URBAN SOIL HEALTH

Top 10 Small Farm Conservation Practices

We educate and advocate to improve soil health on Indiana's urban and diversified small-scale farms and gardens.

Created in 2024

urbansoilhealth.org

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Introduction

The Urban Soil Health Program (USH) is an initiative that began in Indiana in 2020. Since then, USH has been educating and advocating for soil health alongside urban and small-scale growers, as well as conservation partners across the state. The program operates within the Indiana Association of Soil and Water Conservation Districts (IASWCD), a non-profit organization that empowers each of Indiana's 92 soil and water conservation districts to address local natural resource concerns. Through IASWCD, the program receives financial support from the USDA's Natural Resources Conservation Service (NRCS), which provides technical and financial assistance to farmers.

Recently, many resources have been dedicated to conservation efforts in Indiana, including $6 million allocated to the Clean Water Indiana Program in 2023. This includes initiatives promoting soil health, particularly for urban and small-scale growers. The USH program works daily to elevate the voices of growers and partners, educating the public about soil health in diversified farming and food systems. Urban farmers, small-scale growers, homesteaders, and gardeners adopt practices that maintain the soil's ability to function as a vital living ecosystem. This booklet introduces the top 10 small farm conservation practices supported by the Natural Resources Conservation Service.

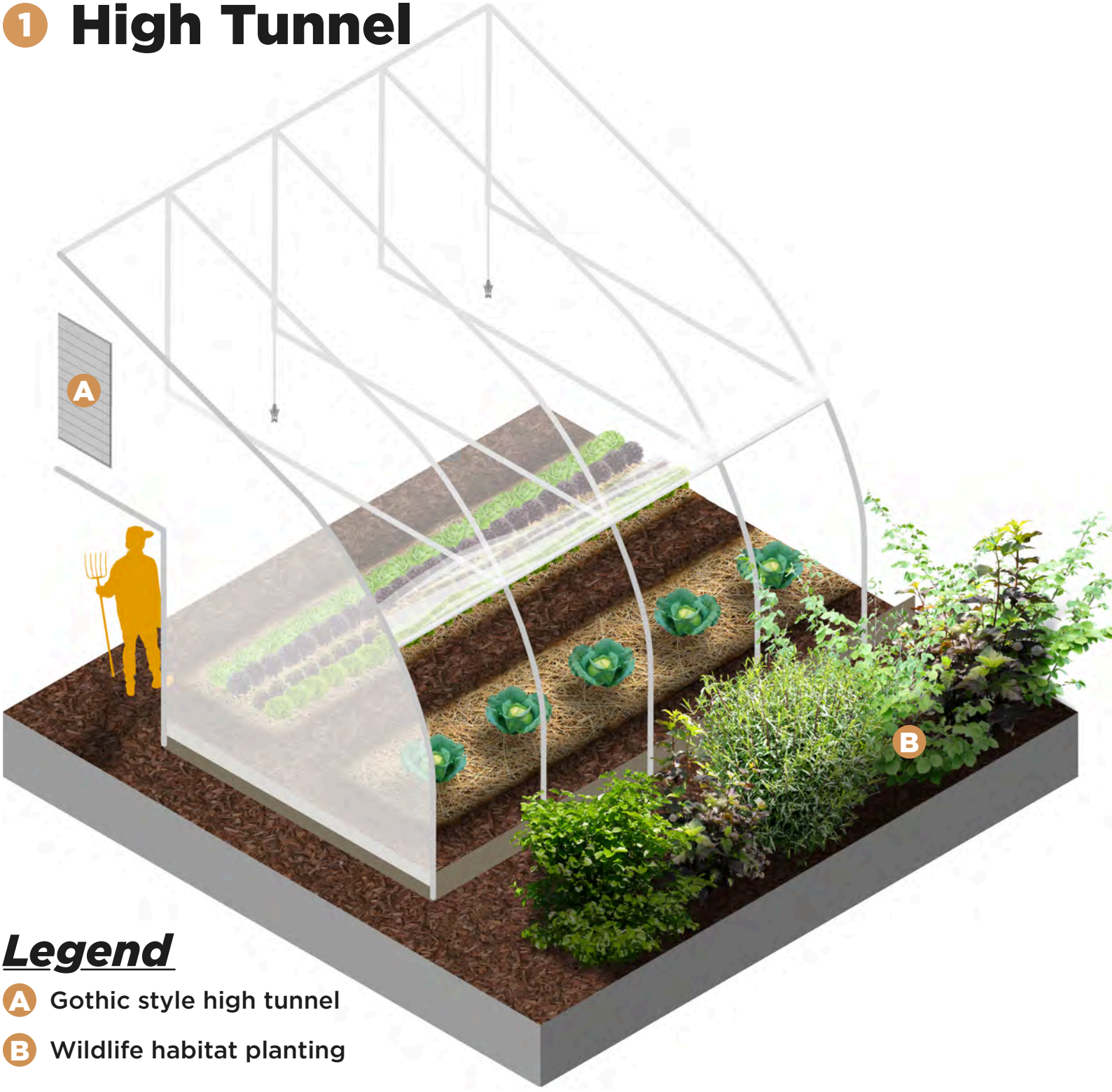
The practices outlined in this booklet address a wide range of resource concerns, including soil erosion, soil quality, water quality, air quality, plant health and productivity, animal health, and energy use. Our goal is not just to provide information, but to inspire action and foster a commitment to continually improving the health of the land we steward.

