

# RURAL ALASKA END-USER ACCEPTANCE OF DECENTRALIZED NON-POTABLE WATER SYSTEMS.

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9<sup>th</sup> Annual Water and Sanitation Innovations for the Arctic  
U.S. Arctic Research Commission &  
Centers for Disease Control & Prevention  
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# BACKGROUND CONTEXT

- W & S Challenge End-User Session – Sept 22, 2016
- Four hours of breakout group, plenary group, and written survey to examine users perspectives on DNW
- 12 Female Adults, 14 Male Adults
- Ages Unknown, but bulk of participants considered to be in 35 to 65 age group, ranging from mid 20's to mid-70's.
- 18 villages, under-plumbed, YK Delta, Interior, NW Arctic
- Self-identified Yup'ik Preference Group facilitated in Yup'ik
- Caveats: *Youth and Elder under-represented*
- *Additional data from house-to-house surveys conducted in Western AK, Interior villages, and ethnographic observation.*

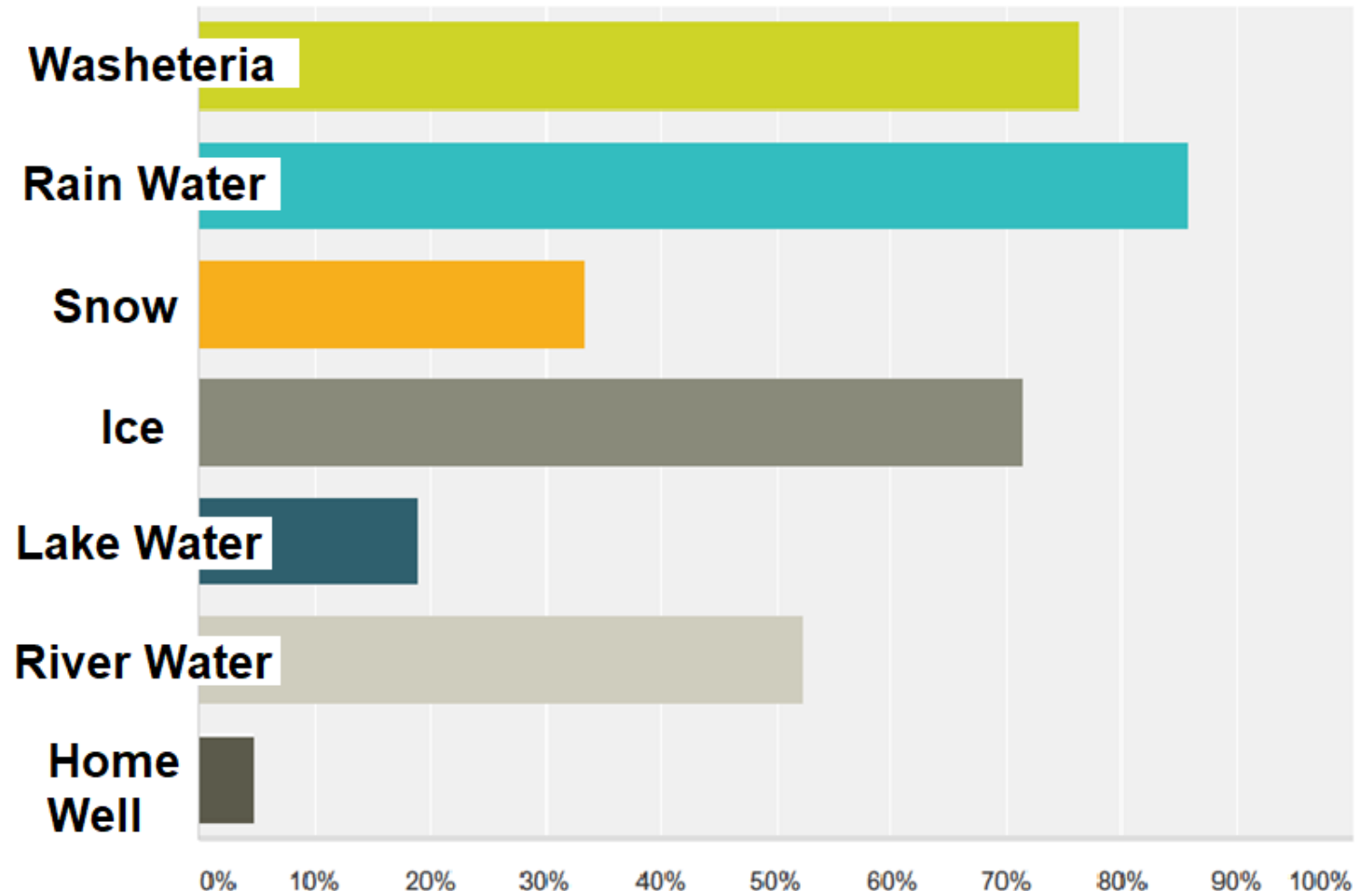




Primary sources of water: end-user session with 18 villages (4 having 2 representatives)

