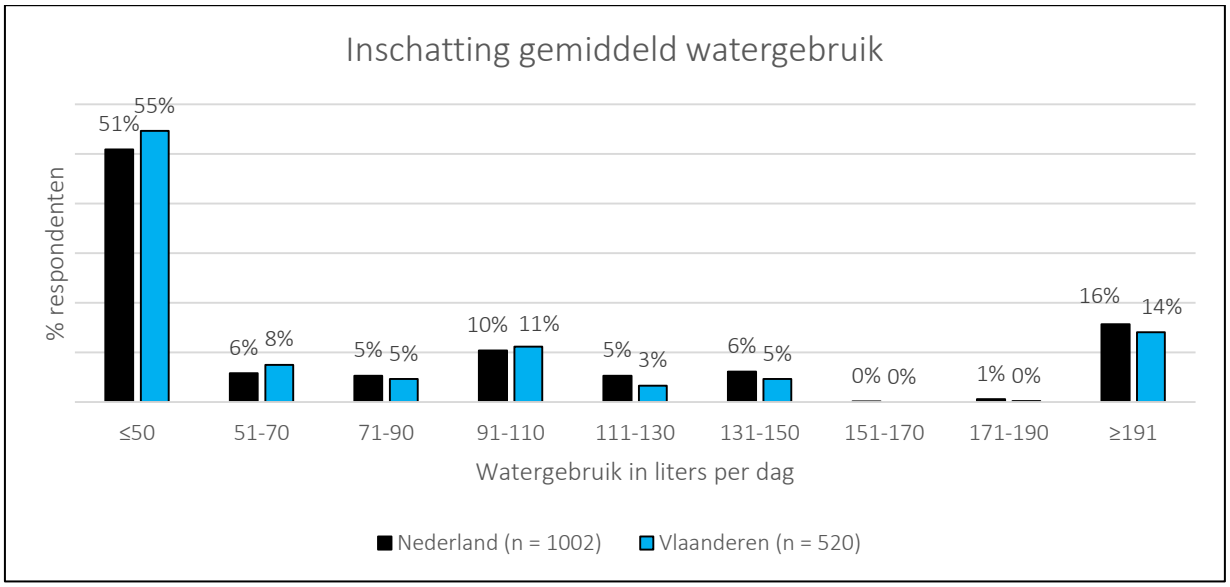
Figuur 3 Het type water met de hoogste kwaliteitseisen

(II) Kennis waterkwantiteit

II.1 Spontaan. zonder op te zoeken. Schat in hoeveel kraanwater een persoon in Nederland/Vlaanderen gemiddeld per dag gebruikt.

… liter per dag

NB: Het watergebruik per dag verschilt tussen Nederland en Vlaanderen. De gemiddelde Nederlander gebruikt 120 liter kraanwater per dag. De gemiddelde Vlaming gebruikt 110 liter per dag. Het maximaal aantal punten werd in Nederland toegekend wanneer respondenten tussen 111-130 liter schatten. In Vlaanderen was dit tussen 101-120 liter.

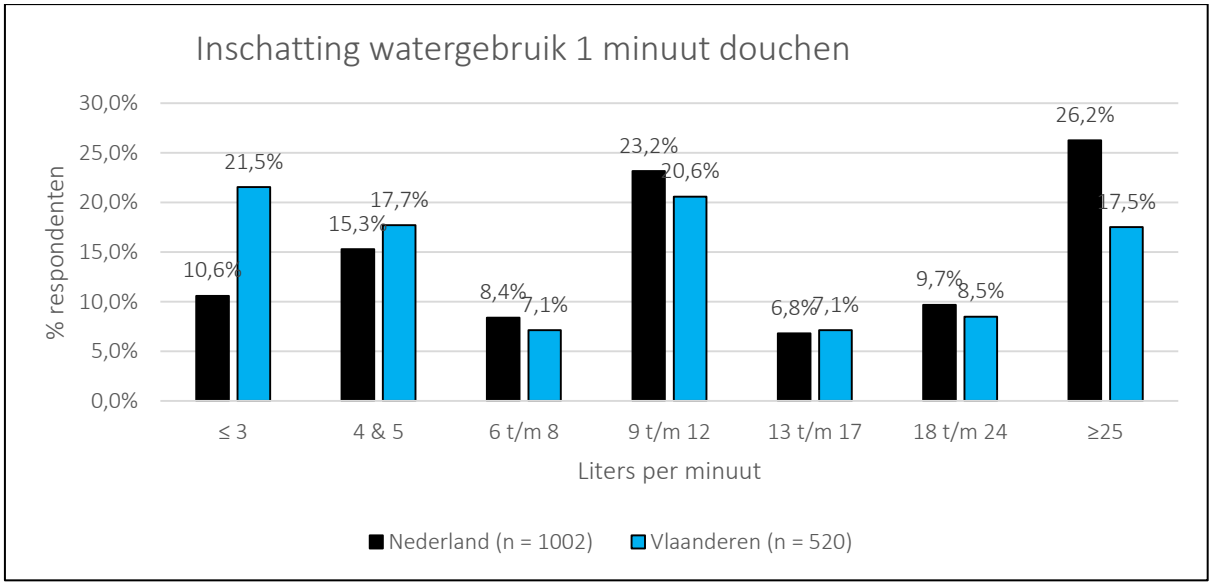


Figuur 4 Geschat watergebruik per dag

II.2 Spontaan. zonder op te zoeken. Schat in hoeveel kraanwater er wordt gebruikt met 1 minuut douchen (standaard douchekop. geen bespaar. comfort of regendouche).

… liter per minuut

NB: Het maximaal aantal punten werd toegekend wanneer respondenten het watergebruik van een minuut douchen inschatten tussen de 6-8 liter.



Figuur 5 Geschat watergebruik voor een minuut douchen[2]

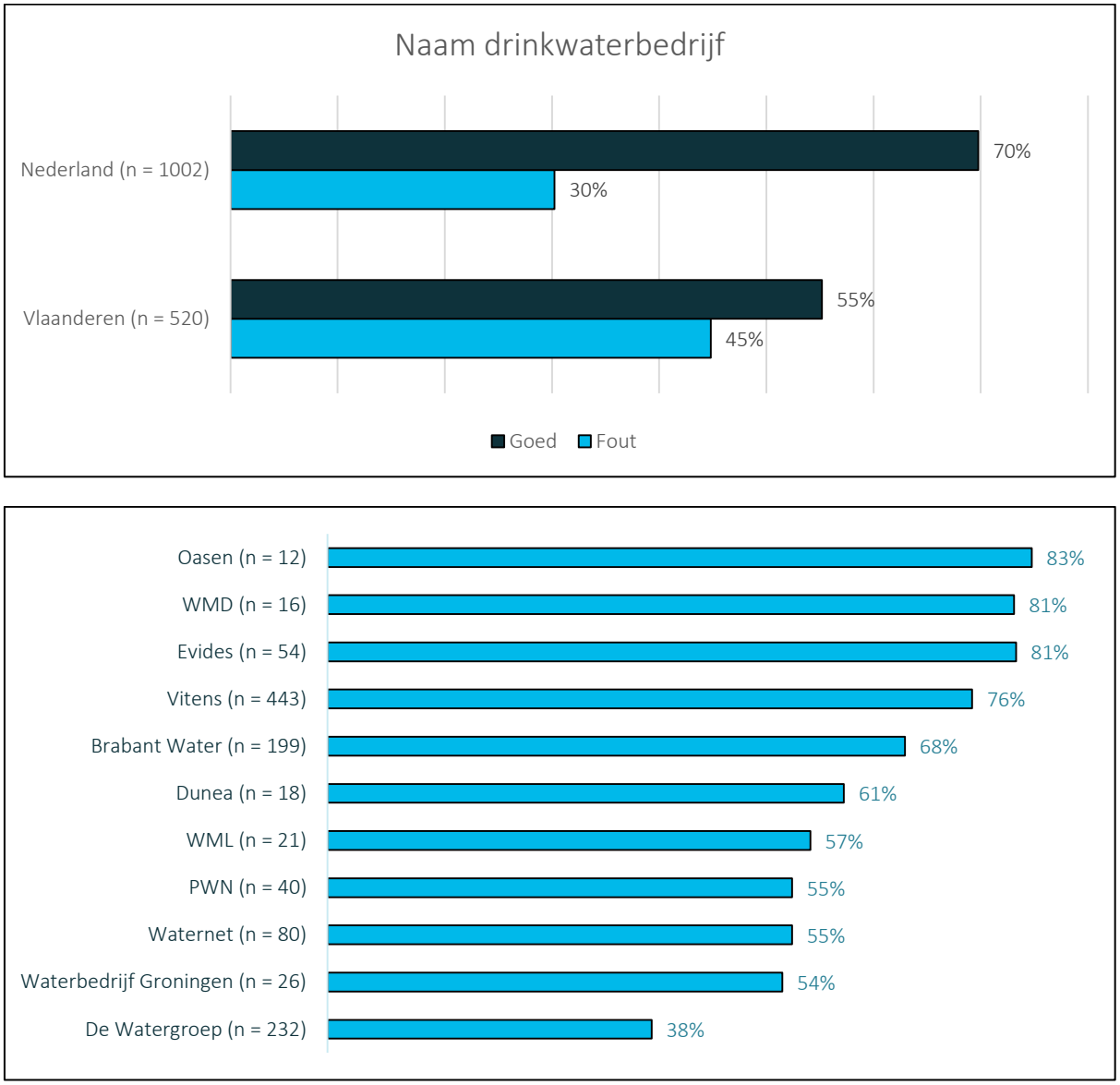
(III) Begrip watersysteem

III.1 Wat is volgens u de naam van uw drinkwaterbedrijf?

- ….
- Weet ik niet

NB: Typfouten in de spelling van de naam zijn goed gerekend. Naam van het drinkwaterbedrijf is gecontroleerd aan de hand van de postcode.

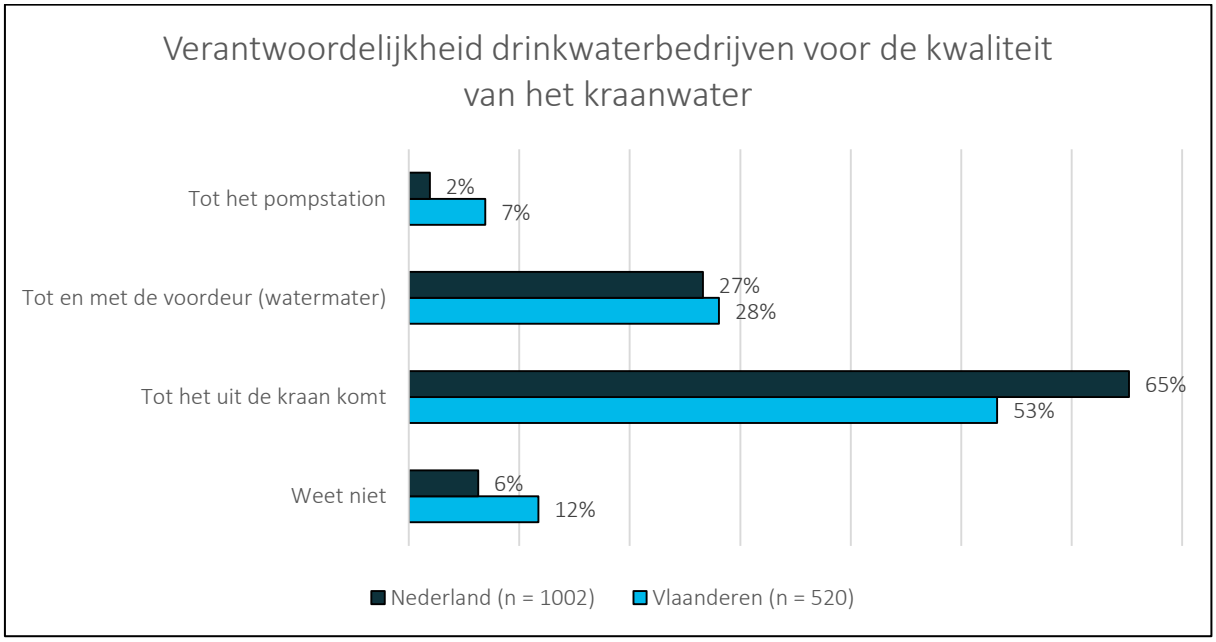
[2] Nadere analyse (Appendix II, tabel 7 en 9, vragen II.1 & II.2) laat zien dat lager opgeleiden (in NL significant) lager én hoger opgeleiden (in NL significant) hoger scoren op deze schattingsvraag. Het valt niet uit te sluiten dat dit samenhangt met het vermogen goed abstract te kunnen denken.