All graphics in this document were designed and rendered by: Nature Matters LLC

Legend

1. High Tunnel
2. Composting Facility
3. Wildlife Habitat Planting
4. Pest Management Tarping
5. Soil Carbon Amendment
6. Cover Cropping
7. Irrigation
8. Mulching
9. Alley Cropping
10. Low Tunnel

1 High Tunnel



Legend

A Gothic style high tunnel

B Wildlife habitat planting

High tunnels are enclosed structures that protect crops from sun, wind, excessive rainfall, and cold. These tunnels are made from plastic, polyethylene, fabric, or polycarbonate (for the end walls only) and help improve plant productivity. Inside a high tunnel, soil and air temperatures are higher, extending the growing season. Soil health practices are essential in a high tunnel due to prior land uses, soil disturbance during construction, reduced rainfall, and specific crop management needs. It is important to have solid irrigation, water management, and nutrient management plans to avoid salinity and fertility issues. Incorporating cover crops can also improve soil tilth. To learn more about high tunnels, consider attending a USH event where you can help build a high tunnel and gain practical knowledge. https://www.urbansoilhealth.org/events

2 Composting Facility

Legend

- **A** Three bin compost system with roof
- **B** Raised beds
- **C** Water catchment system

Establishing a compost facility on a small farm or garden can be an effective way to recycle organic waste while creating nutrient-rich soil amendments. One popular system is the three bin compost system, which allows for the efficient processing of organic material in various stages—active composting, curing, and finished compost. Having a roofed compost system can protect your compost from excess rainfall, which can cause nutrient runoff, and ensure that the composting process continues smoothly. Compost enriches the soil with essential nutrients, enhances microbial diversity, and improves the soil's ability to retain moisture, making it a key component of sustainable soil management.