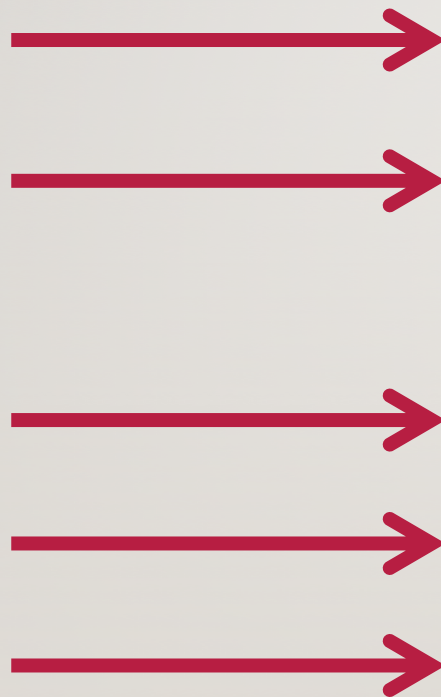
## Q2 1. What are the primary sources of water for all uses in your home over the course of a year?

Answered: 21 Skipped: 1



# END-USER INSIGHTS INTO PUBLIC HEALTH GUIDANCE FRAMEWORK

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## 1. Design

- Select the appropriate  $\log_{10}$  reduction target (LRT) for the end use.
- Select the appropriate treatment process train to achieve the LRT.
- Receive approval by a Professional Engineer.

## 2. Management Plan

- Specify the Responsible Management Entity (RME) Management Category (1 to 3).
- Designate the roles and responsibilities of the RME.

## 3. Permit Application Report Submission

- Specify the design, RME, assurance of reliability via monitoring, commissioning plan, operations and maintenance (O&M) plan, and plan for managing the distribution system.
- Receive sign-off by a Registered Professional Engineer and approval by the regulatory agency.

## 4. Construction and Commissioning

- Demonstrate via field verification, when required.
- Submit the Commissioning Report (which includes field verification results and the final monitoring plan).

## 5. Operational Monitoring

- Continuously monitor, at high frequency, surrogate water quality and/or operational parameters correlated to the LRTs.
- Include controls for the production of water that is out-of-compliance.

## 6. Reporting

- Include violations and incidents.
- Use a format for routine reporting that is simple to review.
- Receive approval and enforcement by the regulatory agency.

Figure ES-1: Proposed framework for implementing Decentralized Non-Potable water systems.



# WIDE VARIETY OF GENERAL CONCERNS, MANY UNIQUE TO RURAL ALASKA

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## **5. What are the concerns that you or your community have about using treated wash water?**

- Don't drink it.
- Materials that wash off or cleansers being retained in the treated gray water or impacting a filter :
  - Residues of shower soap and laundry soap causing allergic reaction or not being removed.
  - People are their own mechanics -- oils and grease from working on vehicles from washing hands in sink would be hard on the filter.
  - Would it be efficient to reuse water when used to wash up grease and oil?
- Foods with seal oil
- Animal or fish blood, fish guts, fish slime
- Education needed to use system.
- O&M must be available at all times.
- Difference between or coordination between the local government or the state managing the system
- Individual end-user has the option to pick and choose when to recycle water, an on/off switch.
- Chemicals in water
- Analysis needed