Figuur 6 Naam eigen drinkwaterbedrijf (boven: totaal NL en VL, onder: per dwb)

III.2 Wat is volgens u het juiste antwoord? Drinkwaterbedrijven zijn verantwoordelijk voor de kwaliteit van het kraanwater…

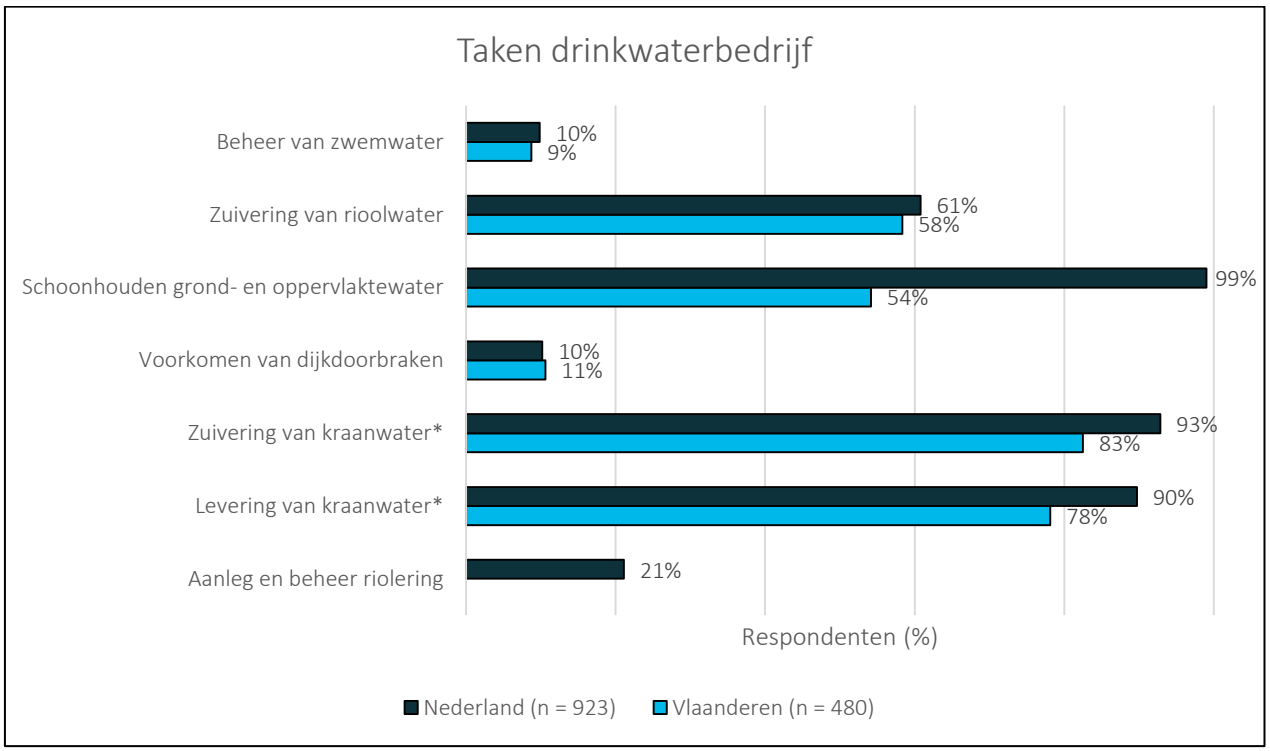
- tot het pompstation
- tot en met de voordeur (watermeter)
- tot het uit de kraan komt
- weet niet



Figuur 7 Verantwoordelijkheid voor de kwaliteit van het kraanwater

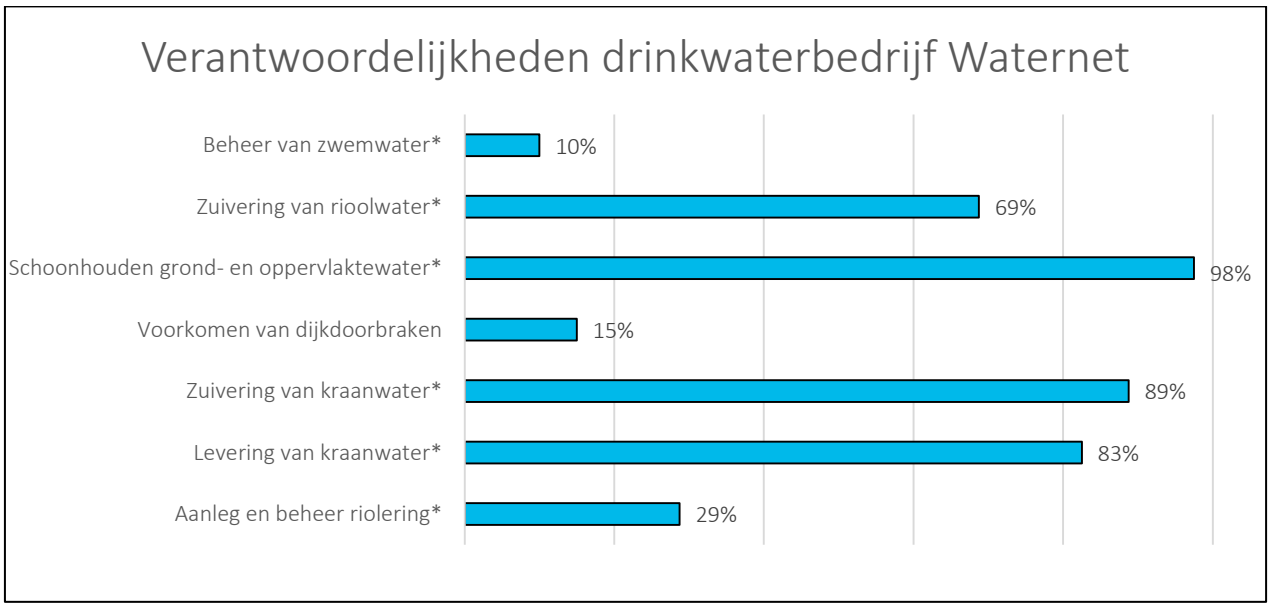
III.3 Welke onderstaande verantwoordelijkheden behoren volgens u tot de taken van uw drinkwaterbedrijf? Meerdere antwoorden mogelijk.

- Beheer van zwemwater
- Zuivering van rioolwater
- Schoonhouden grond- en oppervlaktewater
- Voorkomen van dijkdoorbraken
- Zuivering van kraanwater
- Levering van kraanwater
- Aanleg en beheer riolering (NB: gezien de verdeling van de verantwoordelijkheid voor aanleg en beheer riolering in Vlaanderen per gemeente verschilt is deze antwoord categorie voor Vlaanderen niet meegenomen).

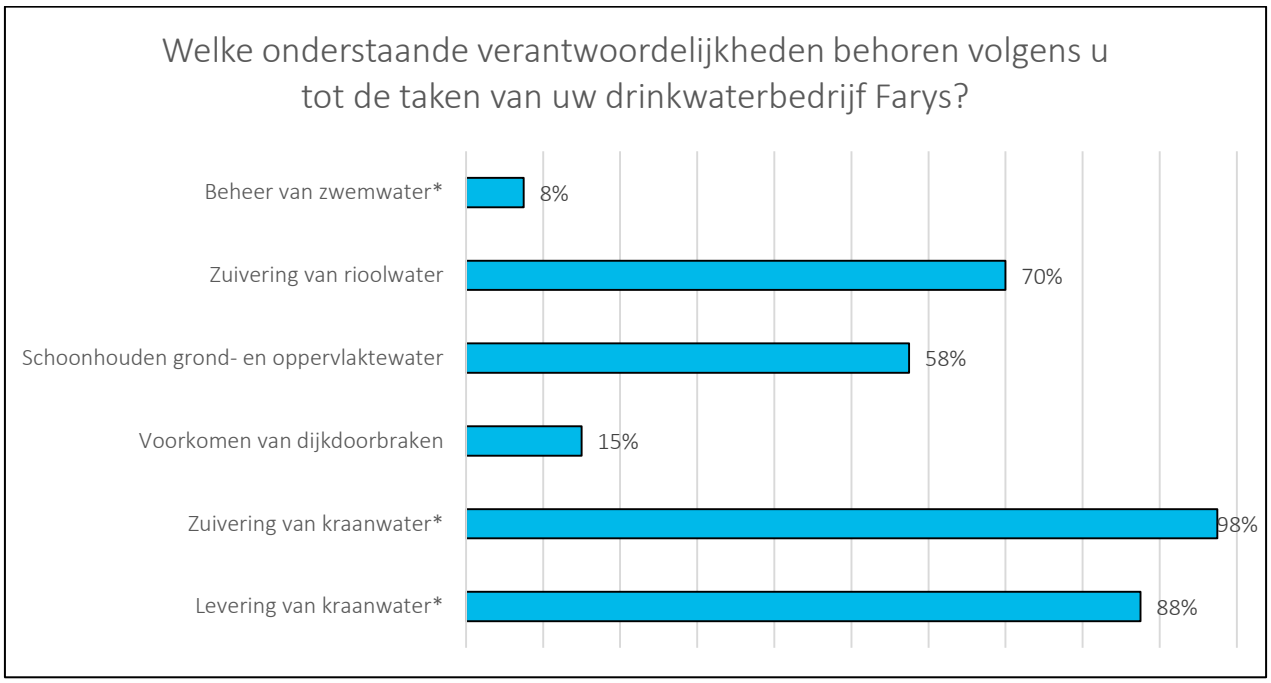


Figuur 8 Verantwoordelijkheden van het drinkwaterbedrijf.

NB: gezien Waternet gericht is op de gehele watercyclus, verschillen de taken van dit drinkwaterbedrijf van die van andere drinkwaterbedrijven in Nederland en Vlaanderen. Waternet is daarom niet meegenomen in Figuur 8. Daarnaast heeft ook waterbedrijf Farys in Vlaanderen andere taken dan de andere drinkwaterbedrijven gezien zij ook verantwoordelijk zijn voor het beheer van zwemwater. In Figuur 9 staan de antwoorden van de klanten van Waternet los weergegeven en in Figuur 10 die van Farys.



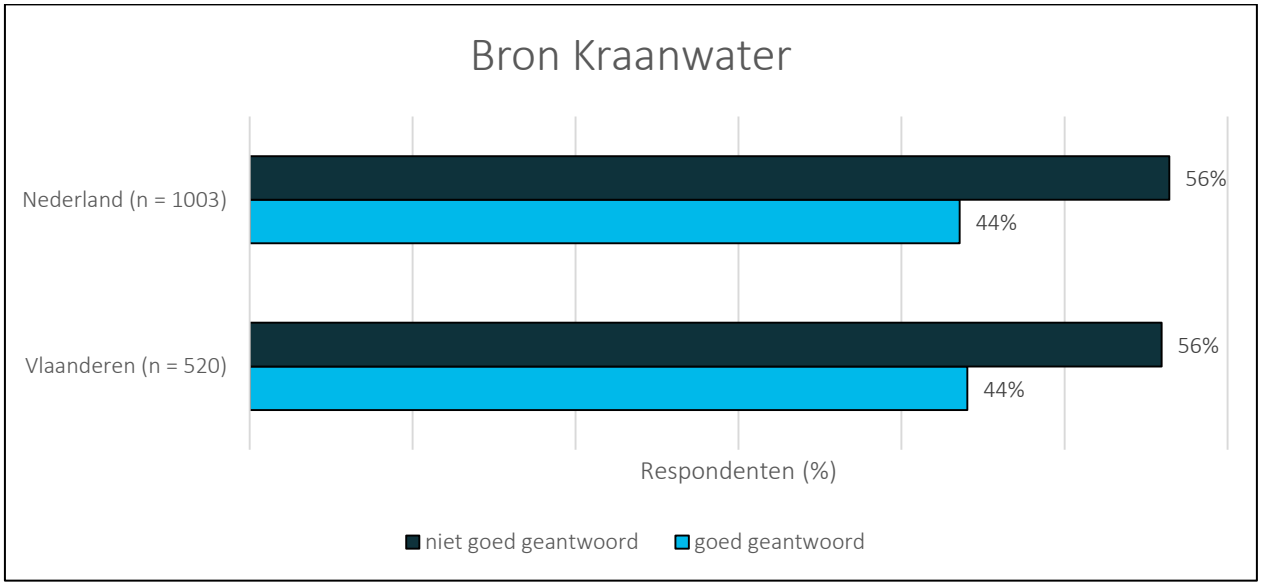
Figuur 9 Verantwoordelijkheden drinkwaterbedrijf Waternet volgens klanten.



Figuur 10 Verantwoordelijkheden drinkwaterbedrijf Farys volgens klanten

III.4 Uit welke bron denkt u dat uw kraanwater wordt gemaakt?