3 Wildlife Habitat Planting

Legend

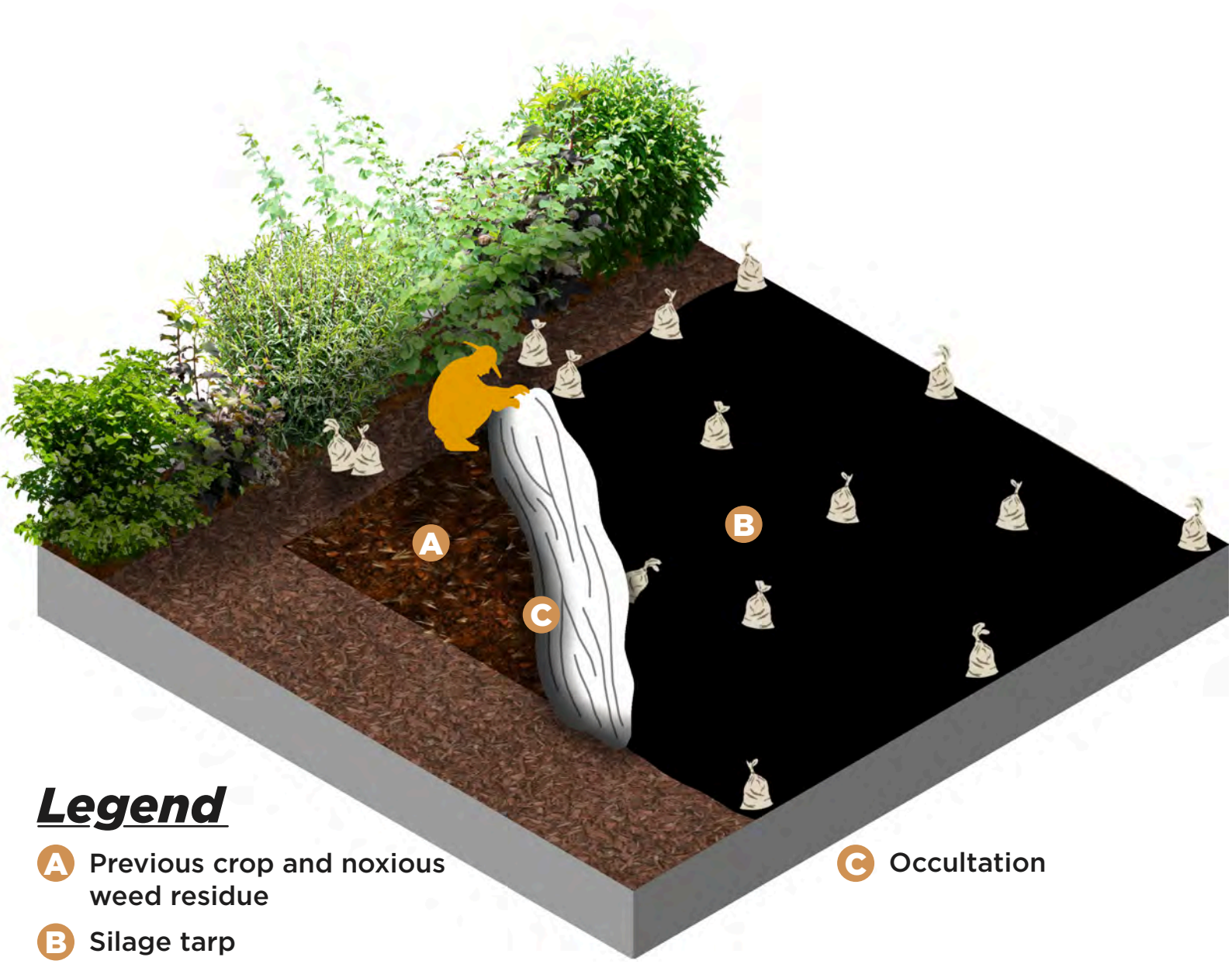
- A Grasses
- B Forbs
- C Biodiversity

Wildlife habitat plantings use trees, shrubs, native grasses, and forbs to provide food and shelter for wildlife, attracting beneficial insects like pollinators and predators that boost crop productivity and health. These habitats are planted with seeds, plugs or bare-root stock and include species that bloom in spring, summer, and fall.

For technical assistance, funding opportunities, and more information, contact your local Soil and Water Conservation District.

https://iaswcd.org/districts/find-local-district/

4 Pest Management Tarping



Legend

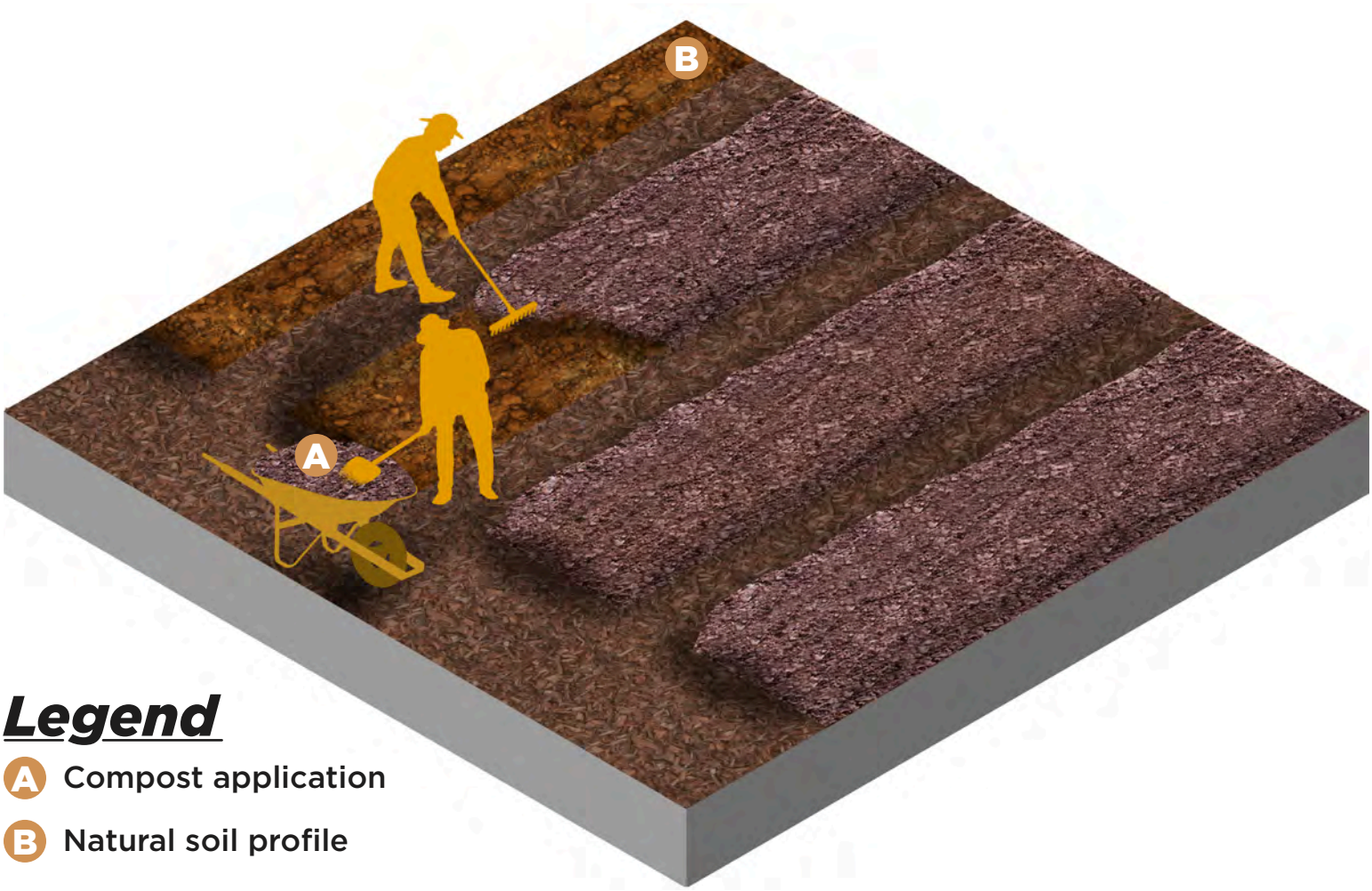
- **A** Previous crop and noxious weed residue
- **B** Silage tarp
- **C** Occultation

Tarping involves using silage tarps for pest management and weed control. Silage tarps are laid flat over previous crop residues, grass, or weeds and are weighted down with sandbags, rocks, or other materials to prevent movement. The heat and darkness created under the tarp smother unwanted plants without harming soil organisms, a process called occultation. This method can also reduce the need for tillage.

