

Using the Water Wheels Outdoor Water Conservation Laboratory to Expand Water Quality Education



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ABSTRACT

Water is one of our most crucial natural resources. Alabama Extension at Alabama A&M University offers a unique outreach delivery system to educate youth and adult residents on how to conserve water, harvest and utilize rainwater, and improve the overall water quality in the environment. The Home Grounds Water Wheels Outdoor Water Conservation Laboratory is a 36-foot mobile water conservation laboratory that provides hands-on, engaging workshops and demonstrations. Implemented in 2012 with a USDA-NIFA Capacity Building Grant, the mobile laboratory engages 5-12 grade youth and adults.

During the 2022-2023 program year, the mobile learning platform traveled to more than a dozen events throughout Alabama, including water festivals and Earth Day events, bringing conservation learning to more than 16,500 youth and adults. As a result, program participants increased their knowledge of watersheds, rainwater collection, water conservation, water quality, and integrated pest management. Ninety-five percent of those surveyed said they would share what they learned with others. Seventy-five percent of participants agreed they would adopt at least one of the recommended best management practices.

OBJECTIVE

The goal of this project is to build the technological and delivery capacity of Urban Extension and to provide interactive, dynamic programs that will motivate participants to increase water conservation, reduce reliance on municipal or community water, and reduce pollution in our rivers, streams, and lakes.

Subsequent Elements

- Element I:** Build Alabama Extension's capacity to deliver water conservation education to underrepresented clients.
- Element II:** Increase knowledge of rainwater collection among participants.
- Element III:** Create behavior change in participants toward water conservation.
- Element IV:** Provide learning forums for extension staff and clientele statewide.
- Element V:** Decrease energy consumption for water delivery and treatment facilities.
- Element VI:** Reduce the level of pollutants entering lakes, streams, and rivers.
- Element VII:** Reduce the amount of municipal and community water used by clientele in urban and rural settings.

INTRODUCTION

Water is one of our most vital resources, even more, important than oil. Water sustains agriculture and, thus, our food chain. Vast quantities of water are used to make the silicon chips that help power our computers and cell phones. It could be said our economy runs on water. Global climate change could generate weather that will exacerbate water pollution and impact our ecosystems, human health, water system reliability, and operating costs. As a result of these changes, the stresses of population growth, land-use change, and urbanization will more adversely impact the environment.

Water demand will grow in the coming decades, primarily due to population growth and demand for irrigation water. However, current water management practices are likely to be inadequate to reduce the negative impacts of climate change on water supply reliability, flood risk, health, energy, and aquatic ecosystems.

We have developed a unique extension outreach delivery system to educate residents on how to conserve water and enhance its quality. It teaches students the importance of water conservation for their future and instructs farmers to use conservation interventions that reduce their irrigation needs. It also educates community planners about water conservation and quality preservation to increase infiltration and groundwater reserves while lowering water treatment infrastructure costs and improving the quality of lakes and streams used for community water and recreation.



Figures. Home Grounds Water Wheels Outdoor Water Conservation Laboratory Snapshots.

NIFA/USDA Relevant Priority Areas

Human health, food safety, water quality, global food security, agricultural bio-security, sustainable agriculture, youth development and family and consumer sciences.



Figure. Home Grounds Water Wheels Outdoor Water Conservation Laboratory.

Table 1. Qualitative Outcomes for the Water Wheels Program.

Outcome Measures	2018	2019	2020	2021	2022	2023	Totals
1. Number of statewide requests for Water Wheels.	11	15	18	20	23	25	112
2. Number of expos and festivals events attended.	11	15	5	5	23	24	83
3. The number of youth and adults trained in water collection.	3509	5405	436	500	5300	5600	20,750

RESULTS

Program Outputs

During the 2023 program year, the mobile learning lab traveled to more than a dozen events throughout Alabama, including water festivals and Earth Day events, bringing conservation learning to more than 5,600 youth and adults. As a result, program participants increased their knowledge of watersheds, rainwater collection, water conservation, water quality, and integrated pest management. Ninety-five percent of those surveyed said they would share what they learned. Eighty-five percent of participants agreed they would adopt at least one of the recommended best management practices.

Program Outcomes

- Increased knowledge gained on environmental issues assessed using pre/post-test measures.
- Increased adoption of rainwater collection and best management practices (BMPs).
- Decreased costs associated with the amount of municipal water used by clientele.
- Environmental and economic gains from reducing energy consumption for water delivery and treatment.

Water Wheels Programs and Participation

- Program outcomes from 25 workshops revealed significant increases in knowledge from very low to moderate (1-3) before the workshops to ratings of high to very high (4-5) after the workshops (n = 13,250).
- Positive behavioral changes: 95% of participants said they would practice water conservation and adopt at least one of the recommended best management practices.

Table 2. Knowledge gains among educators.