- Grondwater
- Oppervlaktewater (bijv. uit een rivier of meer)
- Duinwater
- Zeewater
- Anders. namelijk…
- Weet niet



Figuur 11 Bron drinkwater volgens klanten

III.5 [Nederland]Wat denkt u dat de prijs is voor 1.000 liter (1 m3) kraanwater. exclusief belastingen? *Maak een zo goed mogelijke schatting.*

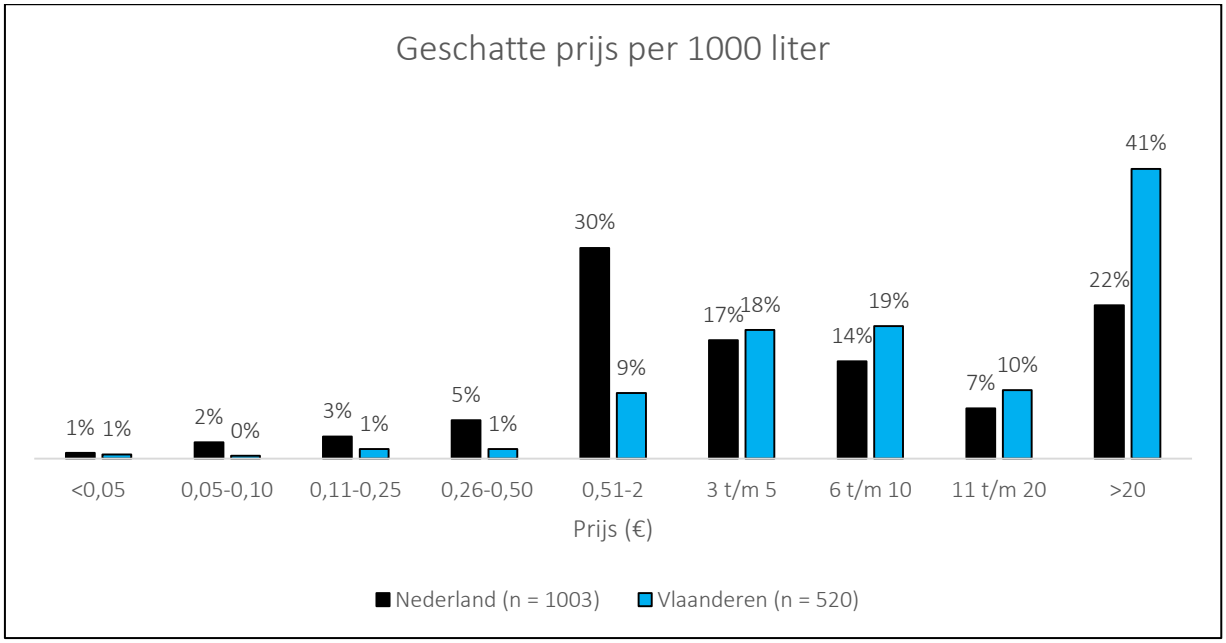
……. € per 1000 liter

[Vlaanderen] Wat denkt u dat het basistarief* is voor 1.000 liter (1 m3) kraantjeswater, exclusief belastingen? *Maak een zo goed mogelijke schatting.*

** U betaalt het basistarief voor het basisverbruik. Dat is 30 m³ per wooneenheid plus 30 m³ per inwonende per jaar*

… ……. € per 1000 liter

NB: De prijs voor kraanwater verschilt per drinkwaterbedrijf. In Nederland ligt de prijs gemiddeld lager dan in Vlaanderen. Nederlandse klanten kregen het maximale aantal punten als zij de prijs tussen de 0,51-2,00 euro schatten. Voor Vlaanderen was dit tussen de 1,01-2,50 euro. In Vlaanderen



Figuur 12 Geschatte prijs van 1000 liter kraanwater.

II.II Resultaten Hart (Voelen)

Nederland

Tabel 10 Behaalde scores van de Nederlandse respondenten voor alle individuele attitudevragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	**Vraag**	**Totaal Score**	**Geslacht** (n=1001)	**Leeftijd** (n=996)						
				≤17	**18 -24**	**25 - 34**	**35 - 44**	**45 -54**	**55 -64**	**65≥**

Hart (Voelen)	IV.1	83.9	♀ 83.3 ♂ 84.7	82.5	87.6* t = 2.443	82.4	82.2	81.7	84.6	86.2
	IV.2	16.9	♀ 17.7 ♂ 16.0	22.5	17.9	16.2	17.4	18.5	15.6	15.3
	IV.3	37.9	♀ 42.4 ♂ 32.6	42.5	32.7	36.9	36.3	46.0** t = 2.714	37.6	35.5
	V.1	67.9	♀ 69.4 ♂ 66.2	68.3	67.9	66.3	64.4* t = -2.018	70.4	70.8	67.4
	V.2	58.3	♀ 64.2 ♂ 51.4	68.3	57.3	57.1	59.4	62.4	60.5	50.8** t = -2.938
	V.3	47.1	♀ 52.1 ♂ 41.0*** t = - 3.452	50.8	42.5	43.4	42.1	56.5*** t = 3.942	51.4	43.5
	VI.1	58.3	♀ 62.0 ♂ 53.7	65.0	55.3	59.3	54.4* t = -2.082	64.0* t = 2.457	58.9	55.7
	VI.2	58.2	♀ 63.5 ♂ 51.7	58.3	58.1	55.6	58.1	61.8	57.8	57.3

Tabel 11 Behaalde scores van de Nederlandse respondenten voor alle individuele attitudevragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	Vraag	Totaal score	**Opleiding** (n=1000)			**Klantperspectief** (n=999)			
			Laag	Middel	Hoog	Kwaliteits- & Gezondheids -gericht (Ik)	Bewust & Betrokken (Wij)	Egalitair & Solidair (Zij)	Nuchter & Vol Vertrouwen (Jullie)
Hart (Voelen)	IV.1	83.9	79.4*** t = -4.034	84.6	86.3*** t = 3.284	71.3*** t = -5.856	87.2*** t = 5.090	81.6	88.4*** t = 6.096
	IV.2	16.9	15.3	16.6	18.3	20.5* t = 2.002	18.4	18.0	12.2*** t = -4.637
	IV.3	37.9	35.5	37.0	40.4	50.0*** t = 4.194	42.8	42.3* t = 2.028	21.4*** t = -10.123
	V.1	67.9	66.9	68.6	67.9	66.3	74.9*** t = 7.033	69.7* t = 2.123	58.0*** t = -7.600
	V.2	58.3	62.3	58.4	55.7	62.8	62.5* t = 2.179	63.6** t = 2.634	45.5*** t = -6.616
	V.3	47.1	46.5	45.4	49.0	55.2** t = 3.217	53.4*** t = 3.704	52.0** t = 2.669	29.9*** t = -8.840
	VI.1	58.3	57.7	56.3	60.7* t = 2.096	67.1*** t = 4.601	65.2*** t = 4.638	58.0	45.6*** t = -9.034
	VI.2	58.2	57.9	55.7	60.7	65.1* t = 2.393	66.6*** t = 4.581	59.0	43.4*** t = -7.661

Vlaanderen

Tabel 12 Behaalde scores van de Vlaamse respondenten voor alle individuele attitudevragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	Vraag	Totaal score	Geslacht (n=506)	**Leeftijd** (n=504)						
				≤17	18 -24	25 - 34	35 - 44	45 -54	55 -64	65≥
Hart (Voelen)	IV.1	67.1	♀ 65.7 ♂ 68.4	69.8	63.1	66.9	69.6	65.4	67.6	67.5
	IV.2	16.3	♀ 16.5 ♂ 15.9	14.6	22.8	24.7** t = 2.955	18.8	16.2	14.5	8.2*** t = -6.042

	IV.3	44.1	♀ 46.2 ♂ 42.4	45.8	47.8	44.9	40.6	44.1	44.5	43.8
	V.1	71.1	♀ 72.1 ♂ 70.2	76.0	73.3	67.1	66.2* t = -2.140	74.1	72.4	72.0
	V.2	57.5	♀ 58.4 ♂ 56.5	45.8	58.9	47.5* t = -2.036	53.2	57.1	59.9	67.7*** t = 3.562
	V.3	53.6	♀ 55.1 ♂ 52.2	51.0	55.6	55.1	50.0	55.9	48.3	56.9
	VI.1	64.7	♀ 63.2 ♂ 66.1	69.8	69.4	57.3** t = -2.615	55.2** t = -3.024	65.0	71.2* t = 2.357	68.1
	VI.2	61.3	♀ 59.2 ♂ 62.7	70.8	54.4	62.0	54.5	61.2	64.5	63.8

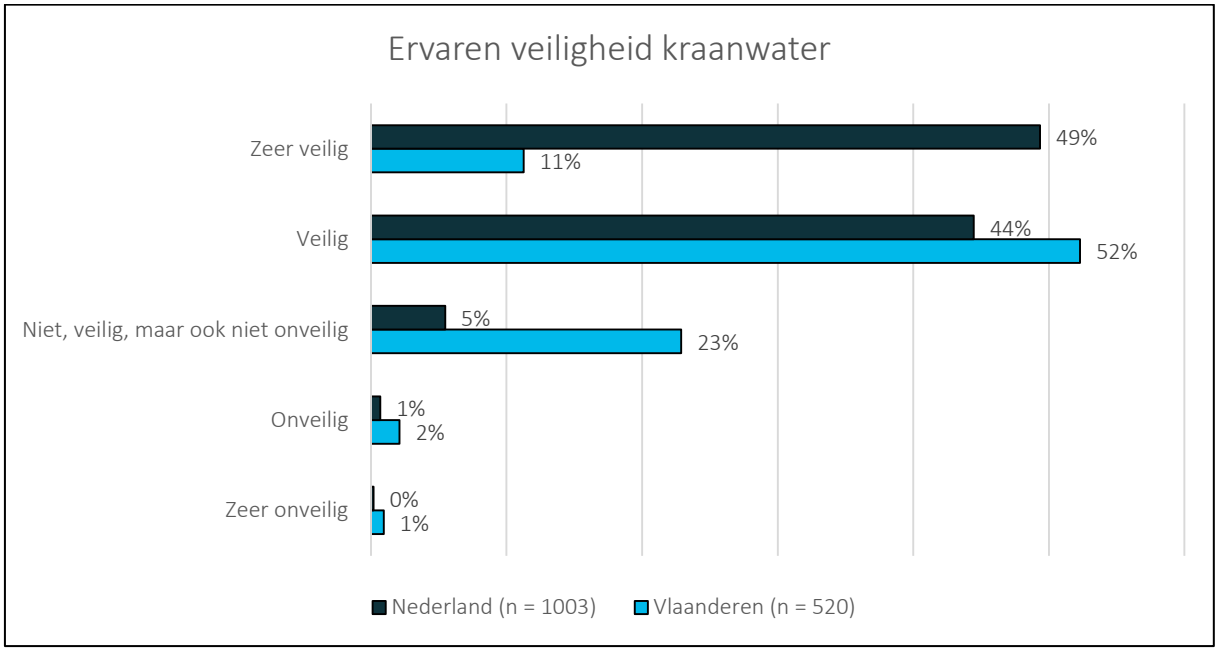
Tabel 13 Behaalde scores van de Vlaamse respondenten voor alle individuele attitudevragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	**Vraag**	**Totaal score**	**Opleiding** (n=504)			**Klantperspectief** (n=501)			
			Laag	**Middel**	**Hoog**	**Kwaliteits- & Gezondheids-gericht (Ik)**	**Bewust & Betrokken (Wij)**	**Egalitair & Solidair (Zij)**	**Nuchter & Vol Vertrouwen (Jullie)**
Hart (Voelen)	**IV.1**	67.1	62.6* t = -2.448	69.1	69.1	54.0*** t = -6.149	74.9*** t = 3.831	72.0* t = 2.532	68.2
	IV.2	16.3	17.1	15.1	16.6	20.9** t = 2.827	18.1	13.9	11.8** t = -2.817
	IV.3	44.1	42.0	41.2	49.2* t = 2.253	55.4*** t = 4.159	42.9	40.3	36.6* t = -2.280
	V.1	71.1	68.8	70.5	73.6* t = 2.025	71.7	74.4* t = 2.034	72.3	65.4** t = -3.034
	V.2	57.5	60.0	54.2	58.8	58.1	63.1* t = 2.081	59.5	48.2** t = -2.823
	V.3	53.6	54.4	50.7	56.4	58.9* t = 2.551	57.9	53.8	42.1*** t = -3.986
	VI.1	64.7	66.5	61.2* t = -2.151	66.6	74.8*** t = 5.864	66.7	63.5	52.0*** t = -5.031
	VI.2	61.3	54.8* t = -2.530	65.0	63.4	70.4*** t = 3.454	65.9	64.2	42.1*** t = -6.196

(IV) Perceptie waterkwaliteit

IV.1 Hoe veilig ervaart u het kraanwater?

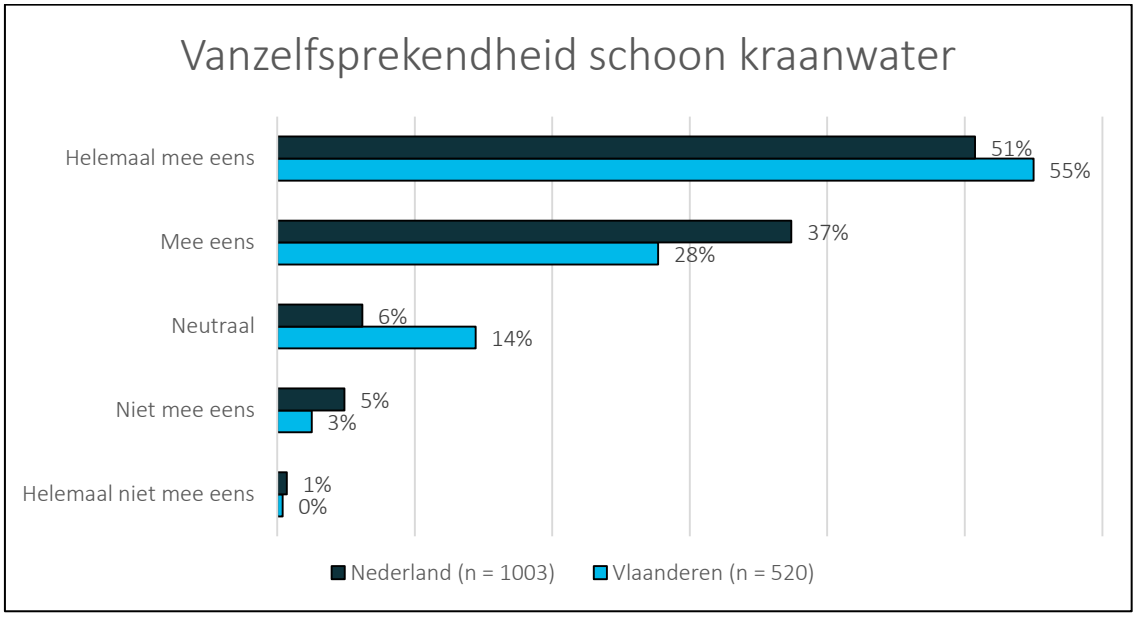
- Zeer veilig
- Veilig
- Niet veilig. maar ook niet onveilig
- Onveilig
- Zeer onveilig



Figuur 13 Ervaren veiligheid van het kraanwater

IV.2 Voor mij is het vanzelfsprekend dat er schoon kraanwater uit de kraan komt in Nederland/Vlaanderen.