For a comprehensive guide on tarping, see University of Maine Cooperative Extension's guide on tarping in the Northeast, which, though not Indiana-specific, contains relevant information for local growing conditions.

https://extension.umaine.edu/publications/1075e/

5 Soil Carbon Amendment



Legend

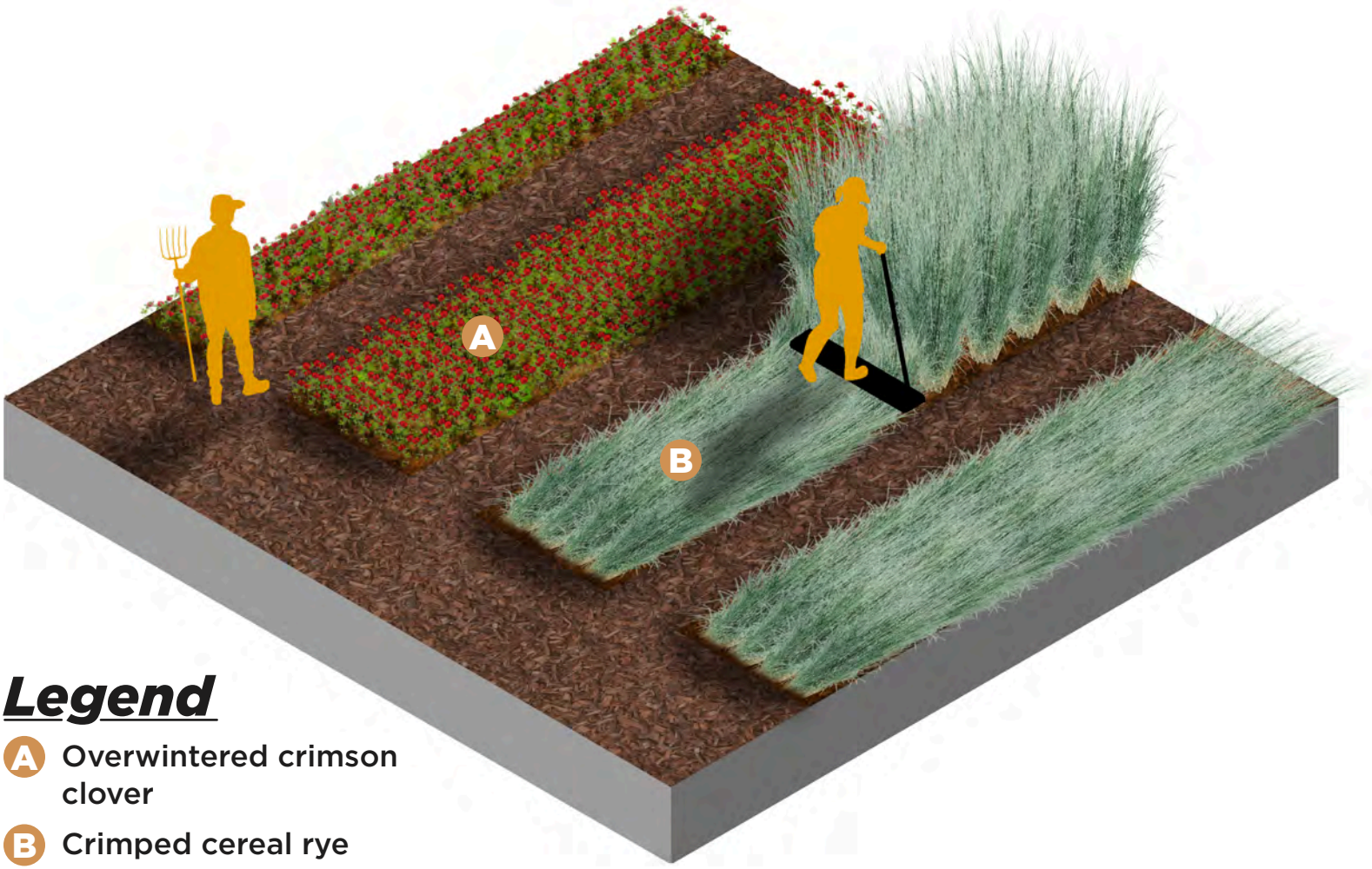
A Compost application

B Natural soil profile

Soil carbon amendments, such as biochar and compost, play a vital role in increasing soil organic matter, which enhances soil structure, water retention, and nutrient availability. Carbon-rich materials are incorporated into the soil to improve long-term soil health by promoting microbial activity. Amendments like biochar, a stable form of carbon created from organic materials, can significantly boost soil fertility by enhancing nutrient exchange and reducing nutrient leaching. Incorporating these amendments into your garden or farm can improve soil resilience and support healthy plant growth over time.

You can contact us with questions such as: What the heck is biochar? What benefits of biochar vs compost vs combo? Are there more suitable areas to apply than others? How much to apply?