# END-USER CONCERNS RELATING TO DESIGN, OPERATIONAL MONITORING, AND REPORTING

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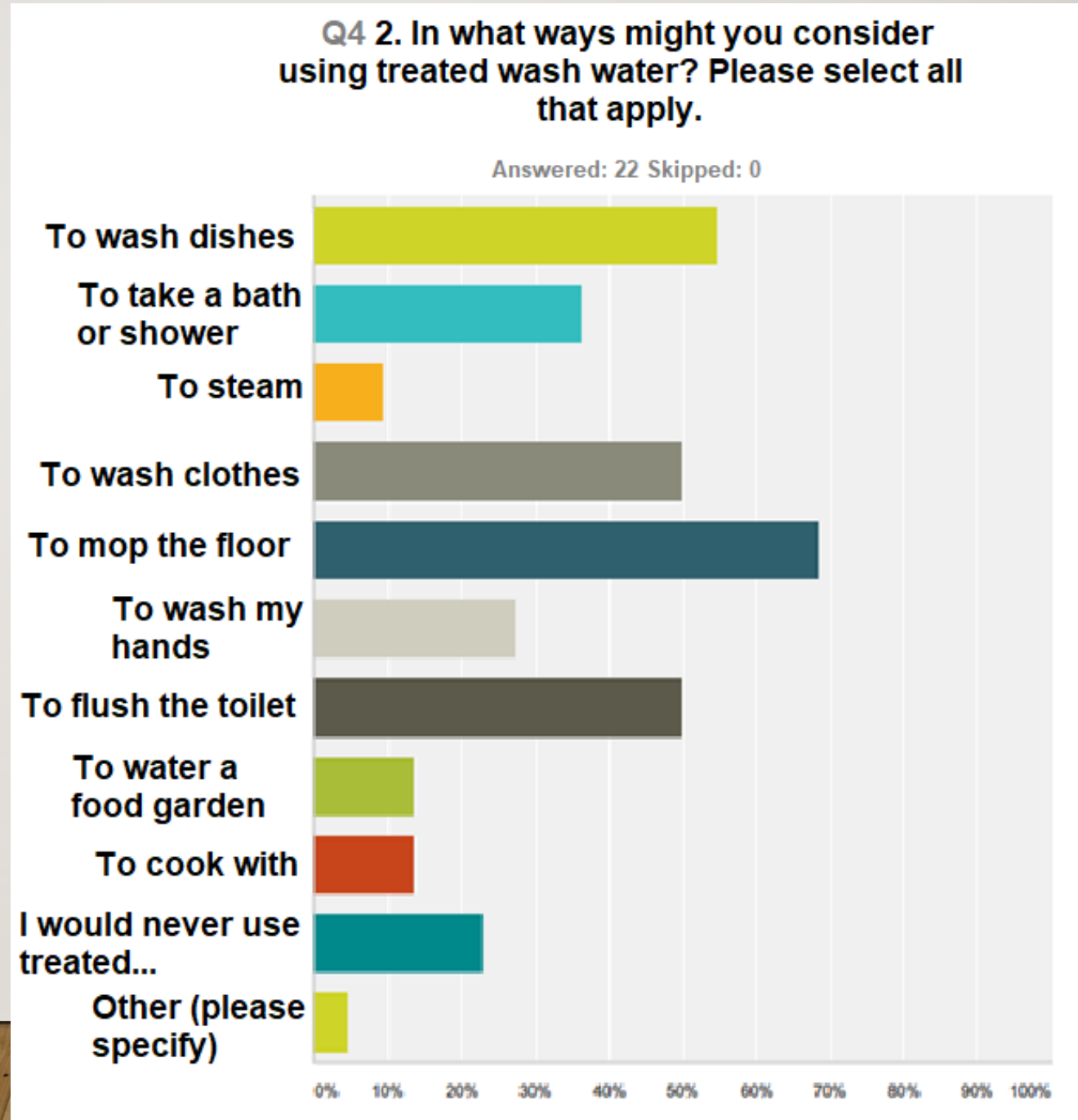
- Operation and Maintenance (Cost and Mechanics) was the number one concern regardless of feedback vehicle.
- Related was the concern for safety and need for field verification & routine testing.

## Overall General Concerns:

Concern	Dots
Operation and maintenance	8
Funding for sewage water project	7
System not tested in village	5
Our elders	4
Installation costs per home, o&m, monthly fees	3
That all the villages get help with one of these systems that they can all afford, we are all in need	3
Funding and high cost of system or monthly bill	3