1. Participants who increased their knowledge of how rainwater can be collected.	92%
2. Participants who showed knowledge gains concerning water supply as an epidemic in America.	86%

Water Wheels Future Programs

Water Wheels continues to receive programming requests throughout the year. Our ultimate goal is to increase the utilization of this mobile learning platform, adding more engaging, interactive resources. Future plans also include more delivery of adult home grounds, water conservation, water quality, and integrated pest management programs to all nine Urban centers in Alabama. The targeted audiences will include but are not limited to small urban farmers, urban homeowners, k-12 educators, and apartment residents. We also plan to offer new adult curricula focused on multiple disciplines. This will involve the Home Grounds-Urban Gardens, Sustainable Landscapes and Forestry, Wildlife and Natural Resource Management, and Integrated Pest Management Teams. In summary, water resource management touches many disciplines and is an essential program within Extension.

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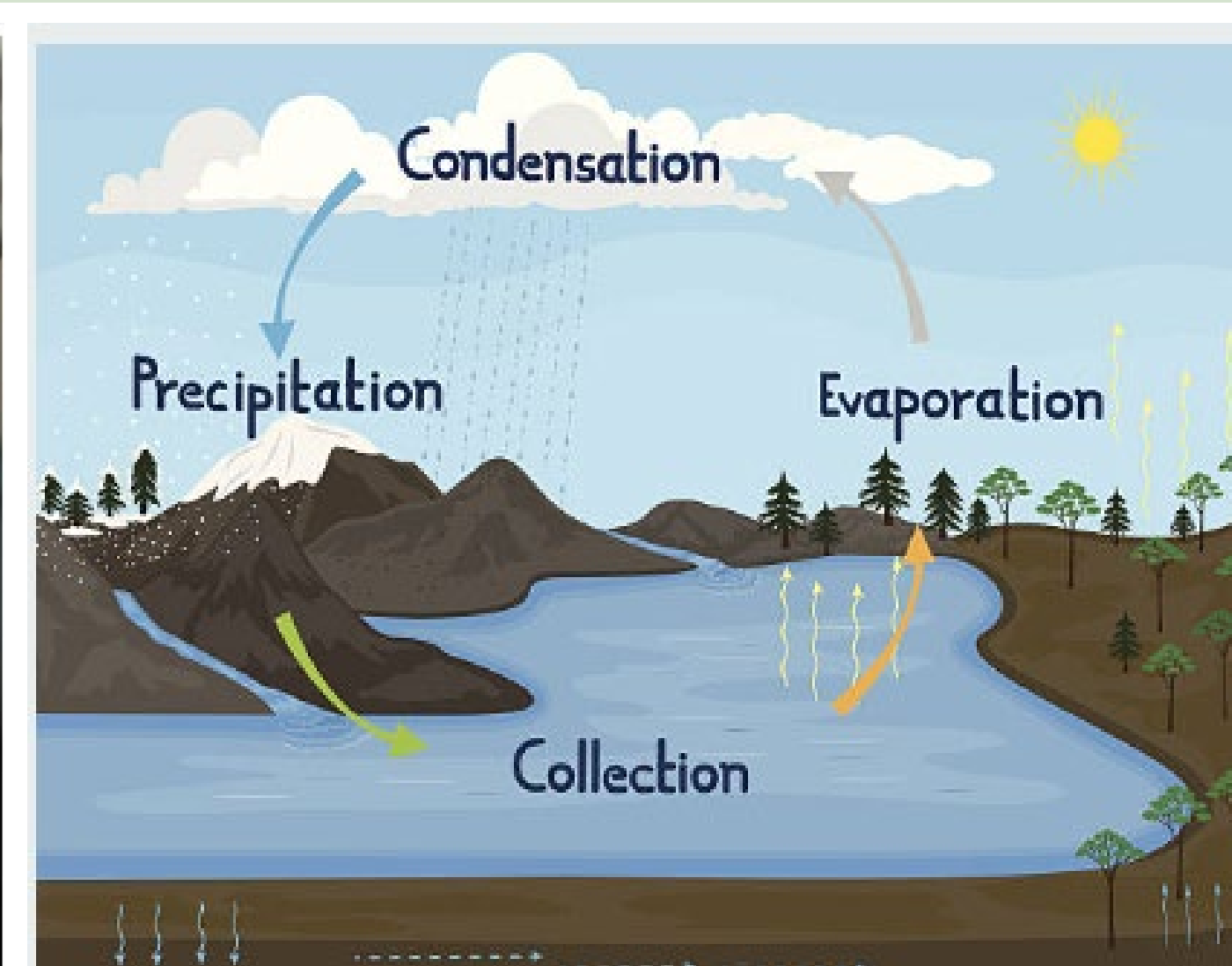
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Figures. Home Grounds Water Wheels Outdoor Water Conservation Laboratory Snapshots.