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Will They Buy It? Consumer Willingness to Pay for Agricultural Products Irrigated with Recycled Water

A Review of Recent Studies

Due to increasing stress on existing water resources, many farmers are considering alternative water sources to maintain the long-term sustainability of production. One option is recycled water, highly treated municipal wastewater that is then used for agricultural and other beneficial purposes. Farmers have expressed interest in recycled water but want to know if consumers would buy products made with it. This document is a summary of results from economics experiments on consumer willingness to pay for agricultural products made with recycled water, including how different types of information affect consumer willingness to pay for these products.

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Introduction

Farmers are innovators and use cutting-edge technologies to improve yields and management of natural resources. In response to increasing stress on existing water resources, many farmers are considering alternative water sources to maintain the long-term sustainability of agricultural production. One option is water reuse, which is the use of highly treated municipal wastewater for agricultural and other beneficial purposes such as landscape irrigation, industrial processes, toilet flushing, and replenishing a groundwater basin (Dery et al, 2018). Water reuse, sometimes called water recycling, can provide a reliable, lower-cost water resource, that is resilient to environmental factors such as drought and extreme precipitation which can both impact water quality (U.S. Environmental Protection Agency, 2018).

Farmers have expressed interest in water reuse for agricultural production but have also cited a number of concerns about its use. One concern is whether consumers will be willing to buy produce irrigated with recycled water. Consumer acceptance of this alternative water source is critical for farmers' economic success (Suri et al, 2019). In other words, farmers want to know: "Will consumers buy it?"

This factsheet provides a summary of results from a series of behavioral economics experiments that shed light on consumers' willingness to buy agricultural products made with recycled water, including how processing affects consumer willingness to pay; demographic differences; the influence of information on consumer willingness to pay; preferred water terminology; a summary of research results; and what this information may mean for farmers.

The results presented in this report are from several experiments that used different terminology to describe the concept of water reuse. To maintain the accuracy of the findings, terms used in this document reflect those used in the economic experiments. Water reuse, water recycling, and reclaimed water all refer to highly treated effluent from municipal wastewater treatment plants (Bastian, 2012). These three terms will be used interchangeably in this report.

These studies, and this summary report, are part of CONSERVE: A Center of Excellence at the Nexus of Sustainable Water Reuse, Food and Health that brings together interdisciplinary research to enable the safe use of nontraditional irrigation water, including recycled water, on food crops.

Consumers Were More Willing to Buy Processed Foods Made with Recycled Water Compared to Fresh Foods

Processed food in this study referred to items that had been dried or liquefied (Savchenko, Li, Kecinski & Messer, 2019). Consumers were less likely to buy fresh fruits and vegetables irrigated with recycled water (Savchenko, Kecinski, Li, Messer, & Xu, 2018). Fresh foods referred to fruits and vegetables that have not been altered from their original state.

Consumers were willing to pay the same price for processed foods (raisins, dried olives, grape juice, and olive oil) grown with recycled water as they would for processed foods grown with conventional water. Processing might relieve some concerns over the use of recycled irrigation water because there are several processing steps that create separation between the food product and the recycled water (Savchenko et al., 2019). However, in a study focused on wine, consumers were less willing to pay for wine when they had information about the type of water used to grow the grapes, even if it was conventional water (Li, McCluskey & Messer, 2018). This could mean that for at least some products, consumers simply prefer not to think about how the product was made.

Research Shows Demographic Differences in Willingness to Purchase Agricultural Products Irrigated with Recycled Water

Farmers and distributors may want to consider demographic differences when marketing, which will be discussed in more detail in the following section.

Using highly treated effluent from wastewater treatment plants (pictured) is called water reuse, water recycling, or reclaimed water. Photo by Dr. Rachel Rosenberg Goldstein.

- Younger adults were more willing to buy processed foods irrigated with recycled water, which may be due to a greater concern among older adults about health risks (Savchenko et al., 2018).
- Consumers were less likely to buy foods made with recycled water when there were children in the household. This may be because parents are more risk-averse in choosing food for children to eat (Savchenko et al., 2018).
- Consumers with higher household incomes were less likely to purchase fresh and processed foods made with recycled water (Savchenko et al., 2019).