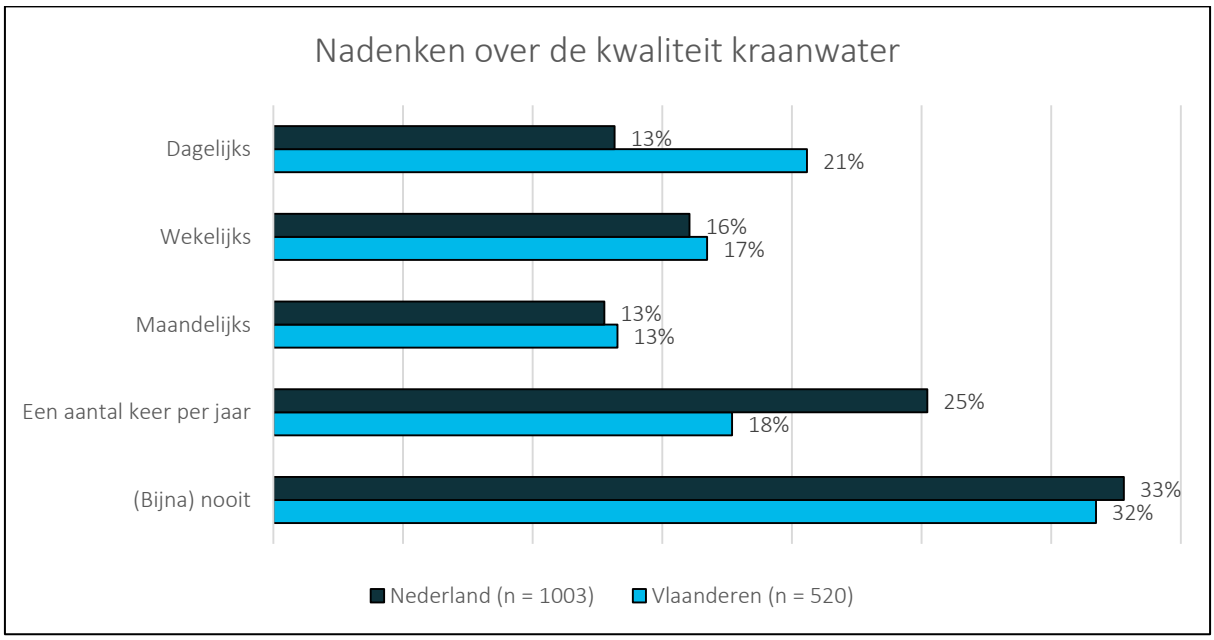
- Helemaal mee eens
- Mee eens
- Neutraal
- Niet mee eens
- Helemaal niet mee eens



Figuur 14 Vanzelfsprekendheid schoon kraanwater

IV.3 Hoe vaak staat u stil bij de kwaliteit van uw kraanwater?

- Dagelijks
- Wekelijks
- Maandelijks
- Een aantal keer per jaar
- (Bijna) nooit

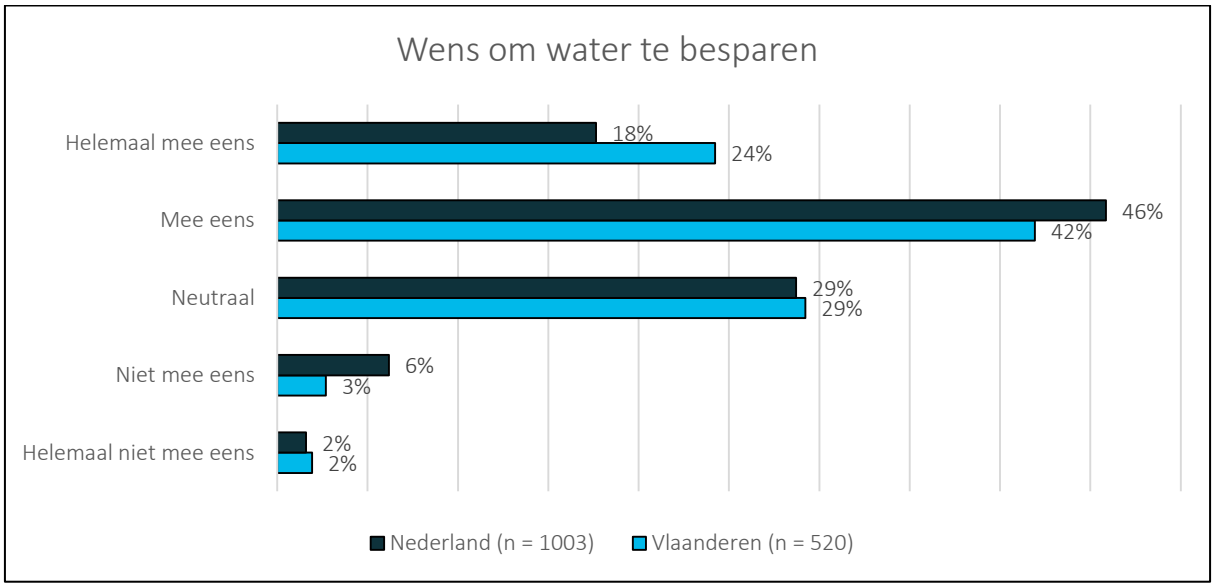


Figuur 15 Frequentie waarop klanten stil staan bij de kwaliteit van kraanwater

(V) Geven om water

V.1 Ik zou thuis graag (nog) meer kraanwater willen besparen.

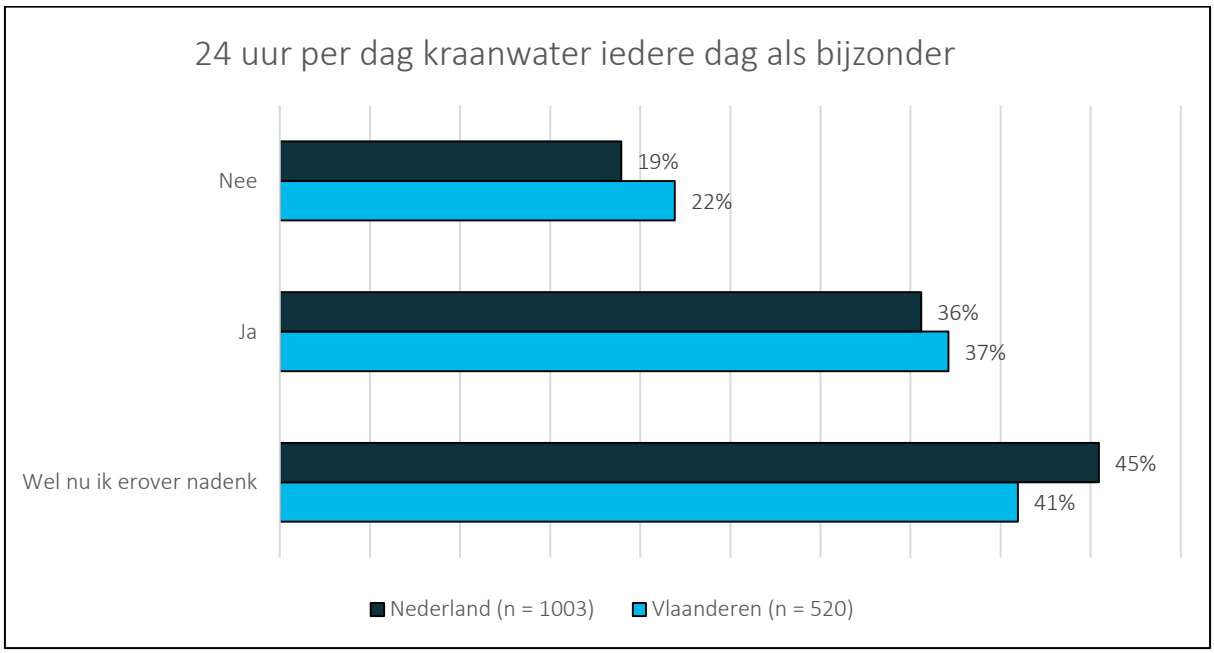
- Helemaal mee eens
- Mee eens
- Neutraal
- Niet mee eens
- Helemaal niet mee eens



Figuur 16 Of klanten de wens hebben om water te besparen

V.2 Bent u het eens met de onderstaande stelling?
24 uur per dag water uit de kraan ervaar ik iedere dag weer als bijzonder.

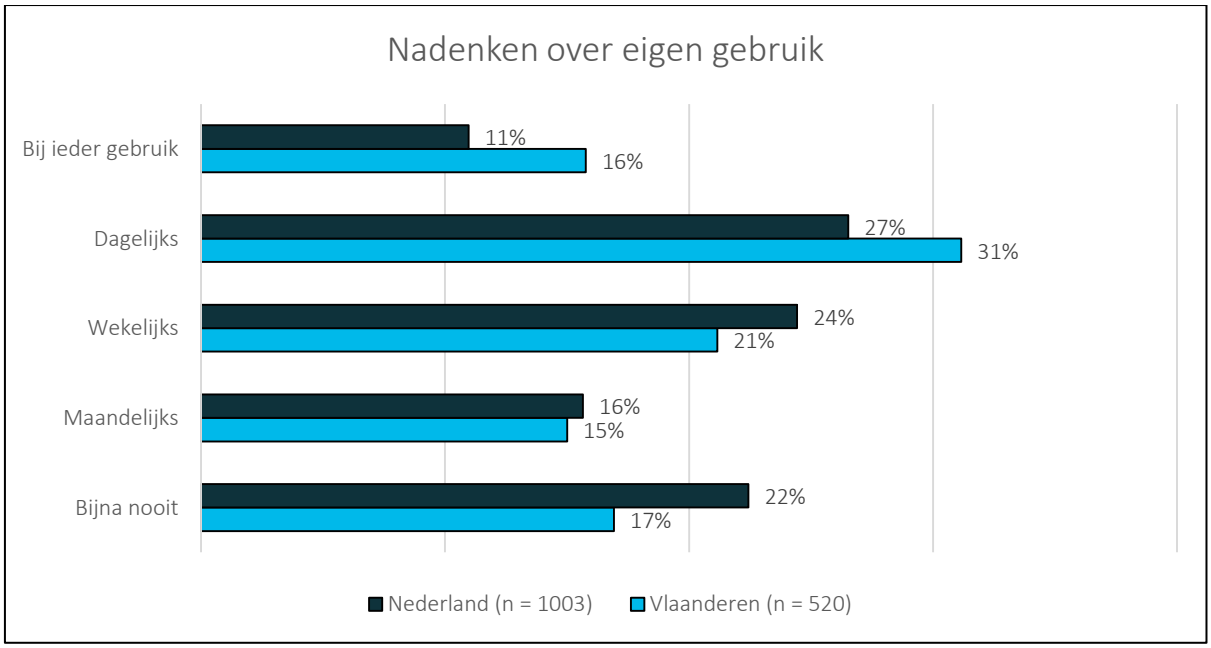
- Nee
- Ja
- Wel nu ik erover nadenk



Figuur 17 Kraanwater ervaren als iets bijzonders

V.3 Hoe vaak denkt u er over na hoeveel water u gebruikt?

- Bij ieder gebruik
- Dagelijks
- Wekelijks
- Maandelijks
- Bijna nooit

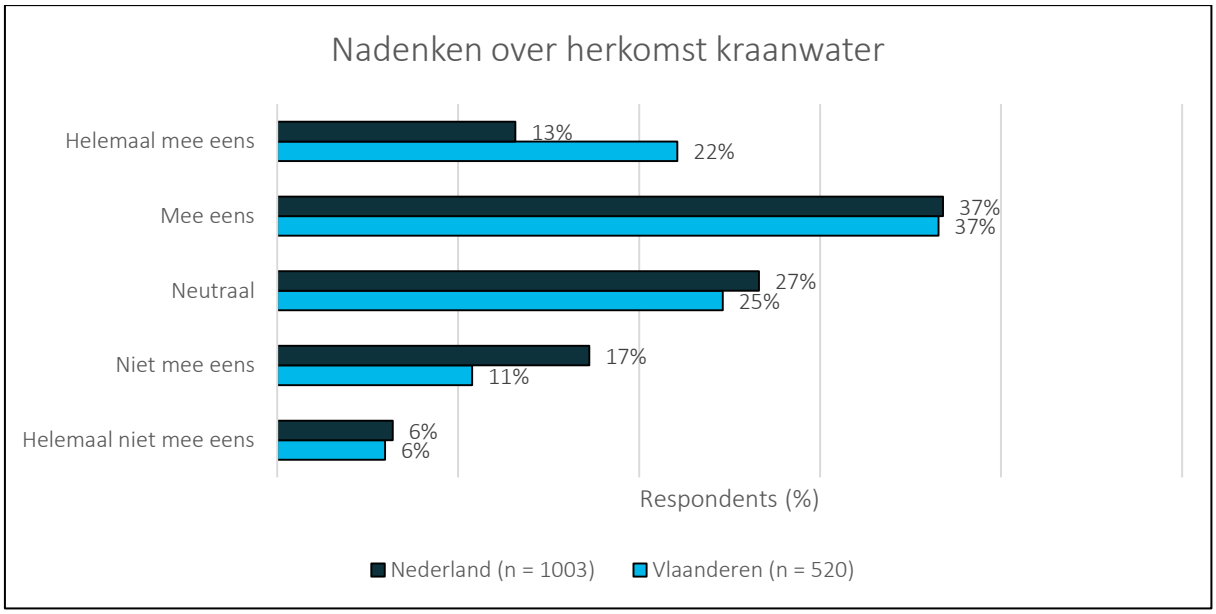


Figuur 18 Frequentie waarop klanten nadenken over hoeveel kraanwater zijn gebruiken

