

P.A.L.M.S.

Precipitation Access Localized Modular System

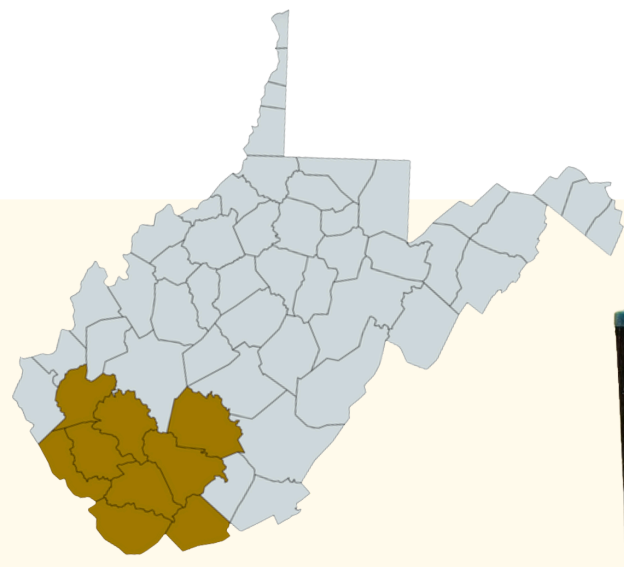
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Helping Coalfield Residents Access Drinking Water that is **Safe, Trustworthy and Affordable**

Problem

300,000

- Residents in WV Coalfield Counties suffer from **contaminated drinking water**



"Use A Filter"

Causes:

- Straight-piping
- Coal Blasting Industry
- Deteriorating water lines



"Just Boil It"



Local Spring Water: Contains E-Coli

Status Quo:

- Municipal projects** cost **\$287 million** for **4 counties**
- Residents spend **10-15%** of income on **bottled water**
- Water **purification tablets** taste poor & fail to remove heavy metals
- Extreme contamination shortens **filter** lifespan

~75% of roofs are **asphalt shingle tiles**

Leach heavy metals & toxic compounds

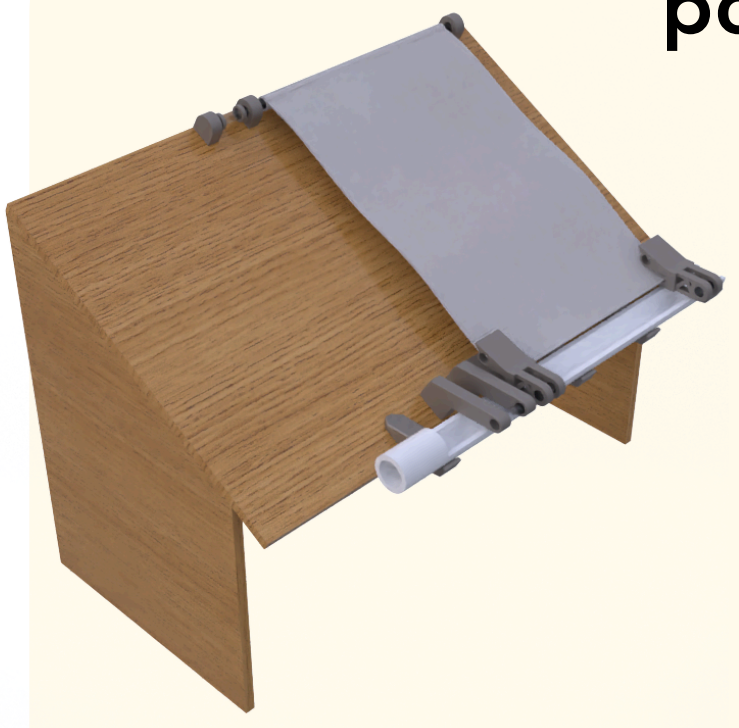
Barrier to Rainwater Collection

OUR SOLUTION:

DIY MODULAR RAINWATER COLLECTION SYSTEM

1. Collection

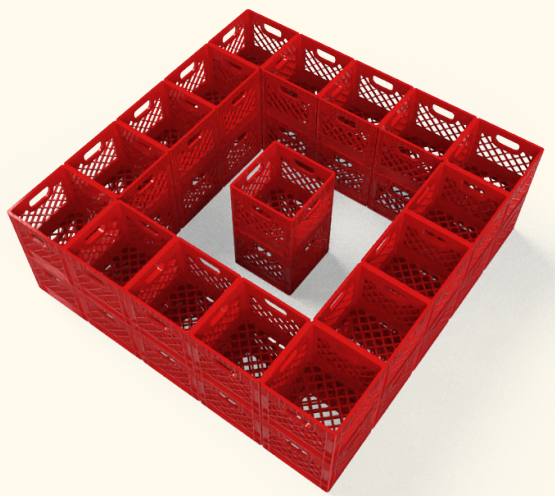
A **retractable tarp** that allows **potable rainwater collection**.