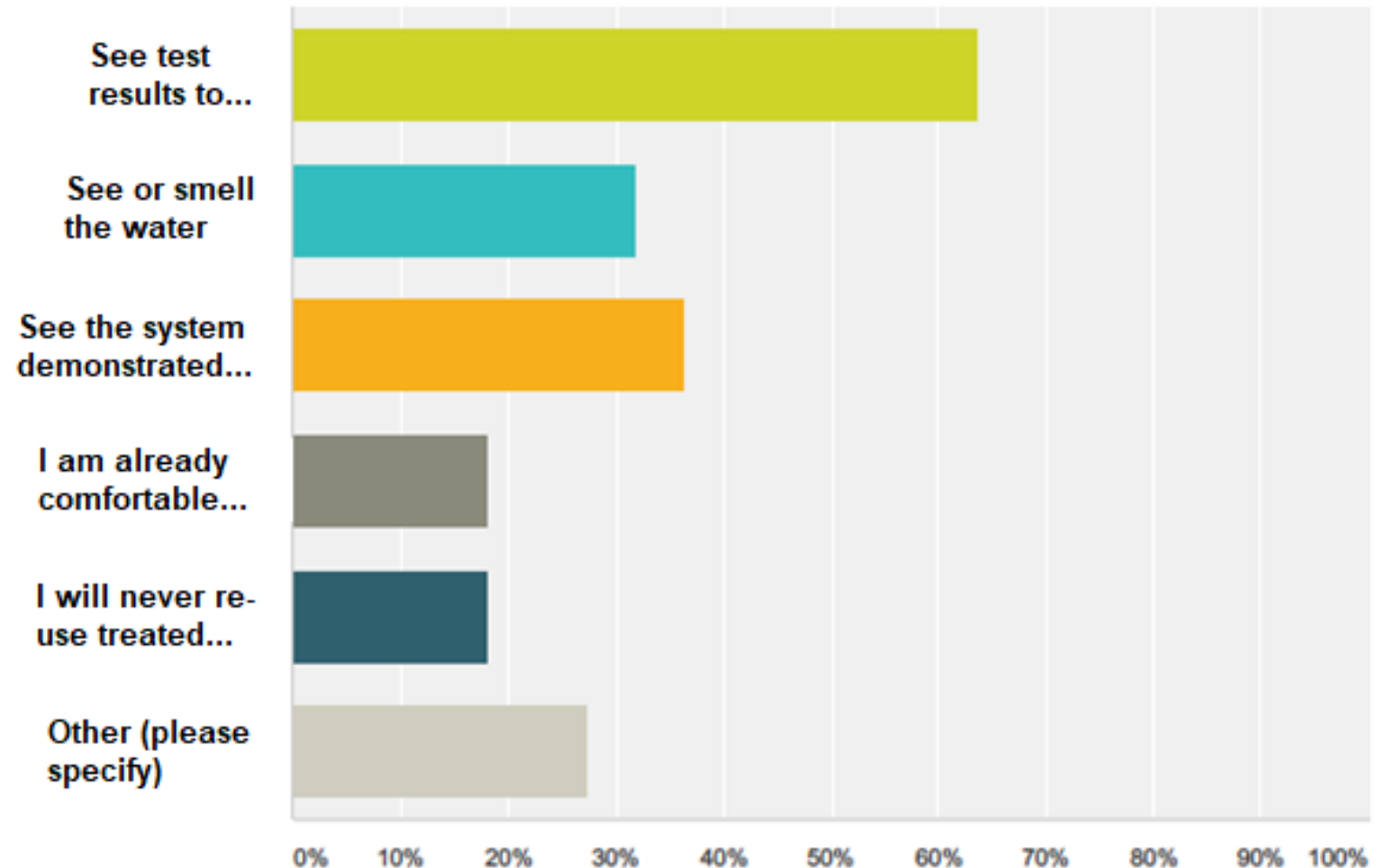
- A wide variety of uses is potentially acceptable.
- Low-acceptance rates here may be tied to traditional & customary use (subsistence and steam vs. shower/bath) and avoidance of contamination of this resource.



- Acceptance may be dependent on confidence in performance.

**Q5 3. Which of the following will you need to do before you use wash water in your own home? (Please select all that apply.)**

Answered: 22 Skipped: 0





Acceptance may be dependent on end-users adding additional treatment/steps and having choice.

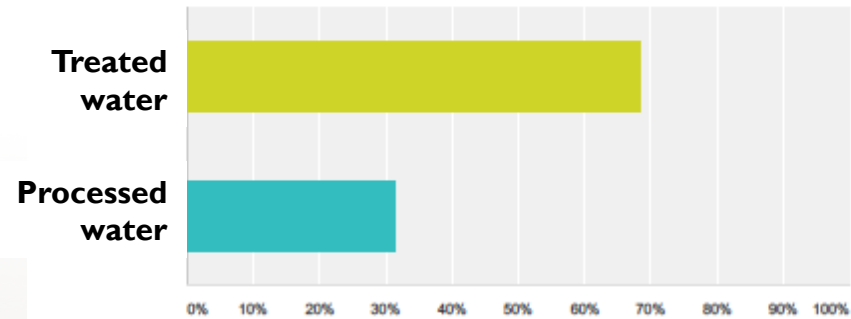
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Other (please specify)
boil water for 10 mins
boil water for 10 mins
determine what can and can't go into the system (down the drain)
get data from test project
only use sometimes not always
some homes use wash basin in their homes so this is same