6 Cover Cropping



Legend

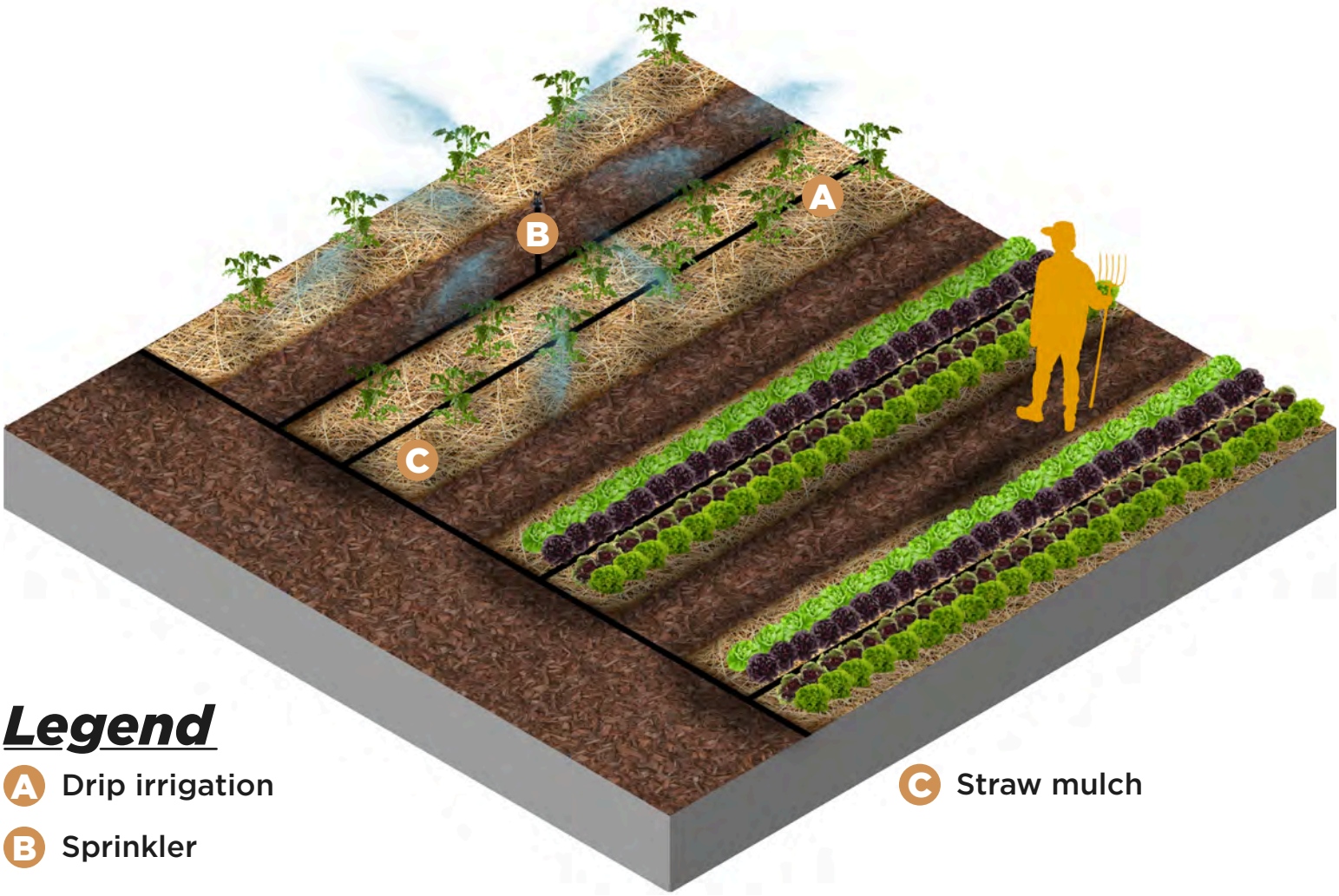
- **A** Overwintered crimson clover
- **B** Crimped cereal rye

Cover crops are grasses, legumes, and forbs planted to replenish and improve soil by providing seasonal vegetative cover. These crops offer numerous benefits for soil health, such as increasing organic matter, controlling erosion, minimizing compaction, suppressing weeds, and breaking pest cycles. Specific goals can guide your choice of cover crops. For example, deep-rooted cover crops can help reduce soil compaction. Use good quality seed, plant within the seeding window, and apply the appropriate seeding method (broadcasting or direct seeding) to achieve stands that provide coverage, organic matter, and weed suppression.

One example is the use of crimson clover in the fall, which contributes nitrogen to the following crop, while cereal rye's deep roots address compaction and provide mulch. Some gardeners grow a bed of cereal rye to cut and use as a locally sourced mulch.

Visit the Urban Soil Health website Resources page:
https://www.urbansoilhealth.org/resources