(VI) Verantwoordelijkheidsgevoel

VI.1 Ik denk wel eens na over de herkomst van mijn kraanwater

- Helemaal mee eens
- Mee eens
- Neutraal
- Niet mee eens
- Helemaal niet mee eens

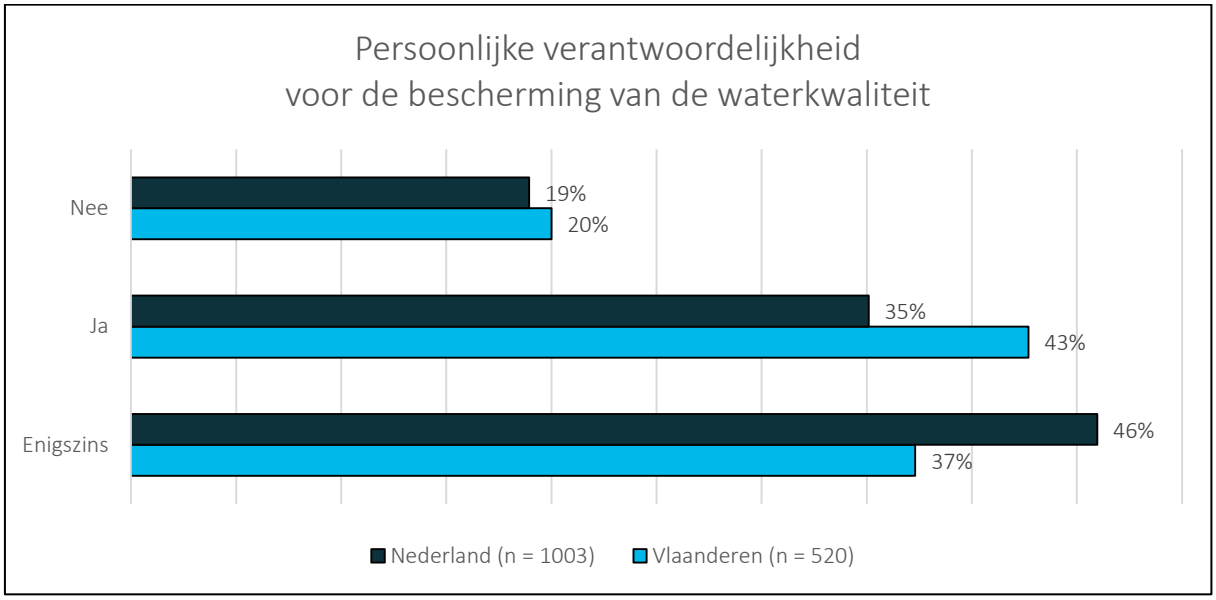


Figuur 19 Nadenken over herkomst water

VI.2 Bent u het eens met de onderstaande stelling?

Ik voel een persoonlijke verantwoordelijkheid voor de bescherming van de waterkwaliteit van de ondergrond. sloten. rivieren en meren.

- Nee
- Ja
- Enigszins



Figuur 20 Gevoel van verantwoordelijkheid voor de bescherming van de waterkwaliteit

II.III Resultaat Handen (Gedrag)

Nederland

Tabel 14 Behaalde scores van de Nederlandse respondenten voor alle individuele gedragsvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	Vraag	Totaal Score	Geslacht (n=1001)	Leeftijd (n=996)						
				≤17	18 -24	25 - 34	35 - 44	45 -54	55 -64	65≥
Handen (Gedrag)	VII.1	11.4	♀ 11.9 ♂ 10.9	16.7	12.8	11.2	13.5	13.4	7.5* t = -2.276	10.3
	VII.2	65.5	♀ 66.0 ♂ 64.8	65.6	65.2	63.5	62.0	68.0	67.2	67.0
	VIII.1	89.5	♀ 90.2 ♂ 88.8	92.5	88.7	91.6	88.4	87.9	88.9	91.0
	VIII.2	51.9	♀ 58.4 ♂ 44.3	51.7	44.7* t = -2.347	50.7	50.5	54.3	52.9	55.8
	IX.1	71.5	♀ 70.2 ♂ 73.3	66.1	60.2*** t = -3.521	65.0	78.2	76.7* t = 2.040	70.3	76.7
	IX.2	72.0	♀ 71.7 ♂ 72.9	62.5	64.7* t = -2.068	70.7	75.2	73.1	72.6	76.3* t = 2.378

Tabel 15 Behaalde scores van de Nederlandse respondenten voor alle individuele gedragsvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	Vraag	Totaal score	Opleiding (n=1000)			Klantperspectief (n=999)			
			Laag	Middel	Hoog	Kwaliteits- & Gezondheids-gericht (Ik)	Bewust & Betrokken (Wij)	Egalitair & Solidair (Zij)	Nuchter & Vol Vertrouwen (Jullie)
Handen (Gedrag)	VII.1	11.4	6.3*** t = -3.438	10.1	16.2*** t = 3.559	24.8*** t = 3.872	12.8	8.5** t = -2.749	6.4*** t = -4.133
	VII.2	65.5	61.5	65.0	68.5* t = 2.240	53.0*** t = -3.730	71.5*** t = 4.147	63.8	65.7
	VIII.1	89.5	87.1	89.6	91.0	84.5* t = -2.144	92.5*** t = 3.404	90.6	87.2
	VIII.2	51.9	52.7	53.9	49.3	56.8* t = 2.104	53.0	53.5	46.5*** t = -3.337
	IX.1	71.5	79.8*** t = 5.032	72.4	64.5*** t = -5.215	66.1	74.1	75.5	66.6
	IX.2	72.0	78.5*** t = 3.554	70.2	69.8	68.0	73.7	76.3** t = 2.597	67.4* t = -2.362

Vlaanderen

Tabel 16 Behaalde scores van de Vlaamse respondenten voor alle individuele gedragsvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	Vraag	Totaal score	Geslacht (n=506)	Leeftijd (n=504)						
				≤17	18 -24	25 - 34	35 - 44	45 -54	55 -64	65≥
Handen (Gedrag)	VII.1	12.3	♀ 12.6 ♂ 11.8	12.5	13.3	17.7	14.3	11.8	7.0	11.2
	VII.2	37.7	♀ 38.5 ♂ 37.1	43.8	30.4	35.0	39.4	37.1	42.6	36.9
	VIII.1	88.5	♀ 90.7 ♂ 86.9	86.5	88.3	89.6	85.1	90.9	89.0	88.4

	VIII.2	49.5	♀ 49.1 ♂ 49.9	55.2	37.2* t = -2.513	48.4	41.2* t = -2.239	52.9	56.7* t = 2.586	51.3
	IX.1	68.1	♀ 65.1 ♂ 70.7	58.3	46.4*** t = -3.847	42.6*** t = -5.915	59.0	75.6** t = 3.027	76.9*** t = 3.617	88.5*** t = 8.473
	IX.2	78.6	♀ 76.5 ♂ 80.8	70.8	60.6** t = -3.332	60.1*** t = -4.382	75.0	85.0** t = 3.149	87.5*** t = 4.230	90.9*** t = 6.817

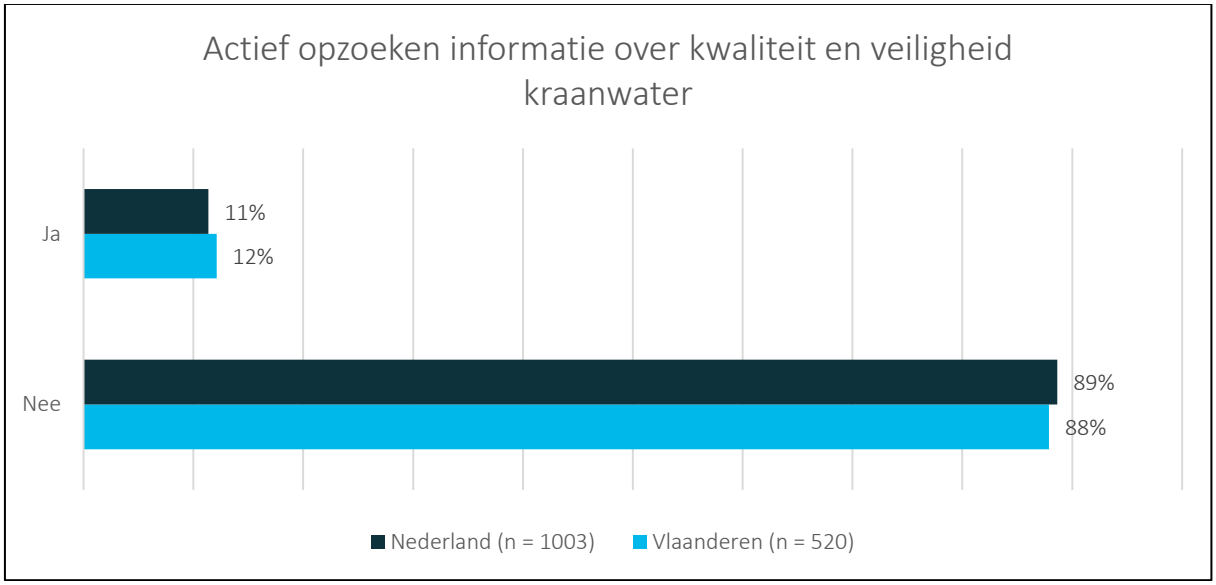
Tabel 17 Behaalde scores van de Vlaamse respondenten voor alle individuele gedragsvragen. In oranje de vragen met betrekking tot kraanwaterkwaliteit, in lichtgroen de vragen met betrekking tot waterkwantiteit en in het wit de vragen met betrekking tot het watersysteem. In het felgroen de scores die significant verschillen van de gemiddelde score van de andere groepen.

Dimensie	**Vraag**	**Totaal score**	**Opleiding** (n=504)			**Klantperspectief** (n=501)			
			Laag	**Middel**	**Hoog**	**Kwaliteits- & Gezondheids-gericht (Ik)**	**Bewust & Betrokken (Wij)**	**Egalitair & Solidair (Zij)**	**Nuchter & Vol Vertrouwen (Jullie)**
Handen (Gedrag)	**VII.1**	12.3	6.7** t = -2.763	10.7	19.5** t = 3.028	14.8	14.3	11.7	7.9
	VII.2	37.7	36.4	39.4	37.0	29.0** t = -3.177	44.8* t = 2.239	39.1	38.6
	VIII.1	88.5	88.0	86.3	91.9* t = 2.549	86.9	92.9** t = 2.764	90.3	83.3* t = -2.269
	VIII.2	49.5	48.8	50.0	49.7	50.9	49.0	52.9	44.1* t = -1.989
	IX.1	68.1	74.6** t = 2.653	64.5	65.9	68.1	70.7	72.6	59.8* t = -2.404
	IX.2	78.6	83.6** t = 2.754	75.3	77.1	79.4	79.6	80.7	74.1

(VII) Kwaliteitsgestuurd gedrag

VII.1 Bent u in de afgelopen 24 maanden wel eens actief op zoek gegaan naar informatie over de kwaliteit en veiligheid van Nederlands/Vlaams kraanwater (bijv. via internet of door contact op te nemen met het drinkwaterbedrijf)?

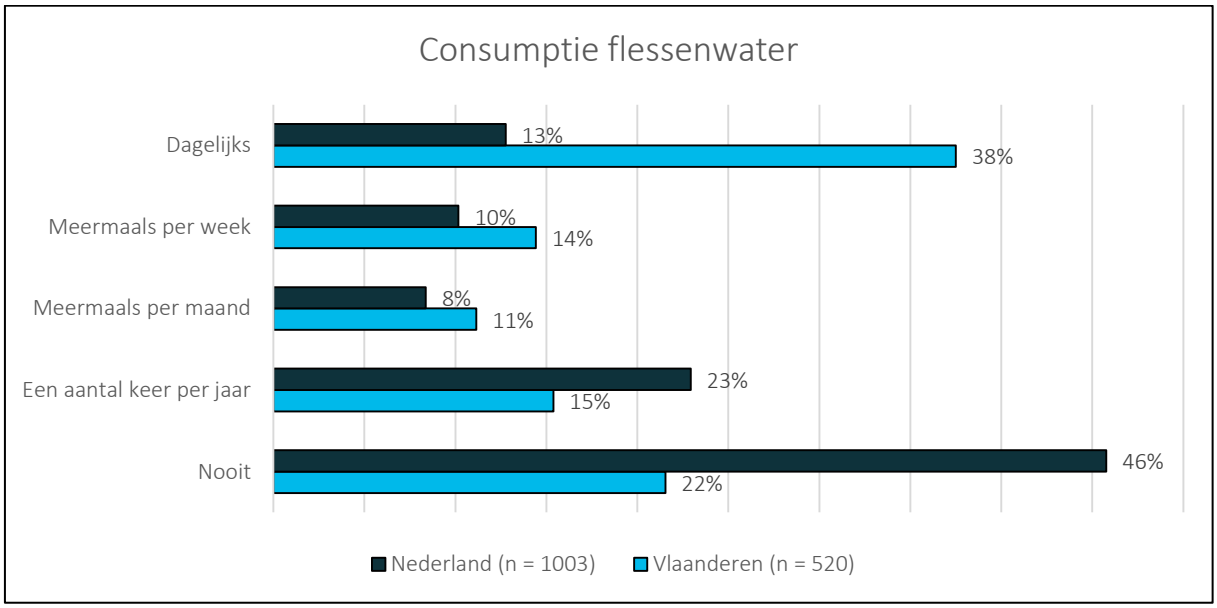
- Ja
- Nee



Figuur 21 Actief opzoeken informatie kwaliteit en veiligheid kraanwater in de afgelopen 24 maanden

VII.2 Hoe vaak drinkt u thuis flessenwater zonder prik?

