

# Innovative Production

## Local Policy Barriers and Strategies for Urban Agriculture

In places where soil access is limited, space is tight, or growing seasons are short, alternative food production methods like hydroponics, aquaponics, aeroponics, and vertical farming can offer practical solutions. In cities and peri-urban areas, these methods can be operated in warehouses, rooftops, shipping containers and other marginal or otherwise unused spaces to grow food year-round. While not replacements for outdoor, soil-based farming, innovative agricultural production expands the range of what is possible in terms of local food production. Producers using these systems often face unclear regulations, high utility costs, and other policy barriers. By updating policies and providing targeted support, cities and other local governments can expand the options available for food production.

## Innovative Food Production Systems and Their Benefits

### Controlled Environment Agriculture (CEA)

Any system—indoor or enclosed—that controls light, temperature, humidity, and other factors that impact plant growth.

**WHY USE IT**

Extends the growing season or enables year-round production; reduces weather, pest, and disease risks; allows precise control over crop conditions.

### Season Extension Structure

A permanent or temporary structure that covers or encloses crops, such as a greenhouse, hoop house, high or low tunnel, or cold frame.

**WHY USE IT**

Protects seedlings and sensitive crops; reduces risk of extreme weather; creates warmer microclimate that extends the growing season.

### Rooftop Farm

A farm or garden on the roof of a building, often using raised beds.

**WHY USE IT**

Uses underutilized space; reduces building heat; produces food close to consumers.

### Vertical Farm

Stacked, indoor growing system that uses artificial lighting, primarily viable for leafy greens, herbs, and flowers.

**WHY USE IT**

Reduces land use by using warehouses, shipping containers, or other spaces not typically used for food production; enables year-round production.

### Hydroponics

A method for growing plants without soil, using a nutrient-rich water and often an inert substrate to support the roots.

**WHY USE IT**

Ideal for small, indoor spaces; allows precise nutrient and temperature control; faster plant growth; enables year-round production.

### Aquaponics

A system that combines hydroponics and aquaculture in a closed-loop system.

**WHY USE IT**

Produces fish and vegetables together; recycles water and nutrients; eliminates the need for fertilizer.

# Innovative Production Barriers and Policy Strategies

Innovative producers often fall outside the scope of laws and regulations that address agriculture. This can create uncertainty and roadblocks for producers who may otherwise be contributing to a city or region's local food production goals. Below are a few common challenges faced by producers setting up an innovative production system, along with strategies policymakers can implement.

| COMMON BARRIERS FOR FARMERS | STRATEGIES FOR POLICYMAKERS | RELEVANT PRODUCTION SYSTEMS |
|---|---|---|
| **Innovative food production is omitted or misclassified in zoning codes**, limiting where and how farmers can operate. | Update zoning codes to clearly define and permit practices and accessory structures, such rooftop garden beds, CEA facilities, or season extension structures. | Rooftop farms, season extension structures, CEA |
| **Indoor farming incurs high utility costs**, particularly for water and electricity. | Offer financial incentives like grants, off-peak utility rates, or lower rates specific to innovative food production. | Vertical farms, CEA, hydroponics |
| **Innovative producers face ambiguity in building codes** for spaces not designed for food production. | Consider innovative food production methods when updating and amending the building code. | Rooftop farms, CEA, vertical farms, hydroponics |
| **Circulating water systems and integration of fish into agricultural systems pose unique contamination risks** not addressed in standard food safety laws. | Update food safety guidance to account for innovative production methods such as aquaponics and hydroponics. | Hydroponics, aquaponics, CEA |

# Best Practices for Producers Using Innovative Food Production Methods

- **Check your zoning code.** Learn how your city's zoning rules apply to your production method, especially if you grow indoors or on rooftops.
- **Search for key terms.** Look for terms like *rooftop farm*, *hydroponics*, and *accessory structures* in the zoning code's definitions to clarify what's allowed.
- **Explore special use permits and variances.** If your practice is not allowed by-right in your zoning code, work with your local land use authority to see if you can apply for special permission.
- **Review building and energy codes.** Some CEA practices may trigger building or energy code requirements. Make sure you understand how your food production system applies.
- **Seek incentives and grant opportunities.** Depending on your growing operation, you may qualify for special utility rates or agriculture-specific grants.

USDA

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**Want to learn more?**
View the whole project at **cafs.vermontlaw.edu/projects/urban-agriculture-and-innovative-production** or scan the QR code.