7 Irrigation



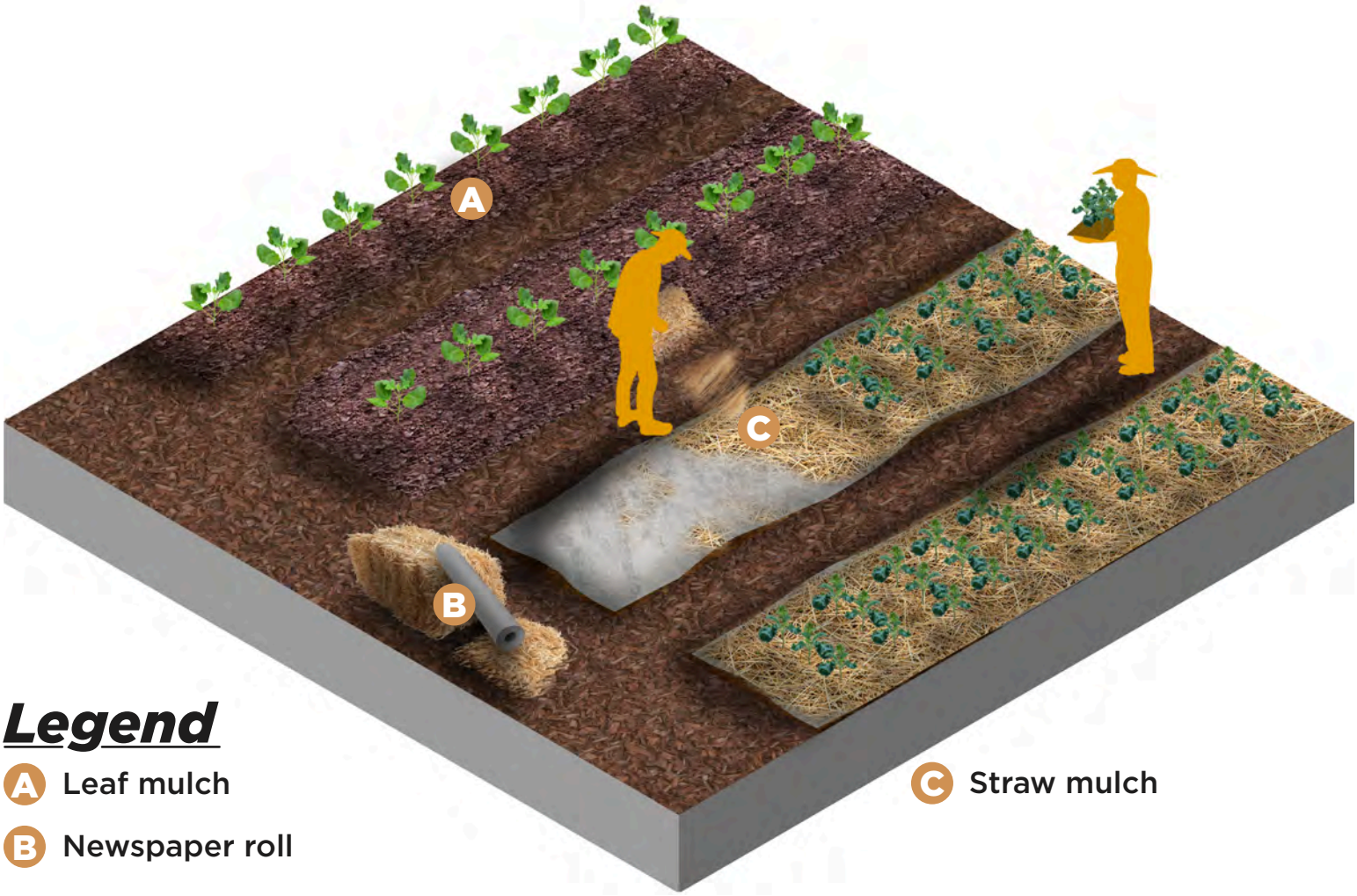
Legend

- **A** Drip irrigation
- **B** Sprinkler
- **C** Straw mulch

Irrigation is critical for maintaining healthy crops, especially in regions with inconsistent rainfall. Small-scale growers often use drip irrigation systems, which deliver water directly to the plant's roots, minimizing water waste and reducing the likelihood of disease by keeping the plant's foliage dry. Sprinkler systems, though less efficient in water conservation, are also common and can cover larger areas more quickly. A well-designed irrigation plan should include water management practices, such as monitoring soil moisture and incorporating mulches, to reduce evaporation and optimize water usage. Proper irrigation is vital to maintaining soil health, especially in high tunnels, where natural rainfall is limited.

If you are wondering when to irrigate, how much water to apply, how much irrigation amount, rate, and timing and other considerations, you can contact our staff to assist you in finding answers.

8 Mulching



Legend

- A Leaf mulch
- B Newspaper roll
- C Straw mulch

Mulch materials—such as straw, hay, woodchips, cardboard, or newspaper—are applied to the soil surface to improve moisture retention, reduce erosion, boost plant productivity, and increase organic matter. Mulch also protects soil microbes and provides food for beneficial invertebrates like earthworms. Choose mulches suited to the crop and planting method. For example, using newspaper and adding straw when transplanting broccoli helps regulate temperatures and reduce weeds. However, using straw with direct-seeded crops might obstruct germination. Leaf mulch or composted leaves can work for crops like carrots but may require additional moisture during germination. If you have additional questions, our staff is ready to talk through what are the pros/cons of mulching material, what are the C:N ratio considerations of mulches and how much to apply.