What is the Influence of Information on Consumers' Willingness to Pay?

Consumers were less willing to pay for produce that they knew was grown with recycled water than produce grown with an unspecified type of water (Savchenko et al., 2018). This may show that to some extent, consumers prefer to simply not think about what type of water was used to make the products they use.

Giving consumers only negative information about recycled water reduced willingness to pay for products grown with this water source. When consumers were told about the potential for contact with pathogens when handling produce irrigated with recycled water, it reduced willingness to pay by almost 50% (Savchenko et al., 2018).

Positive messages about the environmental benefits of recycled water, such as how recycling water creates a dependable water source and can reduce and prevent pollution, did not significantly affect consumer willingness to pay (Savchenko et al., 2018).

However, giving consumers information about both the environmental benefits and the health risks associated with water reuse increased consumers' willingness to pay by 30% (Savchenko et al., 2018). Balanced information was the most effective strategy for increasing consumer demand for produce irrigated with recycled water.

Farmers and distributors should consider providing buyers with a candid message about the use of recycled water in agriculture, rather than trying to only share the benefits. Buyers may feel they are able to make an informed decision when they have more information.

Another important way farmers and distributors share information about products is through marketing and food labels. A key point when branding and marketing products irrigated with recycled water is to focus on the water quality rather than the process used to treat it.

Consumer Rankings Showed Preferred Terminology

According to Ellis et al. (2019), from a list of 21 possible options, consumers ranked common water reuse terms such as "recycled," "reclaimed," and "reused" low on the list of preferred words (Table 1). Terms like "all-natural," "eco-friendly," and "fresh" were ranked significantly higher. The most favorable term for consumers was "pure water." In fact, when pure was added to the word recycled, it increased the ranking of the term among consumers from number 16 to number 7. Consumers prefer to hear about the water itself and not to think about how the water achieved a high level of cleanliness.

Experimental Summary: Consumers Willing to Pay for Some Products Made with Recycled Water, but Less than for Similar Foods Grown with Non-recycled Water

> Giving consumers information about both the environmental benefits and the health risks associated with water reuse increased consumers' willingness to pay by 30 percent

There were some differences in preferences based on age and household characteristics. Consumers were more comfortable purchasing processed agricultural products (olive, raisins, etc.) made with ingredients irrigated with recycled water than with fresh produce irrigated with recycled water. There is also some evidence that being asked to think about the water source used to make a product reduced consumer willingness to pay. However, consumer willingness to pay increased when they received balanced messages about the potential health risks and the environmental benefits of recycled water.

Table 1. Aggregated rankings of how recycled water term preferences among consumers

Rank	Branding Name
1	Pure Water
2	All-natural Water
3	100% Fresh Water
4	All Fresh Water
5	Eco-Friendly Water
6	Advanced Purified Water
7	Pure Recycled Water
8	EcoWater
9	ReNew Water
10	Sustainable Water
11	Advanced Purified Recycled Water
12	NEWater
13	EnviroWater
14	Fresh20
15	Green Water
16	Recycled Water
17	Reclaimed Water
18	Nontraditional Water
19	Treated Wastewater
20	Low Footprint Water
21	Reused Water

Adapted from Ellis at al., 2019.

After Reviewing Experiments, What can Farmers do with this Information?

Possible areas for future exploration identified by the authors of this factsheet include normalizing water reuse among consumers by sharing this type of information at farm stands or farmers markets. There may also be an opportunity to educate distributors about recycled water. Distributors may be in a better position to change marketing and branding on products sold in retail establishments, which is how most consumers purchase food. Consumer buy-in is vital to the adoption of water reuse in agriculture, which will play an important role in ensuring agricultural production can thrive for generations to come.

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For more information about recycled water in agriculture, including fact sheets and videos, visit www.conservewaterforfood.org

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MAYHAH SURI[a]
msuri1@umd.edu

SAMANTHA AMMONS[b]

DR. RACHEL ROSENBERG GOLDSTEIN[a,c]

[a]University of Maryland, College of Agriculture & Natural Resources Department of Agricultural Resource Economics

[b]University of Maryland, School of Public Health, Department of Epidemiology and Biostatistics

[c]University of Maryland, School of Public Health, Maryland Institute for Applied Environmental Health

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