

Biochar

Agenda

- **What is Biochar?**
- **Biochar Production**
- **Biochar & Climate Change**
- **Composting & Biochar**
- **Anaerobic Digestion & Biochar**
- **Federal support**
- **Where to learn more**

What is biochar?



Biochar Production

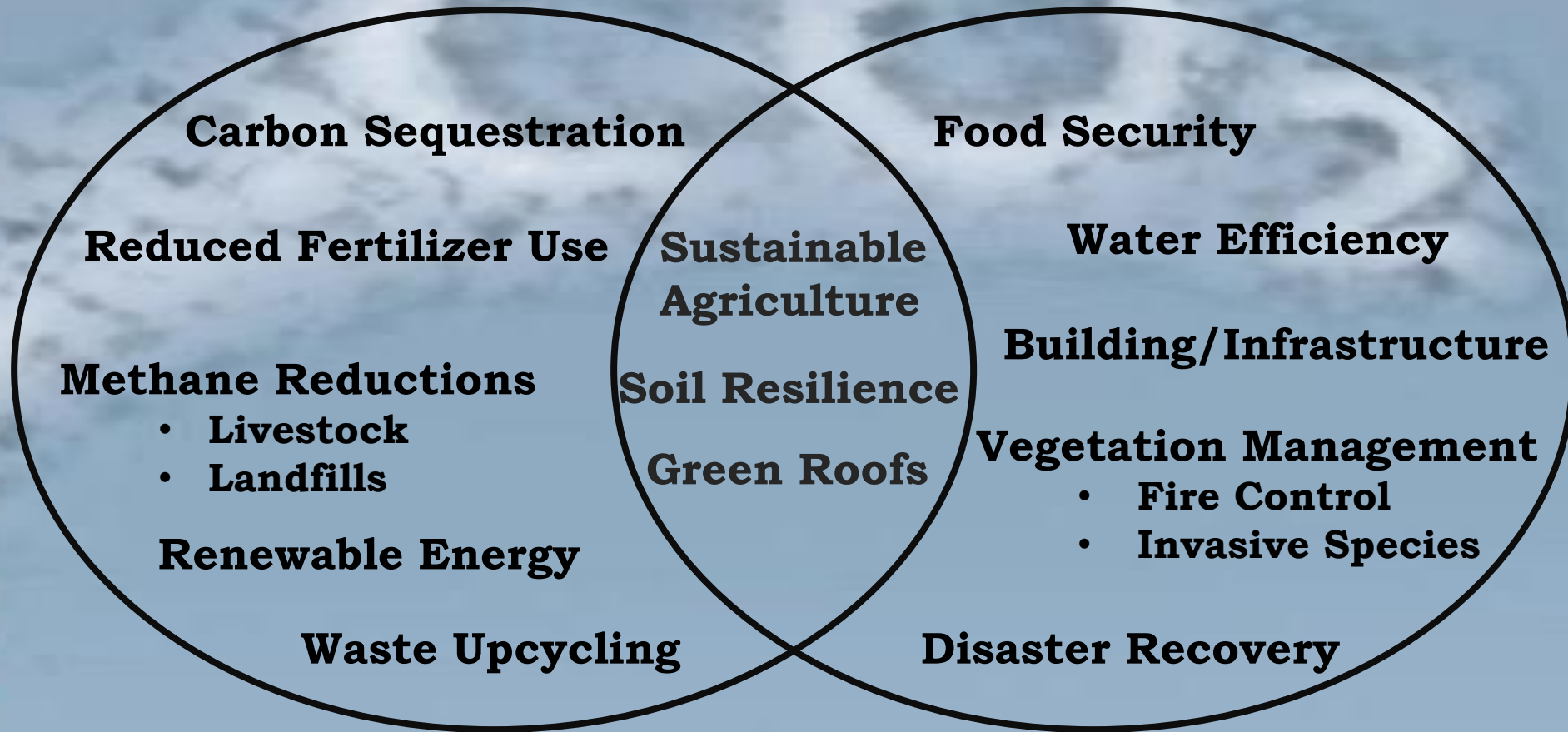
- Thermochemical conversion
- Scalability
- Co-products



Biochar & Climate Change

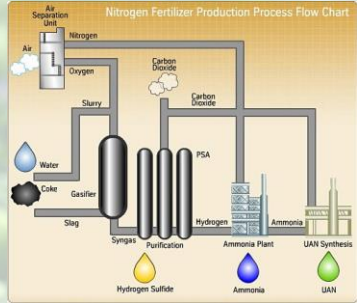
mitigation

adaptation



Climate Change: Biochar & Nitrogen

Nitrogen production



11.2. Commercial Examples | netl.doe.gov

50 – 75% LOST

Nitrogen application



Vaporization/oxidation into **AIR**

- Air pollution
 - Asthma & other health impacts
- Nitrous oxide
 - GHG 300x worse than CO₂
 - In atmosphere for 100+ years

