



Unearthing the Water Benefits of Urban Agriculture

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COLORADO

Department of Local Affairs

Division of Local Government

Moderator



Christy Wiseman
Land Use and Water Planner,
Community Development Office,
Colorado Department of Local Affairs (DOLA)

Speakers



1) Victoria Arling
Colorado Basin Program Manager,
WaterNow Alliance



2) Lindsay Rogers
Water Policy Analyst,
Western Resource Advocates



3) Matthew Cook (Quint) Redmond V
Co-Founder/CEO,
Agriburbia LLC



4) Kevin Reidy
Senior Water Efficiency Specialist,
Colorado Water Conservation Board

EVALUATING URBAN AGRICULTURE AS A WATER MANAGEMENT TOOL

Victoria Arling, CO Basin Program Manager, WaterNow Alliance

Lindsay Rogers, Water Policy Analyst, Western Resource Advocates



Who is WNA?

WaterNow is a nonprofit network of local water leaders advancing sustainable, affordable, equitable, and climate resilient water solutions in their communities

- **Policy advocacy** - to create pathways for sustainable and affordable strategies
- **Forum for engagement** - to connect water leaders to ideas, resources, opportunities, and one another
- **Technical assistance** - to implement projects on the ground

“All production of plants or animals that takes place in or near a city, whether for personal use, for sale, or for charitable distribution, regardless of growing medium.”

Benefits

Social



Environmental



Economic





1. Can urban agriculture in Colorado help us to both **manage stormwater runoff and reduce our demand on municipal water supplies?**
2. And if so, what **policy actions** can be taken to encourage urban agriculture as a land use planning and water resource management tool?

Project Scope



Phase 1
Literature Review



Phase 2
Stakeholder
Interviews



**PUEBLO
FOOD
PROJECT**



**AURORA
WATER**



**CITY AND COUNTY
OF DENVER
COLORADO STATE UNIVERSITY
EXTENSION**



**boundless
landscapes**



**COLORADO
STORMWATER
CENTER**

AGRIBURBIA®



Project Scope



Phase 1
Literature Review



Phase 2
Stakeholder
Interviews



Phase 3
Policy Action
Roadmap

Water Conservation and Urban Agriculture



- Water savings
- Difficult to quantify

Water Savings Quantified

Denver Water & Denver Urban Gardens (2015)

- Community gardens: 11 gal/ ft²
- Traditional bluegrass: 18 gal/ ft²
 - **40% water savings**

Aurora Water (2015)

- Turf to veggie conversions at two sites (City Hall and Griswold)
 - **74% water savings**

California Farm & Garden (2021)

- Replacing lawns with vegetable and fruit gardens
 - **75% water savings**

Water Conservation Implications



- Embodied water savings
- Fallow ground during drought times

Xeriscape



Picasa

Water Conservation BMPs

- Irrigation techniques
- Soil amendments
- Mulch
- Crop type
- Rain barrels / water capture



Victoria Arling

Water Conservation Challenges



- Education
 - Watering techniques / crop selection
- Lawn culture

Stormwater Management and Urban Agriculture

"Urban agriculture is an innovative green stormwater infrastructure tool that can be implemented in vacant lots or previously vegetated areas. Urban agriculture not only reduces stormwater runoff but it also increases the nutritional health of the surrounding community, improves the local economy, and provides residents with green space."

- American Rivers, 2015

Stormwater Management and Urban Agriculture

- **Sister Garden Farms - Denver**
 - **Designed proactively to manage stormwater**
- **City and County of Denver - Green Infrastructure Implementation Strategy (2018)**
 - **Water Resources Center at the National Western Complex**
- **New York (2016)**
 - **Community gardens in NYC may be retaining 12 million gallons of stormwater annually**

Stormwater Management BMPs

- Regenerative Farming Practices
 - Garden placement
 - Water control / diversion
 - Crop selection



Denver Post, Sister Gardens

Stormwater Management Challenges



- Inundating crops
- Raised beds
- GSI features / equipment
- Nutrient runoff

WHO IS WRA?