9 Alley Cropping

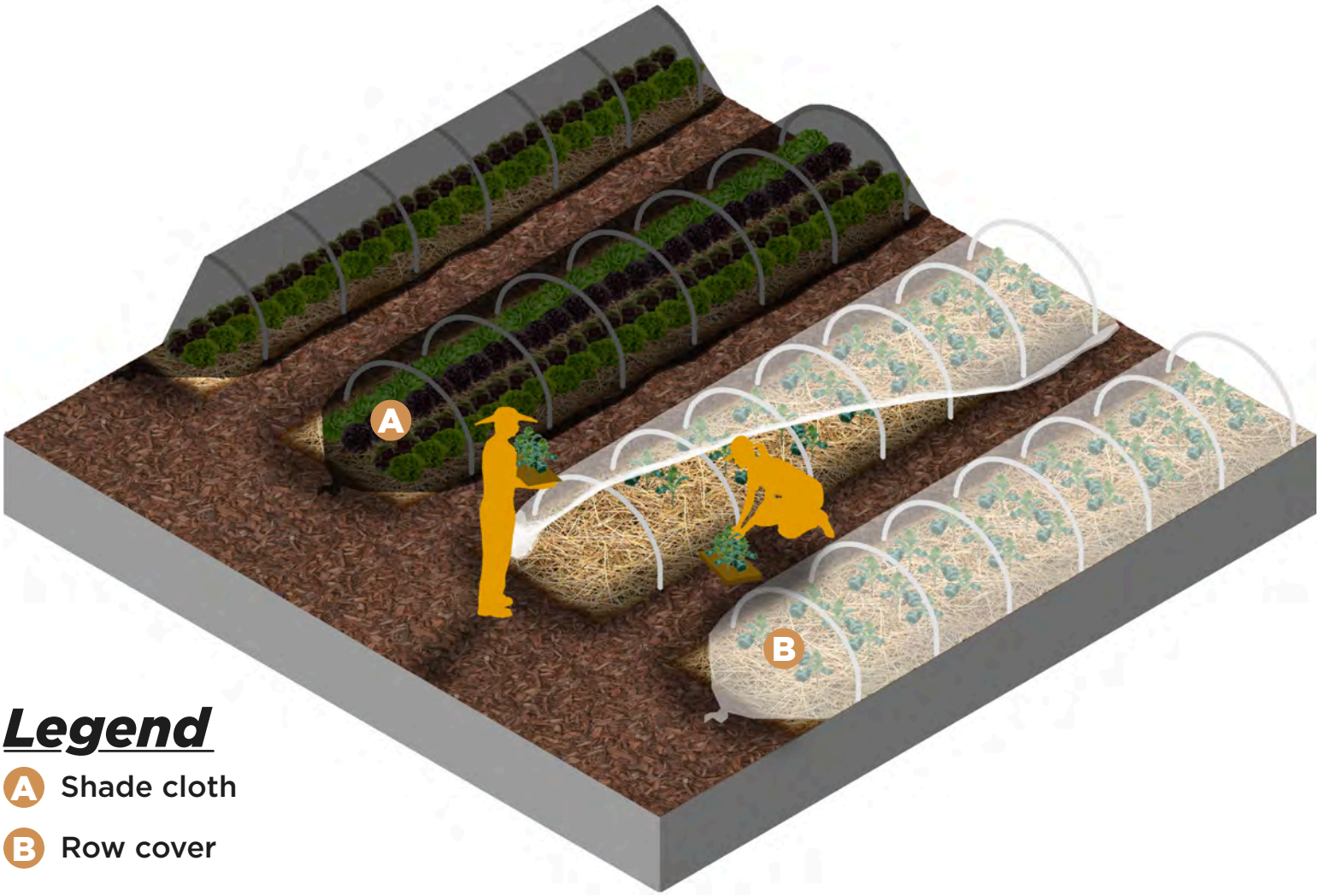
Legend

A Perennial tree/shrub

B Annual crop

Alley cropping involves planting rows of trees or shrubs with space in between for growing crops. This agroforestry practice offers multiple benefits, including reducing soil erosion, improving water infiltration, and increasing biodiversity. The trees or shrubs act as windbreaks, reduce evaporation, and provide shade for crops that may benefit from partial sunlight. Additionally, the deep-rooted trees help improve soil structure and add organic matter over time. Perennial trees and shrubs can also offer additional products, such as fruit, nuts, or timber, diversifying farm income. Alley cropping is a sustainable farming system that enhances both soil health and ecosystem services. If you are interested in this practice, we can help you select the location of planting, select the species, and provide plant spacing and height/shading considerations.

10 Low Tunnel



Legend

A Shade cloth

B Row cover

Low tunnels are small, movable structures made to protect crops from frost, heavy rains, and pests. Typically constructed from metal or plastic hoops covered with polyethylene, fabric, or shade cloth, low tunnels help extend the growing season by maintaining a warmer microclimate underneath. Unlike high tunnels, low tunnels are more affordable and easily adjustable, making them suitable for small-scale growers. To maximize their lifespan, it is essential to take proper care of both the structure and the covering material. Low tunnels are particularly useful for early spring and late fall crops, allowing for better crop resilience in fluctuating weather conditions. There are technical assistance opportunities with our staff related to know when to place the low tunnels, know the components, and benefits of different covers.

Soil Health System Philosophy

Soil is a living, dynamic resource, forming the foundation of a vital ecosystem. Soil health is its ability to function as a living system that supports plants, animals, fungi, and people. **Four Soil Health Principles** guide soil management to improve soil function:

Maintain continuous living roots and plants to feed soil life, improve water infiltration, reduce compaction, and enhance soil structure. Diverse plant roots provide food for soil microbes and build organic matter.