# VOCABULARY IS IMPORTANT

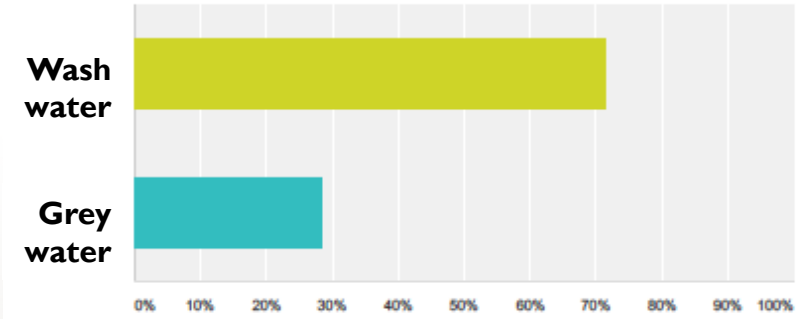
Q9 Treated Water OR Processed Water

Answered: 19 Skipped: 3



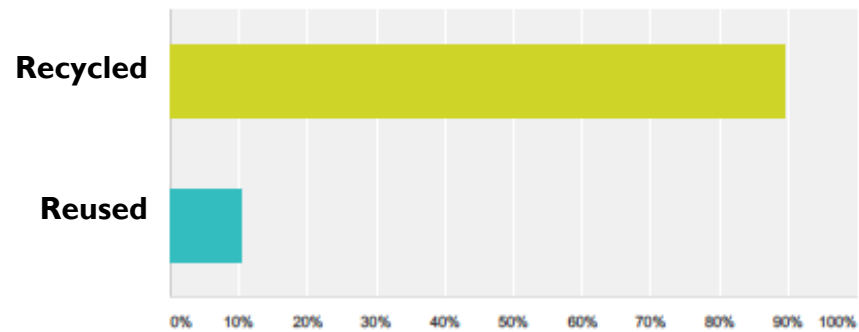
Q8 Washwater OR Grey Water

Answered: 21 Skipped: 1



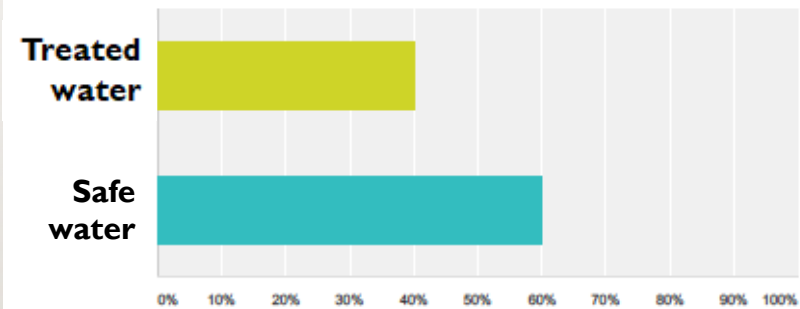
Q7 Recycled OR Reused

Answered: 19 Skipped: 3



Q10 Treated Water OR Safe Water

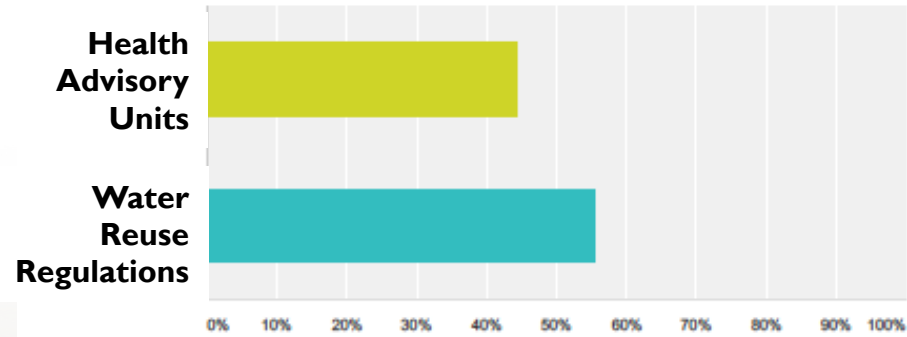
Answered: 20 Skipped: 2





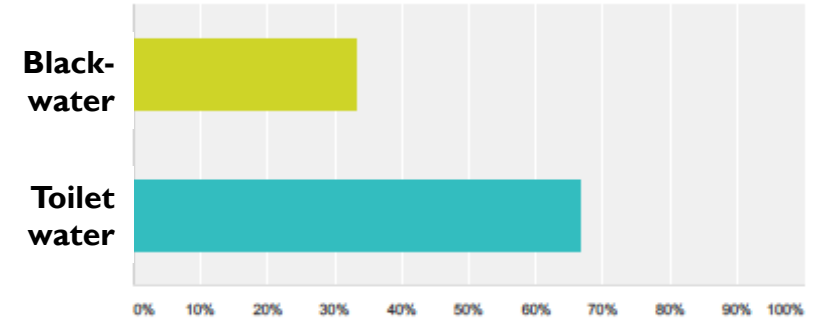
### Q15 Health Advisory Limits OR Water Reuse Regulations