- Dagelijks
- Meermaals per week
- Meermaals per maand
- Een aantal keer per jaar
- Nooit

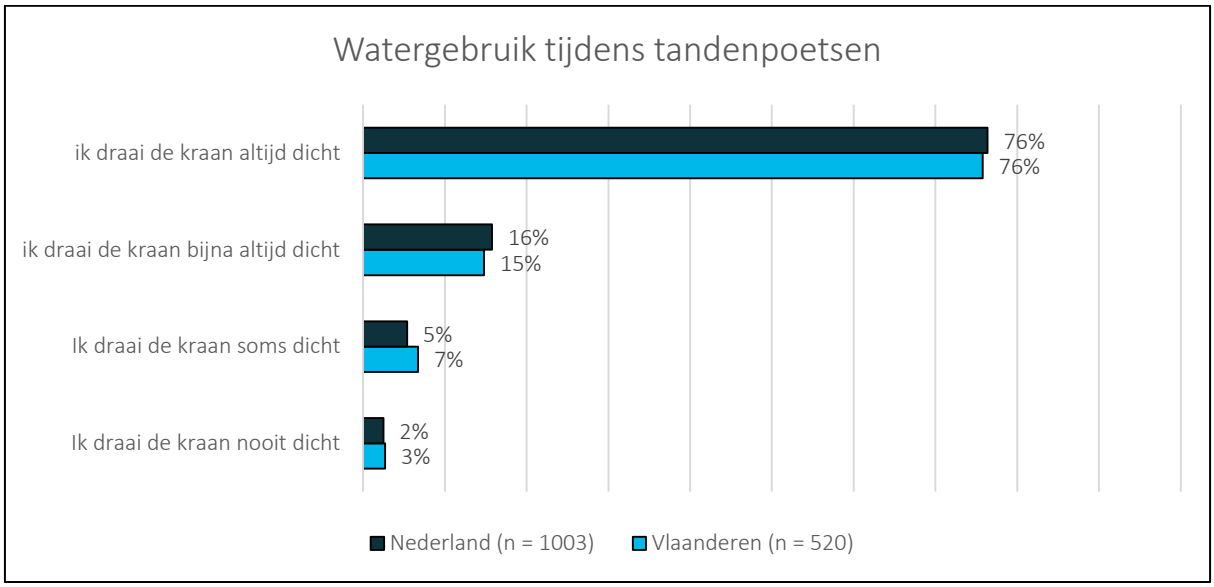


Figuur 22 Consumptie flessenwater zonder prik

(VIII) Efficiëntie gedreven waterconsumptie

VIII.1 Wat doet u met de kraan tijdens het tandenpoetsen?

- Ik draai de kraan altijd dicht
- Ik draai de kraan bijna altijd dicht
- Ik draai de kraan soms dicht
- Ik draai de kraan nooit dicht

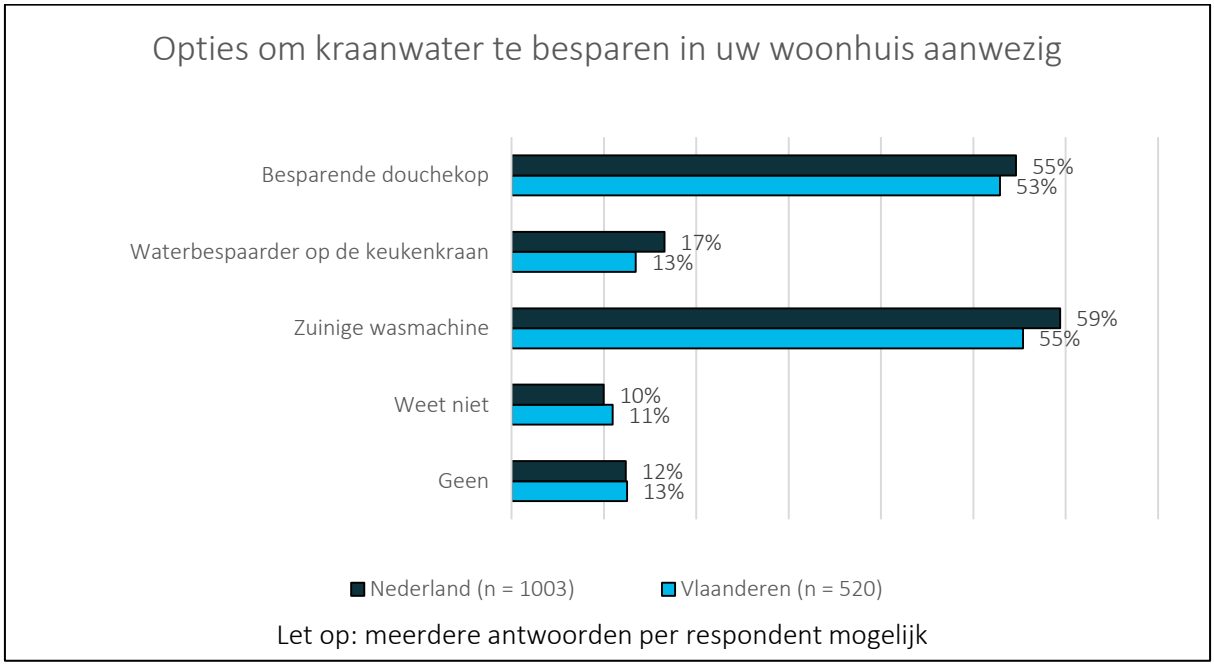


Figuur 23 Dichtdraaien kraan tijdens tandenpoetsen

VIII.2 Welke van de onderstaande opties om kraanwater te besparen heeft u in uw woonhuis?
Meerdere antwoorden mogelijk

- Besparende douchekop
- Waterbespaarder op de keukenkraan
- Zuinige wasmachine
- Anders. namelijk…
- Weet niet
- Geen

NB: Bij het beoordelen van de antwoorden ingevuld bij de optie ‘Anders, namelijk…’ zijn er enkel punten toegekend aan opties die iedereen zou kunnen aanschaffen (dat wil zeggen mensen met zowel een koop als huurhuis en met en zonder tuin). Een voorbeeld hiervan is een timer op de douche. Een voorbeeld van een optie waarvoor mensen geen punten hebben ontvangen is een zuinige vaatwasser, dit is immers niet voor iedereen een optie. Daarnaast zijn er ook enkele punten toebedeeld voor de aanschaf van technische oplossingen en zijn gedragingen voor deze optie buiten beschouwing gelaten (e.g. het opvangen en hergebruiken van water).



Figuur 24 Opties om kraanwater te besparen aanwezig in woning

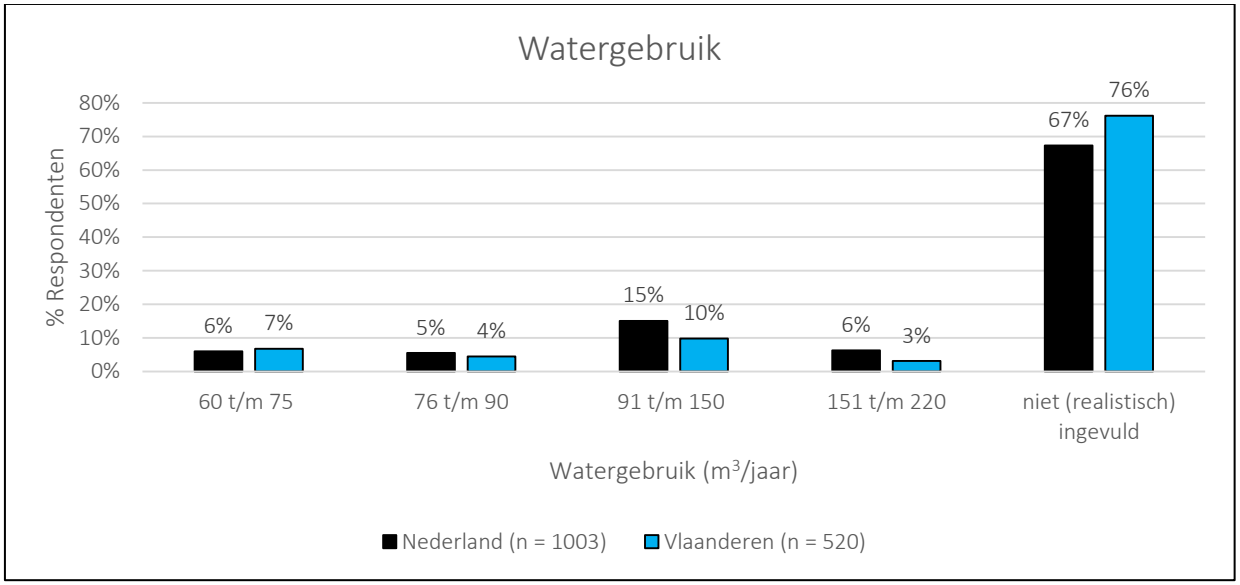
VIII.3

Bekijk uw laatste periodeafrekening van uw drinkwaterbedrijf. Hoeveel kraanwater heeft u de afgelopen periode gebruikt? Noteer de hoeveelheid water. en de 2 data waartussen deze hoeveelheid water is gebruikt.

Hoeveelheid water: … m3 water
Startdatum periodeafrekening: … (dd/mm/yyyy)
Einddatum periodeafrekening … (dd/mm/yyyy)

[let op: anders dan de andere vragen was deze vraag niet verplicht]

NB: De WHO schrijft voor dat ieder mens tussen de 50-100 liter per dag minimaal nodig heeft om in zijn/haar basis voorzieningen te kunnen voldoen. In Nederland gebruikt de gemiddelde persoon 120 liter per dag. Het minimum van 50 liter is dus minder dan de helft. Wij nemen de helft van 120 liter (=60 liter) per dag als ondergrens voor het valideren van onze opgehaalde data. Respondenten die hebben ingevuld minder dan 60 liter water per dag te gebruiken beschouwen wij als ongeloofwaardig. Aan de andere kant van het spectrum kan er ook gekeken worden naar een maximaal gebruik. Hier is gebruik gemaakt van een bovengrens van 400 liter per huishouden. Daarnaast zijn alle huishoudens die een drinkwatergebruik over een periode korter dan 3 maanden hebben doorgegeven er uit gefilterd. Minder dan 3 maanden wordt niet beschouwd als representatieve periode.



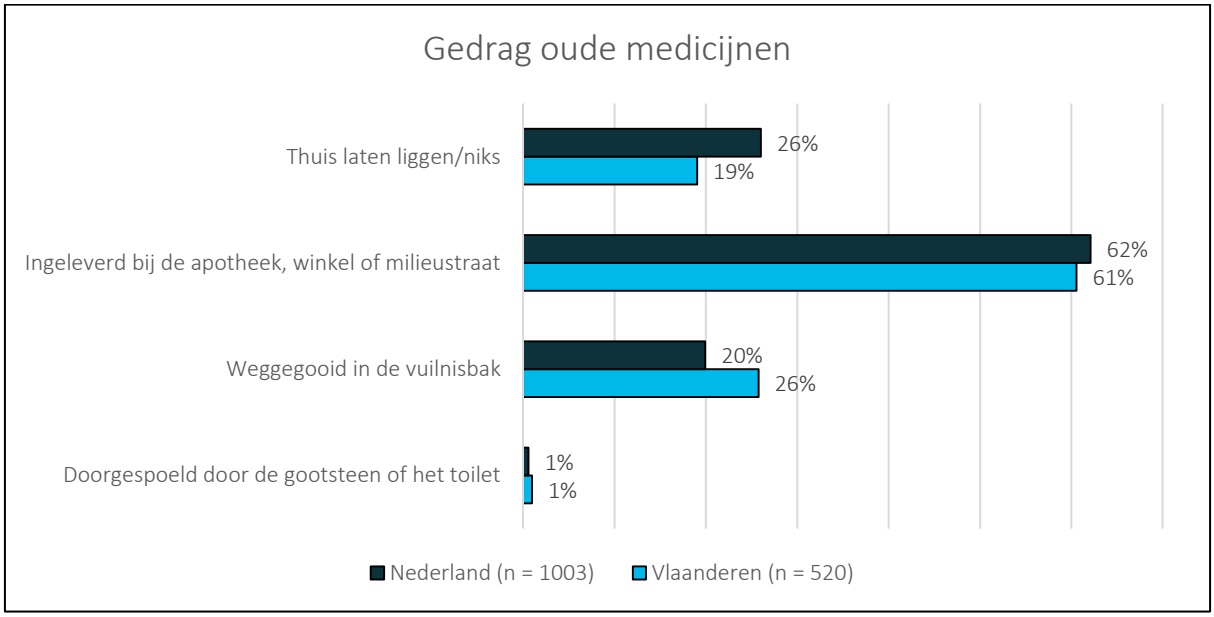
Figuur 25 Werkelijk watergebruik klanten

Omdat er veel antwoorden ontbraken en de vraag door veel respondenten onrealistisch was ingevuld, is deze vraag niet meegenomen in het uiteindelijke kraanwaterbewustzijnsprofiel.