Western Resource Advocates

- We are a conservation organization with more than 30 years experience in the Intermountain West
- We use law, science, and economics to craft innovative solutions to the most pressing environmental challenges
- We work to conserve western lands, advance clean energy, ensure healthy rivers, and protect air quality throughout the region

OUR MISSION: Western Resource Advocates is dedicated to protecting the West's land, air, and water to ensure that vibrant communities exist in balance with nature.

www.westernresources.org



**WESTERN
RESOURCE
ADVOCATES**

PROTECTING THE WEST'S LAND, AIR, AND WATER





1. Can urban agriculture in Colorado help us to both manage stormwater runoff and reduce our demand on municipal water supplies?
2. **And if so, what policy actions can be taken to encourage urban agriculture as a land use planning and water resource management tool?**

Knowledge & Research Gaps

1. **Studies/demonstration projects** quantifying water use & retention associated with urban ag in CO
 - Variables: varying water years, irrigation type, crop type, soil type and amendments, garden layout, scale of operation, location
2. **Green stormwater design** and BMPs for urban ag in CO
 - e.g. addressing infiltration challenges
3. **Next generation urban ag practices**
 - Green roofs, indoor vertical farming, Cannabis
4. **Drought-tolerant, climate resilient crop varieties**

Water-Related Barriers & Policy Considerations

1. Cost of Water
2. Access to Water
3. Water Reuse
4. Turf to Urban Ag Conversions
5. Water Education, Resources & Funding



Denver Post, Lone Tree Garden

Cost of Water



Challenge:

- Municipal, treated supplies more expensive than raw, ditch water
- Unique infrastructure needs (e.g. backflow prevention)

Policy Considerations:

- Shift in thinking - Urban ag as a form of infrastructure
- Subsidies to reduce cost of water or plot fees (low-income gardeners)

Access to Water

Challenge:

- Tap fees are cost prohibitive
- Accessing water early/late in the season on CII property

Policy Considerations:

- City subsidizes urban ag tap fees
- Work with developers to negotiate discounted tap fees
- Develop long-term agreements, relationships with CII property owners
- Subsidies/funding for frost free hydrants or water tanks



Water Reuse

Challenge:

- Restrictions on graywater, rainwater capture and centralized recycled water

Policy Considerations:

- Update Reg 86 to allow for irrigating edible produce
- Update HB16-1005 to allow rain barrels on CII properties; expand stormwater capture regulations
- Reg 84 implementation - pilot programs, reclaimed water infrastructure

Turf to Urban Ag Conversion

Challenge:

- Unlike xeriscape, urban ag doesn't receive rebates/incentives for turf changeouts

Policy Considerations:

- Recognize urban ag as conservation tool in Water Efficiency Plans
- Update turf replacement rebate guidelines to allow for conversion to urban agriculture

Water Education, Resources & Funding

Challenges:

- Equity / access to information and resources
- Under-resourced nonprofits / Extension programs
- Lack of state funding

Policy Considerations:

- Colorado Water Equity Partnership
- Educational centers
- Metro Basin Roundtable representation
- Metro Water Conservation District
- Funding for urban ag non-profits / universities
- CDA's new Urban Ag specialist to act as "hub"

Land Use Barriers & Policy Considerations

1. Access to land
2. Season extension
3. Edible crops & livestock limitations



DUG Morey Garden

Access to Land

- Prioritize/recognize in Planning (Comp Plan, Sustainability Plan)
- Allow in all or most zoning districts
- Require/incentivize in new development
 - Menu of options to meet community amenity requirements
 - % of open space / park space
- Include in Low Impact Development ordinance, MS4 criteria manual
- Create long-term leases on City-owned property/parks

Montava plans town center, working farm in first phases of 4,000-home Fort Collins project

Pat Ferrier Fort Collins Coloradoan

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Season Extension

- Create permitting processes & exemptions for high tunnels (streamlined & affordable)

City of
Fort Collins



Growing in a High Tunnel

EVALUATE YOUR PRODUCTION
GOALS AND SKILLS

environment your tunnel will create and how it will perform with respect to temperature, wind and snow loads, hail impacts, and relative humidity, throughout the year. Consider the size of tunnel, shape and permanence of the structure, and where you will erect it. Start by asking yourself if you can cover your tunnel purchase, construction and maintenance costs by selling or using all the produce you grow. Do you have the time to manage a high tunnel during the winter months when you may need to protect your plants from very low temperatures with row

Edible Crops & Livestock Limitations



- Animal husbandry limitations
- Vegetable gardens in planting strips / ROW
- Setback requirements/buffers for small lots
- HOA limits around urban ag

Next Steps

Policy action roadmap w/ recommendations for Water Plan:

1. Acknowledge urban ag and associated water benefits
2. Identified knowledge gaps and research needs
3. Identified funding/resource needs
4. State and local policy opportunities w/ BMP Guide



THANK YOU!

Lindsay Rogers,
lindsay.rogers@westernresources.org



Victoria Arling,
va@waternow.org