Answered: 18 Skipped: 4



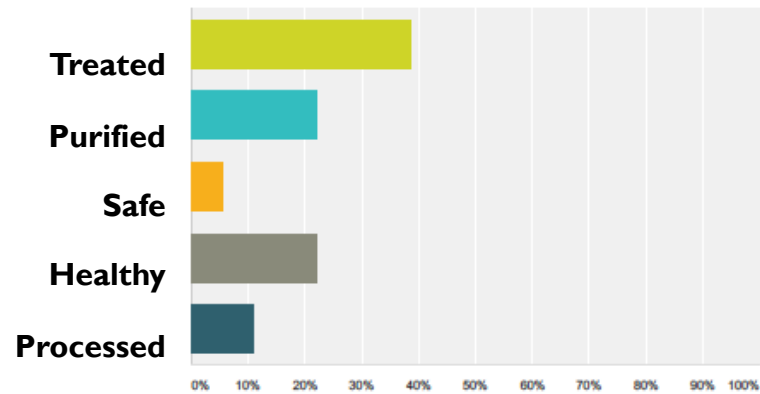
### Q11 Blackwater OR Toilet Water

Answered: 18 Skipped: 4



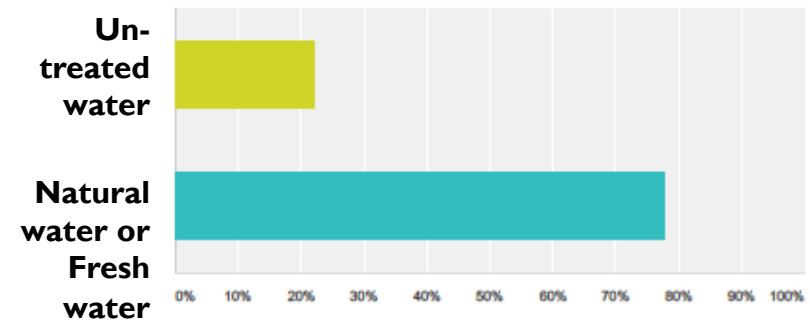
### Q13 Treated OR Purified OR Safe OR Healthy OR Processed