(IX) Bescherming van kraanwaterbronnen

IX.1 Wat heeft u de afgelopen 24 maanden gedaan met uw oude medicijnen? (als u de afgelopen 24 maanden geen oude medicijnen in huis heeft gehad. geef dan antwoord op de vraag: "Wat zou u doen met oude medicijnen?) *Meerdere antwoorden mogelijk*

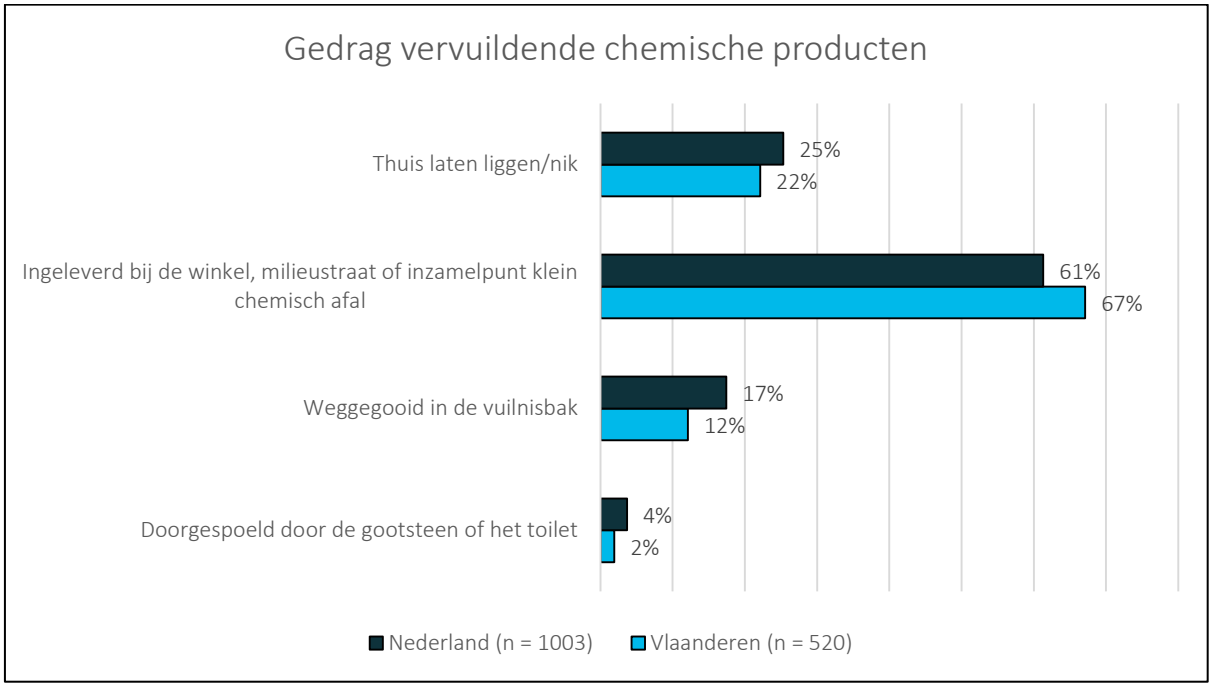
- Thuis laten liggen/niks
- Ingeleverd bij de apotheek. winkel of milieustraat / [Vlaanderen: Ingeleverd bij de winkel, recyclagepark of inzamelpunt klein gevaarlijk afval (kga)]
- Weggegooid in de vuilnisbak
- Doorgespoeld door de gootsteen of het toilet



Figuur 26 Gedrag omtrent het weggooien van oude medicijnen

IX.2 Wat heeft u de afgelopen 24 maanden gedaan met producten zoals oude of gebruikte terpentine. afbijtmiddel. kwastontharder of oude onkruidverdelger? (*als u de afgelopen 24 maanden niet dit soort producten in huis heeft gehad. geef dan antwoord op de vraag: "Wat zou u doen met producten zoals oude of gebruikte terpentine. afbijtmiddel. kwastontharder of oude onkruidverdelger?)*
Meerdere antwoorden mogelijk

- Thuis laten liggen/niks
- Ingeleverd bij de winkel. milieustraat of inzamelpunt klein chemisch afval (kca)
- Weggegooid in de vuilnisbak
- Doorgespoeld door de gootsteen of het toilet



Figuur 27 Gedrag omtrent het weggooien van vervuilende chemische producten

II.IV Significantie per vraag

Tabel 18 Significantie per vraag in vergelijking met het totale gemiddelde van de andere vragen samen voor Nederland.

Vraag	Score Nederland	Paired Samples Test
I.1	63.9***	QI.1 (M = 63.9; STD = 48.1) scores significantly higher (p < .001; t = **7.010**) than the joint average of the other questions (M = 53.4; STD = 11.2).
I.2	40.3***	QI.2 (M = 40.3; STD = 49.1) scores significantly lower (p < .001; **t = -8.767**) than the joint average of the other questions (M = 54.1; STD = 11.3).
I.3	29.4***	QI.3 (M = 29.4; STD = 45.6) scores significantly lower (p < .001; **t = -17.288**) than the joint average of the other questions (M = 54.5; STD = 11.3).
II.1	23.5***	QII.1 (M = 23.5; STD = 33.4) scores significantly lower (p < .001; **t = -28.130**) than the joint average of the other questions (M = 54.8; STD = 11.3).
II.2	45.1***	QII.2 (M = 45.1; STD = 37.5) scores significantly lower (p < .001; **t = -5.313**) than the joint average of the other questions (M = 53.9; STD = 11.3).
III.1	70.3***	QIII.1 (M = 70.3; STD = 45.6) scores significantly higher (p < .001; **t = 6.997**) than the joint average of the other questions (M = 52.9; STD = 10.6).
III.2	26.6***	QIII.2 (M = 26.6; STD = 44.2) scores significantly lower (p < .001; **t = -19.047**) than the joint average of the other questions (M = 54.6; STD = 11.3).
III.3	52.1	QIII.3 (M = 52.1; STD = 34.7) scores **not** significantly lower than the joint average of the other questions (M = 53.7; STD = 11.3).
III.4	56.8*	QIII.4 (M = 56.8; STD = 49.4) scores significantly higher (p < .05; **t = 2.073**) than the joint average of the other questions (M = 53.5; STD = 11.2).
III.5	57.8***	QIII.5 (M = 57.8; STD = 38.6) scores significantly higher (p < .001; **t = 4.946**) than the joint average of the other questions (M = 53.3; STD = 11.2).
IV.1	84.0***	QIV.1 (M = 84.0; STD = 18.4) scores significantly higher (p < .001; **t = 52.683**) than the joint average of the other questions (M = 51.0; STD = 11.8).

IV.2	16.9***	QIV.2 (M = 16.9; STD = 22.9) scores significantly lower (p < .001; **t = -44.887**) than the joint average of the other questions (M = 55.1; STD = 11.6).
IV.3	37.9***	QIV.3 (M = 37.9; STD = 36.0) scores significantly lower (p < .001; **t = -13.098**) than the joint average of the other questions (M = 54.2; STD = 11.1).
V.1	67.9***	QV.1 (M = 67.9; STD = 22.3) scores significantly higher (p < .001; **t = 24.106**) than the joint average of the other questions (M = 52.9; STD = 11.4).
V.2	58.3***	QV.2 (M = 58.3; STD = 36.0) scores significantly higher (p < .001; **t = 4.404**) than the joint average of the other questions (M = 53.4; STD = 11.1).
V.3	47.0***	QV.3 (M = 47.0; STD = 33.7) scores significantly lower (p < .001; **t = -4.658**) than the joint average of the other questions (M = 53.8; STD = 11.0).
VI.1	58.3***	QVI.1 (M = 58.3; STD = 27.7) scores significantly higher (p < .001; **t = 9.430**) than the joint average of the other questions (M = 53.3; STD = 11.2).
VI.2	58.1***	QVI.2 (M = 58.1; STD = 35.9) scores significantly higher (p < .001; **t = 4.392**) than the joint average of the other questions (M = 53.3; STD = 11.0).
VII.1	11.4***	QVII.1 (M = 11.4; STD = 31.8) scores significantly lower (p < .001; **t = -42.864**) than the joint average of the other questions (M = 55.4; STD = 11.5).
VII.2	65.5***	QVII.2 (M = 65.5; STD = 37.6) scores significantly higher (p < .001; **t = 11.153**) than the joint average of the other questions (M = 52.8; STD = 11.1).
VIII.1	89.5***	QVIII.1 (M = 89.5; STD = 22.1) scores significantly higher (p < .001; **t = 53.001**) than the joint average of the other questions (M = 52.0; STD = 11.2).
VIII.2	51.9	QVIII.2 (M = 51.9; STD = 33.6) scores **not** significantly lower than the joint average of the other questions (M = 53.7; STD = 11.1).
IX.1	71.7***	QIX.1 (M = 71.7; STD = 37.4) scores significantly higher (p < .001; **t = 12.795**) than the joint average of the other questions (M = 52.9; STD = 10.9).
IX.2	72.2***	QIX.2 (M = 72.2; STD = 32.2) scores significantly higher (p < .001; **t = 21.050**) than the joint average of the other questions (M = 52.8; STD = 11.1).

Tabel 19 Significantie per vraag in vergelijking met het totale gemiddelde van de andere vragen samen voor Vlaanderen

Vraag	Score Vlaanderen	Paired Samples Test
I.1	45.1	QI.1 (M = 45.1; STD = 49.8) scores **not** significantly lower than the joint average of the other questions (M = 47.8; STD = 11.3).
I.2	10.2***	QI.2 (M = 10.2; STD = 14.7) scores significantly lower (p < .001; **t = -50.132**) than the joint average of the other questions (M = 49.4; STD = 11.1).
I.3	18.0***	QI.3 (M = 18.0; STD = 38.4) scores significantly lower (p < .001; **t = -18.446**) than the joint average of the other questions (M = 49.0; STD = 11.0).
II.1	26.8***	QII.1 (M = 26.8; STD = 36.0) scores significantly lower (p < .001; **t = -13.167**) than the joint average of the other questions (M = 48.8; STD = 11.1).
II.2	46.1	QII.2 (M = 46.1; STD = 36.4) scores **not** significantly lower than the joint average of the other questions (M = 47.9; STD = 11.2).
III.1	46.0	QIII.1 (M = 46.0; STD = 49.9) scores **not** significantly lower than the joint average of the other questions (M = 52.9; STD = 10.6).
III.2	28.5***	QIII.2 (M = 28.5; STD = 45.2) scores significantly lower (p < .001; **t = -10.075**) than the joint average of the other questions (M = 48.7; STD = 11.0).
III.3	48.3	QIII.3 (M = 48.3; STD = 34.3) scores **not** significantly higher than the joint average of the other questions (M = 47.9; STD = 11.2).
III.4	57.6***	QIII.4 (M = 57.6; STD = 49.5) scores significantly higher (p < .05; **t = 4.479**) than the joint average of the other questions (M = 47.8; STD = 11.2).

III.5	36.3***	QIII.5 (M = 36.3; STD = 36.8) scores significantly lower (p < .001; **t = -6.464**) than the joint average of the other questions (M = 48.5; STD = 11.2).
IV.1	67.1***	QIV.1 (M = 67.1; STD = 27.2) scores significantly higher (p < .001; **t = 19.548**) than the joint average of the other questions (M = 46.2; STD = 11.6).
IV.2	16.3***	QIV.2 (M = 16.3; STD = 22.2) scores significantly lower (p < .001; **t = -26.544**) than the joint average of the other questions (M = 49.3; STD = 11.3).
IV.3	44.1	QIV.3 (M = 44.1; STD = 39.0) scores **not** significantly lower than the joint average of the other questions (M = 48.0; STD = 10.6).
V.1	71.1***	QV.1 (M = 71.1; STD = 22.5) scores significantly higher (p < .001; **t = 25.427**) than the joint average of the other questions (M = 49.3; STD = 11.3).
V.2	57.5***	QV.2 (M = 57.5; STD = 37.8) scores significantly higher (p < .001; **t = 6.075**) than the joint average of the other questions (M = 47.6; STD = 11.0).
V.3	53.6***	QV.3 (M = 53.6; STD = 33.7) scores significantly higher (p < .001; **t = 5.757**) than the joint average of the other questions (M = 47.7; STD = 10.8).
VI.1	64.7***	QVI.1 (M = 64.7; STD = 28.1) scores significantly higher (p < .001; **t = 16.560**) than the joint average of the other questions (M = 47.4; STD = 10.9).
VI.2	61.3***	QVI.2 (M = 61.3; STD = 37.9) scores significantly higher (p < .001; **t = 8.852**) than the joint average of the other questions (M = 47.3; STD = 10.6).
VII.1	12.3***	QVII.1 (M = 12.3; STD = 32.9) scores significantly lower (p < .001; **t = -24.884**) than the joint average of the other questions (M = 49.3; STD = 11.1).
VII.2	37.7***	QVII.2 (M = 37.7; STD = 39.7) scores significantly lower (p < .001; **t = -5.687**) than the joint average of the other questions (M = 48.6; STD = 10.9).
VIII.1	88.5***	QVIII.1 (M = 88.5; STD = 23.5) scores significantly higher (p < .001; **t = 39.194**) than the joint average of the other questions (M = 46.3; STD = 11.2).
VIII.2	49.5*	QVIII.2 (M = 49.5; STD = 33.2) scores significantly higher (p < .05; **t = 2.324**) than the joint average of the other questions (M = 47.8; STD = 10.9).
IX.1	68.1***	QIX.1 (M = 68.1; STD = 38.1) scores significantly higher (p < .001; **t = 12.430**) than the joint average of the other questions (M = 46.8; STD = 10.7).
IX.2	78.6***	QIX.2 (M = 78.6; STD = 29.4) scores significantly higher (p < .001; **t = 25.786**) than the joint average of the other questions (M = 46.7; STD = 11.0).