Minimize disturbance includes all forms of disturbance - physical (tillage), biological (overgrazing), and chemical (excess inputs) - to prevent erosion, compaction, water loss, and organic matter depletion.

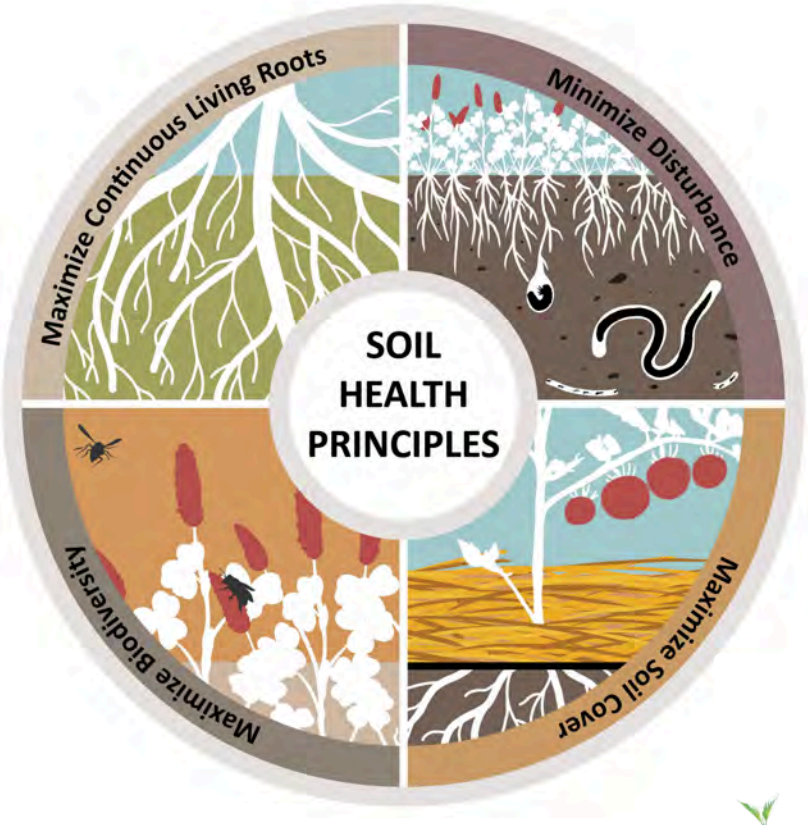
Maximize biodiversity above and below the ground to enhance ecosystem functions and nutrient cycling. Crop diversity and rotation minimize pests and diseases and support beneficial insects.

Maximize soil cover by keeping the soil covered! Mulches, cover crops, and leaving plant residues prevent erosion, retain moisture, regulate temperature, suppress weeds, boost organic matter, and support soil life.

Applying all four soil health principles through a tailored systems approach is key to improving soil function. This involves combining practices that align with specific farm or garden goals. If this system approach stops, the benefits gained can quickly be lost. For that reason, improving soil health requires a commitment to a never-ending journey.

Conservation Practices for Small-Scale Operations

Along with the Top 10, the additional conservation practices below can address resource concerns on small, diversified farms. For mixed-use farms managing livestock, woods, perennials, and other products, tailored practices are essential for protecting resources while enhancing production.



- **Conservation Cover**
- **Critical Area Planting**
- **Crop Rotation**
- **Field Border**
- **Hedgerow Planting**
- **Invasive Species Control**
- **No-Till and Reduced Tillage**
- **Nutrient Management**
- **Prescribed Grazing**
- **Raised Beds**
- **Tree and Shrub Establishment**
- **Silvopasture**
- **Soil and Source Testing**
- **Windbreak Establishment**

Act Now: Stay Connected

Urban Soil Health (USH)

Small-scale growers can connect with USH through our newsletter, social media, or educational events. Contact your regional specialist for farm or garden advice, technical assistance, or site visits. Your local Soil and Water Conservation District or USDA Service Center can also provide guidance and resources, including technical and financial assistance for conservation practices.

For more information, explore our website's resource library, which features materials created by Indiana USDA-NRCS, Marion County SWCD, and Indiana's Urban Soil Health Program.

Natural Resources Conservation Service (NRCS)

NRCS offers technical and financial assistance to help farmers conserve natural resources. In recent years, Indiana NRCS has adapted practices for urban and small-scale farms.

Key programs include:

- *Environmental Quality Incentives Program (EQIP)*
- *Conservation Stewardship Program (CSP)*

Both provide incentive payments for conservation practices that address farm resource concerns. Applications are open year-round, with fiscal year funding deadlines. Contact your local USDA Service Center for details.

Follow us on our social media and check out our website for the most current events and opportunities to network and learn.

Facebook, Instagram, and YouTube: @urbansoilhealth

Find your local USDA service center

Subscribe to USH newsletter

USH library of resources

Clean Water Indiana

INDIANA ASSOCIATION OF soil and water conservation DISTRICTS

URBAN SOIL HEALTH

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

This booklet was made possible with support from the Natural Resources Conservation Service, the Indiana Association of Soil and Water Conservation Districts and individual county Districts, and Clean Water Indiana via the State Soil Conservation Board.

Support Urban Soil Health

We educate and advocate to improve soil health on Indiana's urban and diversified small-scale farms and gardens.

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