Answered: 18 Skipped: 4

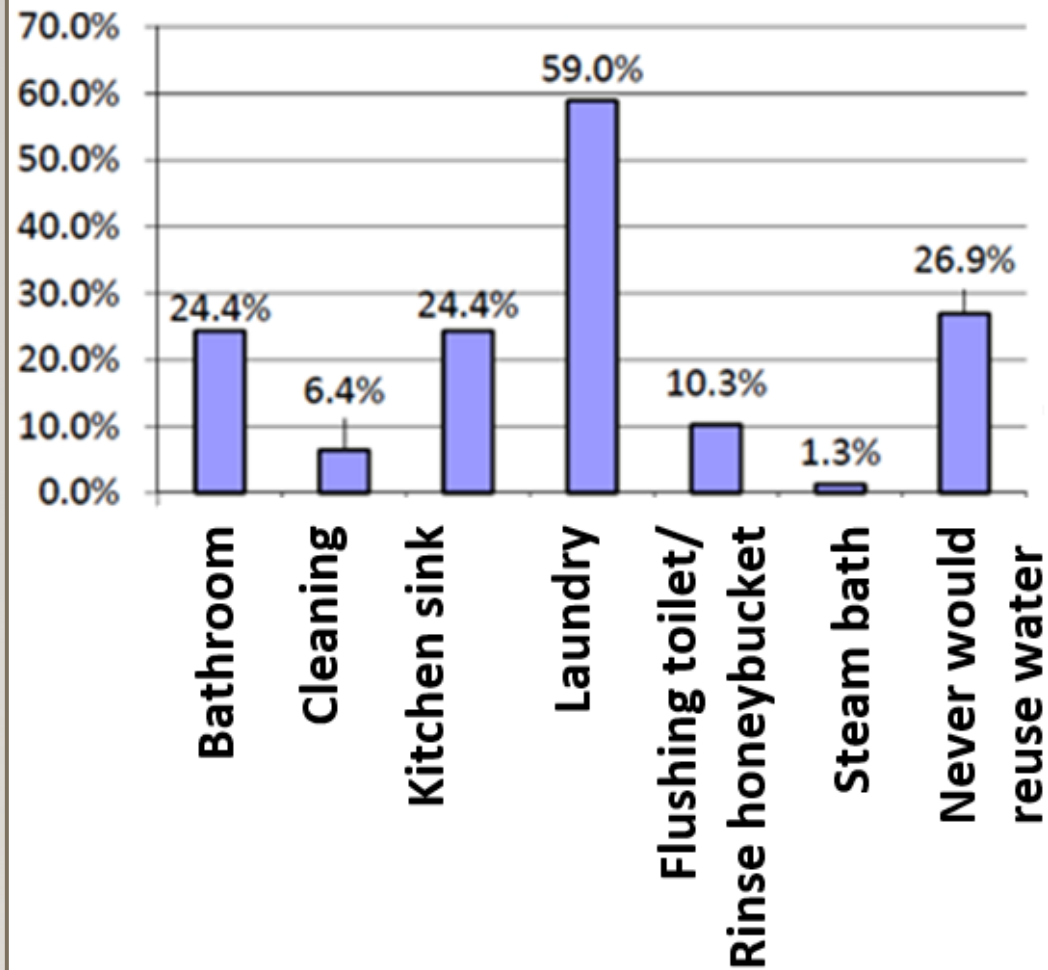


### Q12 Untreated water from rain, ice, spring water, stream OR Natural Water or Fresh Water?

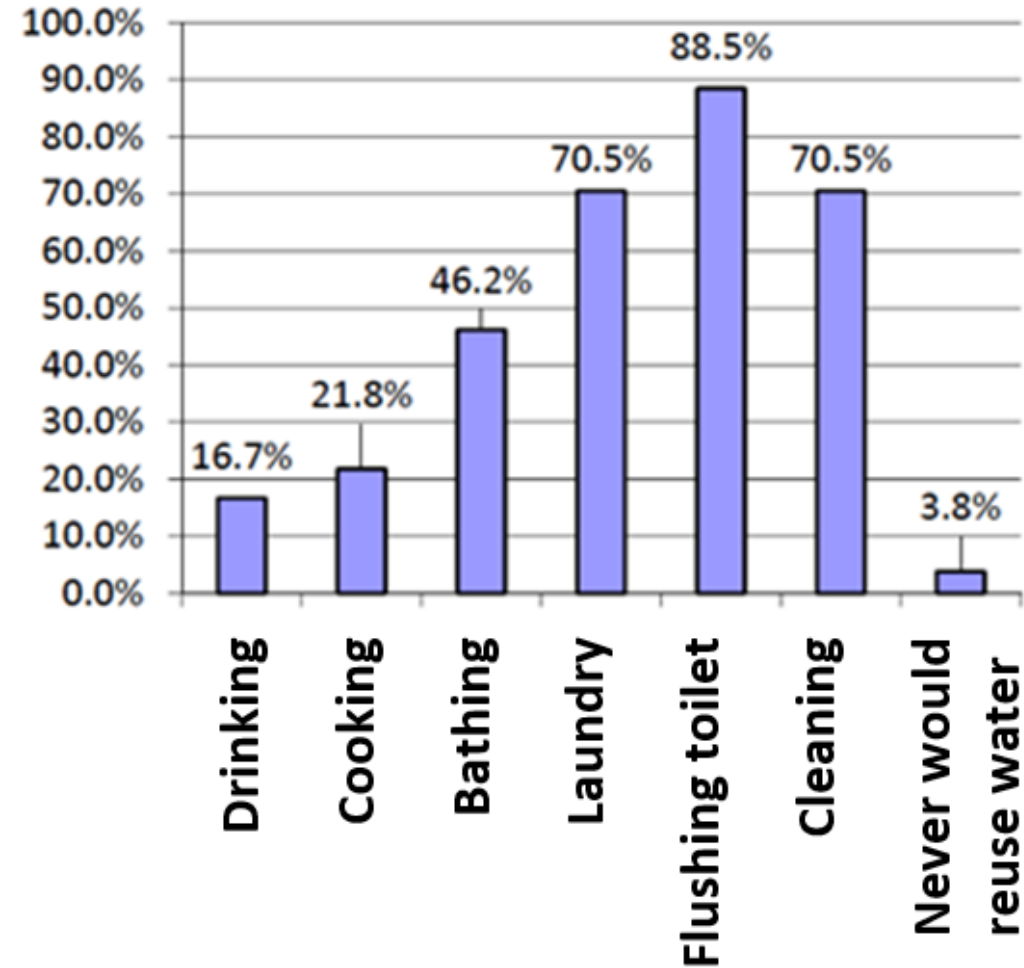
Answered: 18 Skipped: 4



**Figure 3. Current Rates of Re-using Water**



**Figure 4. Acceptance Rates of Re-used Water**



- Very similar responses were seen for two regionally variant communities regarding acceptable uses for recycled water. In both, water is currently re-used in several ways by 73% of respondents. In future scenarios, where water is first treated, acceptance of re-using water considerably **INCREASES** to 89%. Flushing the toilet is over 8-fold higher than current practices, and cleaning is 11-fold higher.