- Avoids **leaching surfaces**
- Rolls back to reduce:
 - UV exposure**
 - Moisture damage**
 - Visual mark**

2. Storage

An in-ground **milk crate water tank**.



- Sealed by **RPE liner**
- Structure** supported by crates
- Natural **insulation**

3. Filtration

Cheap & simple filtration components ideal for a **rural, low-income** background.

Mesh

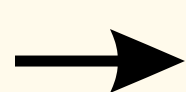
Large debris

Carbon Block filter

Sediment
Chemicals
Bad tastes & odors

Ceramic candle

Bacteria
Protozoa
Fine sediment

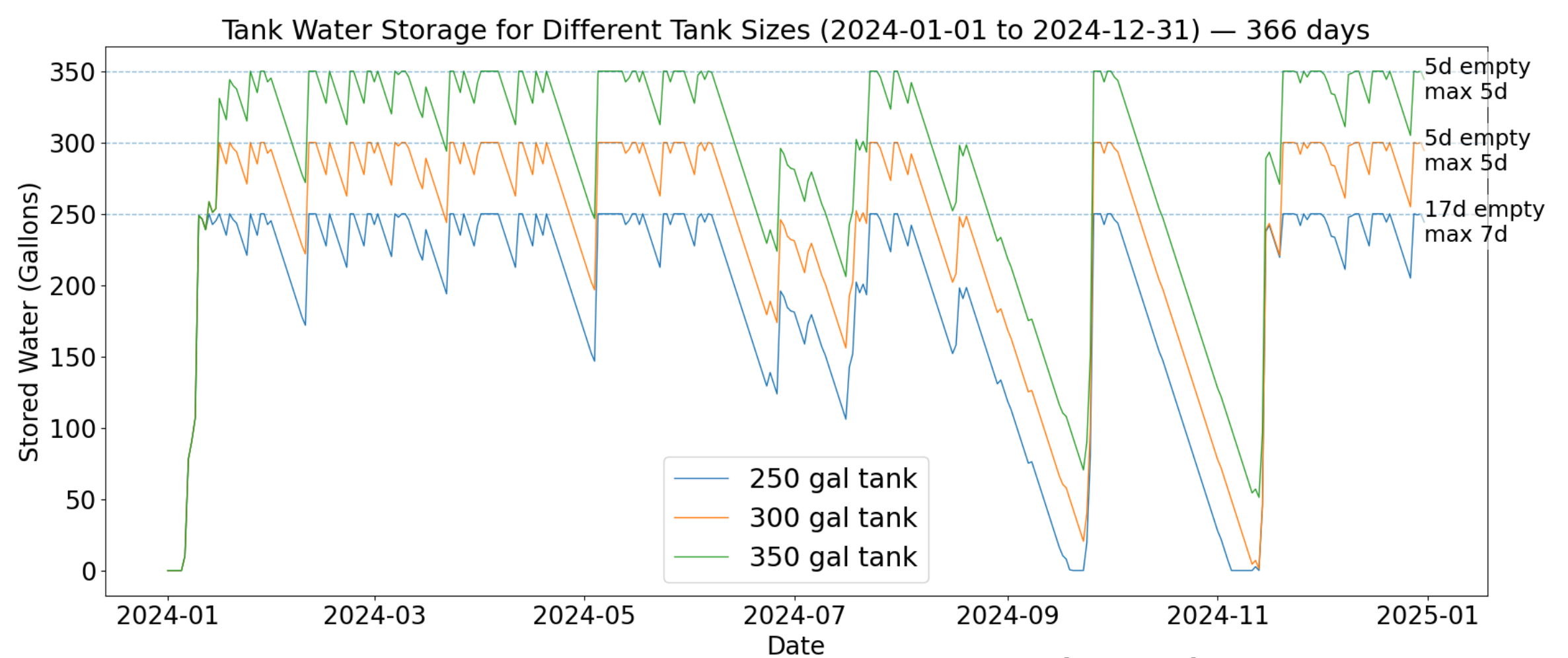


Sample before & after filtration experiment.

Future Plans

- Rain **sensor** and **motor** to **automate** tarp
- Determine **structurally stable** tank configuration
- Prove water **filtration** system **trustworthy**

Simulation & Testing:



- Results from the worst recent rainfall year (2024)
- 16' x 20' tarp** → **320 sqft** collection surface
- 350 gal** size chosen as conservative estimate

Cost Analysis



350 Gal Tank:

	Our Design	IBC Tote	Savings
Base Cost	\$256.55	\$370.2	30.7%
+ Digging	+\$102.35	+\$0	
+ Insulation	+\$0	+\$92.7	
Total	\$358.9	\$462.9	22.5%

Entire System:

	Bottled Water	Our Design	Months to Pay Off	Savings
Base Cost	\$150 / month	\$519.05	3.5	
w/ Digging		\$621.4	4.1	
Annual Cost	\$1,800	\$54.84		97.06%

One resident → Community Adoption.