II.V Verschil Nederland – Vlaanderen per vraag

Tabel 20 Statistisch verschil tussen de Nederlandse en Vlaamse antwoorden per vraag

Vraag	Score Nederland	Score Vlaanderen	Paired Samples Test
I.1	63.9***	45.1	Dutch respondents score significantly higher (p < .001; t = **5.376**) than the Flemish respondents
I.2	40.3***	10.2	Dutch respondents score significantly higher (p < .001; t = **13.566**) than the Flemish respondents
I.3	29.4***	18	Dutch respondents score significantly higher (p < .001; t = **3.826**) than the Flemish respondents
II.1	23.5	26.8	Flemish respondents score higher than the Dutch respondents. This difference is not significant

II.2	45.1	46.1	Dutch respondents score higher than the Flemish respondents. This difference is not significant
III.1	70.3***	46.0	Dutch respondents score significantly higher ($p < .001$; $t = 8.175$) than the Flemish respondents
III.2	26.6	28.5	Dutch respondents score higher than the Flemish respondents. This difference is not significant
III.3	52.1**	48.3	Dutch respondents score significantly higher ($p < .01$; $t = 2.592$) than the Flemish respondents
III.4	56.8	57.6	Dutch respondents score higher than the Flemish respondents. This difference is not significant
III.5	57.8***	36.3	Dutch respondents score significantly higher ($p < .001$; $t = 10.143$) than the Flemish respondents
IV.1	84.0***	67.1	Dutch respondents score significantly higher ($p < .001$; $t = 11.636$) than the Flemish respondents
IV.2	16.9	16.3	Dutch respondents score higher than the Flemish respondents. This difference is not significant
IV.3	37.9	44.1***	Flemish respondents score significantly higher ($p < .001$; $t = 4.367$) than the Dutch respondents
V.1	67.9	77.1***	Flemish respondents score significantly higher ($p < .001$; $t = 4.895$) than the Dutch respondents
V.2	58.3	57.5	Dutch respondents score higher than the Flemish respondents. This difference is not significant
V.3	47.0	53.6***	Flemish respondents score significantly higher ($p < .001$; $t = 5.847$) than the Dutch respondents
VI.1	58.3	64.7***	Flemish respondents score significantly higher ($p < .001$; $t = 5.265$) than the Dutch respondents
VI.2	58.1	61.3**	Flemish respondents score significantly higher ($p < .01$; $t = 2.912$) than the Dutch respondents
VII.1	11.4	12.3	Dutch respondents score higher than the Flemish respondents. This difference is not significant
VII.2	65.5***	37.7	Dutch respondents score significantly higher ($p < .001$; $t = 10.854$) than the Flemish respondents
VIII.1	89.5	88.5	Dutch respondents score higher than the Flemish respondents. This difference is not significant
VIII.2	51.9	49.5	Dutch respondents score higher than the Flemish respondents. This difference is not significant
IX.1	71.7	68.1	Flemish respondents score higher than the Dutch respondents. This difference is not significant
IX.2	72.2	78.6***	Flemish respondents score significantly higher ($p < .001$; $t = 4.836$) than the Dutch respondents

III Appendix: Statische verschillen per component

Om de waarde van het gebruikte kader met de negen verschillende componenten van bewustzijn nader te toetsen is zowel voor de Nederlandse (Tabel 21) als de Vlaamse context (Tabel 22) geanalyseerd of de onderlinge componenten van elkaar verschillen. Onderstaande tabellen laat zien dat deze onderling inderdaad sterk verschillen. Dit geeft dus geen reden om een of meerdere componenten in het vervolg te laten vervallen.

Tabel 21 Statistical difference of each individual component in comparison to the other components constructing the tap water awareness score for the Netherlands

Component	Score The Netherlands	Paired Sample t-test
(I) Water quality comprehension	40.7***	Com. I (M = 40.7; STD = 30.1) scores significantly lower (p < .001; **t = -14.675**) than the joint average of the other components (M = 54.9; STD = 11.3).
(II) Water consumption knowledge	34.2***	Com. II (M = 34.3; STD = 24.5) scores significantly lower (p < .001; **t = -24.526**) than the joint average of the other components (M = 55.4; STD = 11.7).
(III) Water system understanding	52.0**	Com. II (M = 52.0; STD = 21.7) scores significantly lower (p < .01; **t = -2.664**) than the joint average of the other components (M = 53.9; STD = 11.4).
(IV) Water quality perception	55.7***	Com. IV (M = 55.7; STD = 13.7) scores significantly higher (p < .001; **t = 6.553**) than the joint average of the other components (M = 53.1; STD = 12.0).
(V) Caring for water	57.8***	Com. V (M = 57.8; STD = 21.6) scores significantly higher (p < .001; **t = 8.070**) than the joint average of the other components (M = 53.1; STD = 11.2).
(VI) Sense of responsibility	58.2***	Com. VI (M = 58.2; STD =26.3) scores significantly higher (p < .001; **t = 7.818**) than the joint average of the other components (M = 53.0; STD = 11.1).
(VII) Quality driven behaviour	43.8***	Com. VII (M = 43.9; STD = 24.5) scores significantly lower (p < .001; **t = -13.418**) than the joint average of the other components (M = 54.7; STD = 11.7).
(VIII) Curtailment & efficiency behaviour	70.7***	Com. VIII (M = 70.7; STD = 21.8) scores significantly higher (p < .001; **t = 30.836**) than the joint average of the other components (M = 52.1; STD = 11.6).
(IX) Tap water source protection	68.3***	Com. IX (M = 68.5; STD = 32.5) scores significantly higher (p < .001; **t = 16.453**) than the joint average of the other components (M = 51.8; STD = 11.0).

Tabel 22 Statistical difference of each individual component in comparison to the other components constructing the tap water awareness score for Flanders

Component	Score Flanders	Paired Sample t-test
(I) Water quality comprehension	20.3***	Com. I (M = 20.3; STD = 19.9) scores significantly lower (p < .001; **t = -34.526**) than the joint average of the other components (M = 50.9; STD = 11.2).
(II) Water consumption knowledge	36.5***	Com. II (M = 36.5; STD = 26.2) scores significantly lower (p < .001; **t = -9.118**) than the joint average of the other components (M = 48.9; STD = 11.5).
(III) Water system understanding	41.4***	Com. II (M = 41.4; STD = 21.9) scores significantly lower (p < .01; **t = -7.958**) than the joint average of the other components (M = 49.4; STD = 11.4).
(IV) Water quality perception	48.7*	Com. IV (M = 48.7; STD = 15.4) scores significantly higher (p < .05; **t = 2.036**) than the joint average of the other components (M = 48.0; STD = 11.4).
(V) Caring for water	60.7***	Com. V (M = 60.7; STD = 21.3) scores significantly higher (p < .001; **t = 16.904**) than the joint average of the other components (M = 46.3; STD = 10.8).

(VI) Sense of responsibility	63.0***	Com. VI (M = 63.0; STD = 28.0) scores significantly higher (p < .001; **t = 14.908**) than the joint average of the other components (M = 46.8; STD = 10.7).
(VII) Quality driven behaviour	27.6***	Com. VII (M = 27.6; STD = 25.9) scores significantly lower (p < .001; **t = -18.986**) than the joint average of the other components (M = 50.1; STD = 11.1).
(VIII) Curtailment & efficiency behaviour	69.0***	Com. VIII (M = 69.0; STD = 22.9) scores significantly higher (p < .001; **t = 25.237**) than the joint average of the other components (M = 45.9; STD = 11.1).
(IX) Tap water source protection	71.3	Com. IX (M = 71.3; STD = 31.7) scores significantly higher (p < .001; **t = 18.686**) than the joint average of the other components (M = 45.2; STD = 10.8).

IV Appendix: Expert Interviews

WB: Willemijn Bouland, Adviseur Corporate Strategie, Dunea. Interview op 25 juni 2019.

RF: Richard Flipse, Programma Manager, Ons Water. Interview op 4 juli 2019

KA: Koen Augustijn, adviseur strategische communicatie, WML. Interview op 16 juli 2019.

Verslag interviews

Waterbewustzijn werd in alle interviews genoemd als belangrijk onderwerp en iedere interviewee zette zich op een eigen manier in dit te bereiken. Genoemde argumenten om bewustzijn te vergroten zijn:

WB: om adequaat met toekomstige uitdagingen om te kunnen gaan is het belangrijk dat drinkwaterbedrijven samenwerken met andere partijen. Om dit te kunnen doen moeten partijen en de maatschappij zich wel bewust zijn van de uitdagingen waarvoor men staat.

RF: bewustzijn is belangrijk omdat bewuste mensen weten dat kraanwater niet oneindig beschikbaar is en wat de uitdagingen hiervoor zijn. Een bewust persoon: weet dat kraanwater gezond is, hoe het productieproces is georganiseerd; waar hij/zij voor betaalt; en wat toekomstige uitdagingen zijn [kennis]; ook draag deze persoon particuliere verantwoordelijkheid uit en probeert zijn/haar omgeving hierin mee te nemen [houding]; en bespaart hij/zij water en probeert water schoon te houden. Ook anticipeert hij/zij op kennis over de toekomst [gedrag].

KA: vanuit de dwb is kraanwaterbewustzijn belangrijk omdat dwb een maatschappelijke verantwoordelijkheid hebben het drinken van kraanwater te stimuleren. Het vergroten van bewustzijn is hier een onderdeel van.

De driedeling kennis, attitude/gevoel, gedrag kwam duidelijk terug in de interviews. Vooral WB en RF benoemde dit specifiek. Bij KA kwam dit alleen indirect naar voren uit wat hij vertelde.

De driedeling in onderwerpen was ook herkenbaar in de interviews, zij het minder duidelijk. Voor WB kwam dit het meest overeen met wat wij hebben geïdentificeerd: kwaliteit, kwantiteit en herkomst. Voor RF zijn de hoofdthema's waterveiligheid, water kwaliteit en klimaatadaptatie, al moet hierbij worden opgemerkt dat de focus van Ons Water breder ligt dan enkel kraanwater en ook oppervlaktewater omvat. KA gaf aan te focussen op vanzelfsprekendheid, bronbescherming (overeenkomend met systeem) en waarde vermeerdering. Waarbij Waardevermeerdering en vanzelfsprekendheid beide onderdelen gerelateerd aan kwaliteit en kwantiteit lijken te omvatten.

Interessante aspecten die terugkwamen in de interviews ter aanvulling van raamwerk:

- De relatie van water met gezondheid: WB en KA benoemde dit beide expliciet en gaven ook aan dat dit in toenemende mate een belangrijk onderwerp is voor de drinkwaterbedrijven. KA gaf aan dat dit mogelijk geïntegreerd zou kunnen worden in ons schema onder kennisXkwaliteit. Dit relateert ook aan de discussie omtrent het gebruik van flessen water. Zouden bijvoorbeeld een vraag kunnen invoegen over welk water gezonder is.

- Nadenken over de toekomst: RF gaf aan dat bewustzijn in de visie van Ons Water ook inhoud dat je nadenkt over de toekomst en toekomstige uitdagingen in ogenschouw neemt. Dit kunnen we mogelijk meenemen onder systeemXkennis, of systeemXattitude.

- Trigger based bewustzijn: Uit de verschillende interviews kwam naar voren dat het bewustzijn van mensen ook gestimuleerd kan worden door bepaalde gebeurtenissen. Genoemde voorbeelden hiervan zijn: incidenten of gebeurtenissen (de droogte van 2018); jaargetijden (bewustzijn over wateroverlast groter in de herfst); het gebied(in gebieden afhankelijk van grondwater voor de drinkwatervoorziening was de droogte alarmerender dan in gebieden afhankelijk van oppervlaktewater); reizen van de klant zelf (na een reis in het buitenland, meer bewust).

- Bewustzijn stakeholders: Naar aanleiding van het gesprek met WB denk ik dat het goed is expliciet te bepalen of we ons richten op kraanwaterbewustzijn van de gebruiker. WB gaf aan dat het bewustzijn onder stakeholders ook vaak laag is en ook slecht in kaart is gebracht momenteel.

- Vanzelfsprekendheid: Zowel bij KA en RF kwam de vanzelfsprekendheid van kraanwater terug als kernthema wanneer het ging over bewustzijn. Voor RF is het opheffen van de vanzelfsprekendheid van water breder dan enkel attitude, maar ook sterk verbonden aan kennis en gedrag.

- Beinvloeden bewustzijn: RF geeft aan dat in zijn optiek het bewustzijn van mensen op verschillende manieren wordt beïnvloed. Sommige zullen naar aanleiding van kennis bewuster worden, terwijl anderen zich bewust worden door bepaalde ervaringen.

Toevoegingen

	Kwaliteit	Kwantiteit	Systeem/ WB: herkomst van water
Kennis	KA: vraag over gezondheid en effect van kraanwater hierop. Welk water is gezonder? Kraan of fles? RF: Wie is de grootste vervuiler?		WB: Zorgplicht van stakeholders (onder nieuwe omgevingswet). RF: Hoe is de voorziening georganiseerd? Weten dat kraanwater gezond is. Weten waar je voor betaald.
Attitude	WB: vertrouwen in water kwaliteit	RF: Het uitdragen van een publiek verantwoordelijkheid en het meenemen van de omgeving hierin.	
Gedrag	KA: Het vragen om kraanwater in horeca gelegenheden	RF: besparen door water op te vangen. Besparen door	KA: gebruik bestrijdingsmiddelen in de tuin.

	WB: gebruik additionele zuivering in huis. Wens om off-grid te gaan (decentrale trend)	restwater aan planten te geven.	RF: geen chemische bestrijdingsmiddelen door toilet. Anticiperen op kennis over de toekomst. WB: bewustzijn stakeholders: bescherming van leidingen door gemeenten.