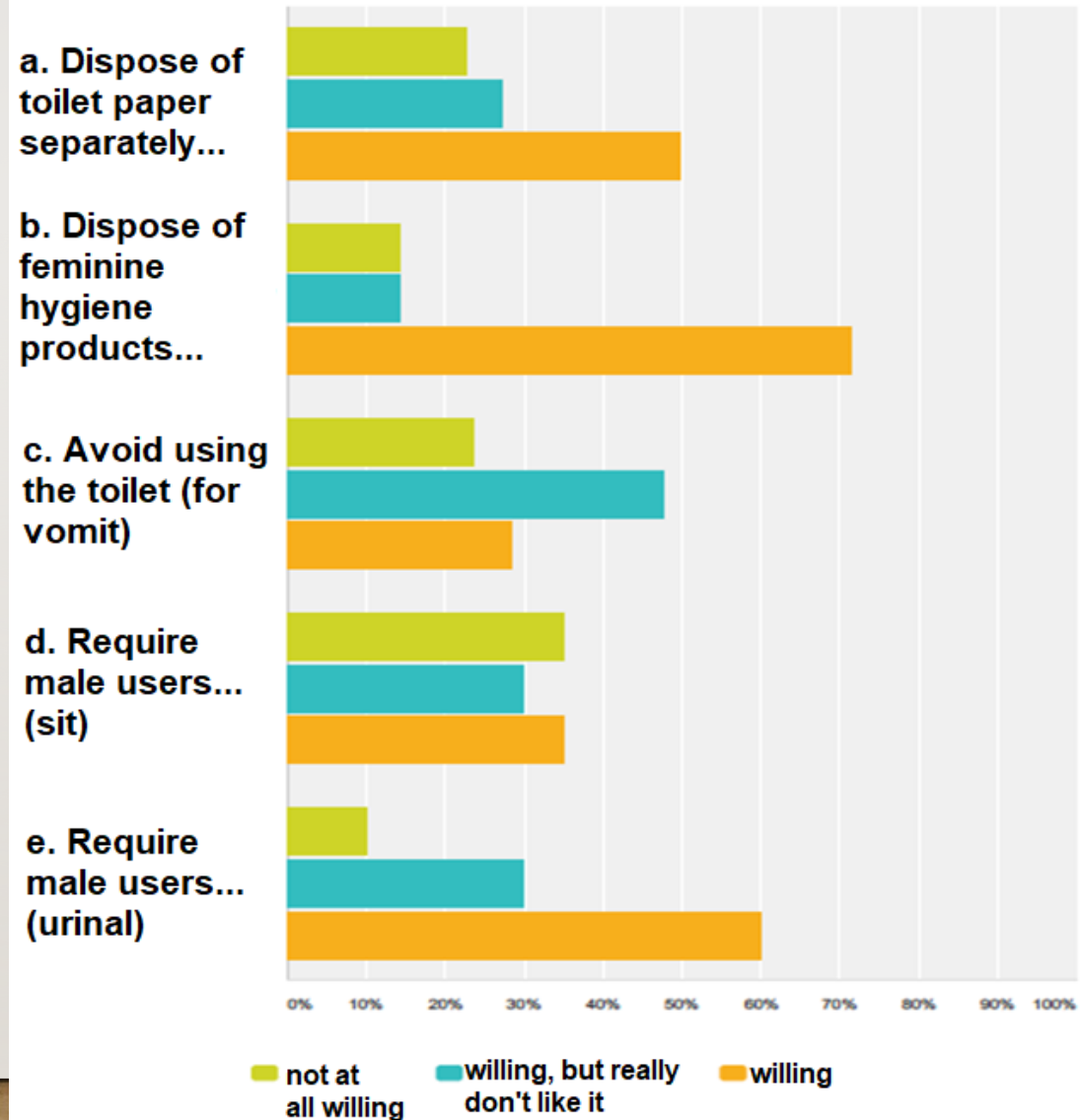


- End-users are willing to modify some behaviors for the system to work.

This might be dependent on what they already do, or have seen in use.

**Q6 4. How willing are you to do the following so that an in-home system works well. Please checkmark your answers:**

Answered: 22 Skipped: 0



# QUESTIONS?

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