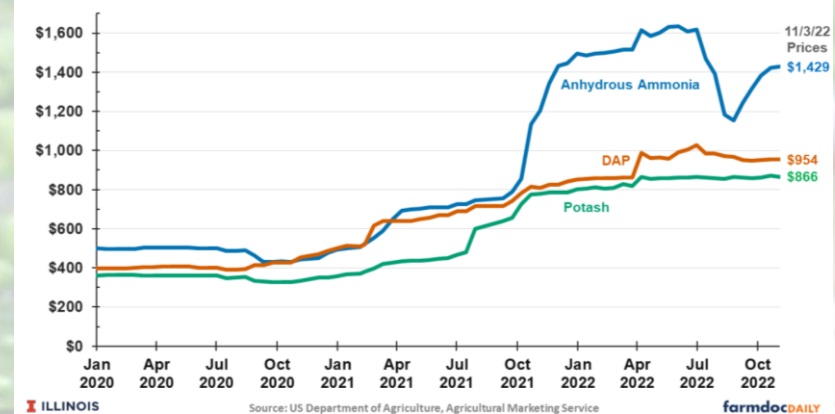
Leaching into **SOIL**

- Groundwater contamination
- Soil Acidification
- Biodiversity loss

Run-off into **WATER**

- Algal blooms (more GHGs)
- Eutrophication (fish kill)

Figure 1. Fertilizer Prices per Ton in Illinois From 2020 to 2022



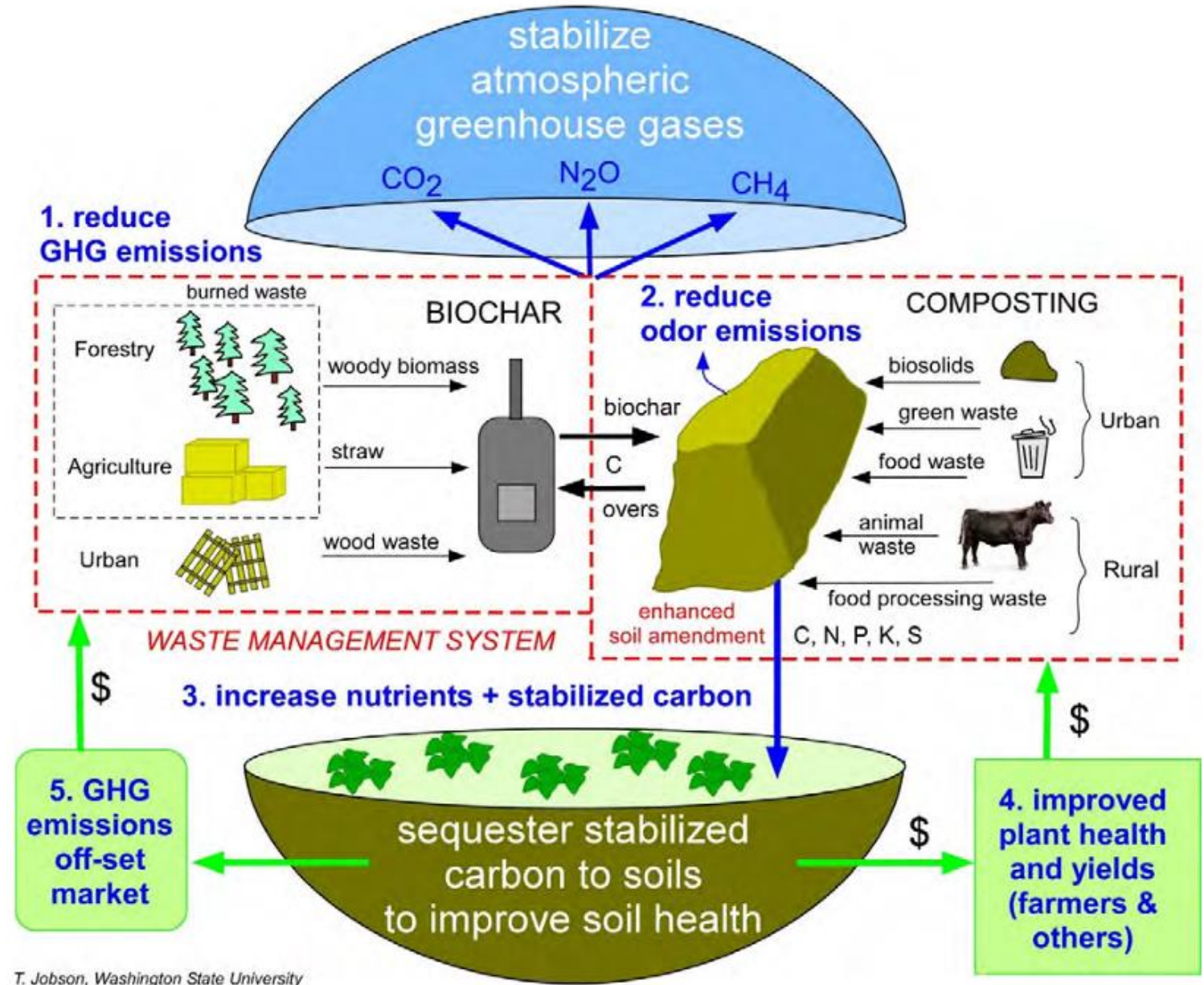
Benefits of biochar-based N fertilizer

- N fertilizer contributes ~2% of global GHGs
- Uses 3 – 5% of world's fossil fuels (mostly NatGas) but projected to account for largest share of growth through 2026.

- Need less N fertilizer as it improves NUE => cost and carbon savings
- Less leaching & run-off
- Improves pH (mitigates soil acidification)

Composting & biochar

- Reduces GHGs
- Reduces odors
- Improves nutrient mgmt
- Reduces time to finished compost
- Enhances microbial diversity and activity
- Longer lasting carbon (eligible for carbon removal credits)
- Immobilizes potentially toxic metals, herbicides, organic pollutants

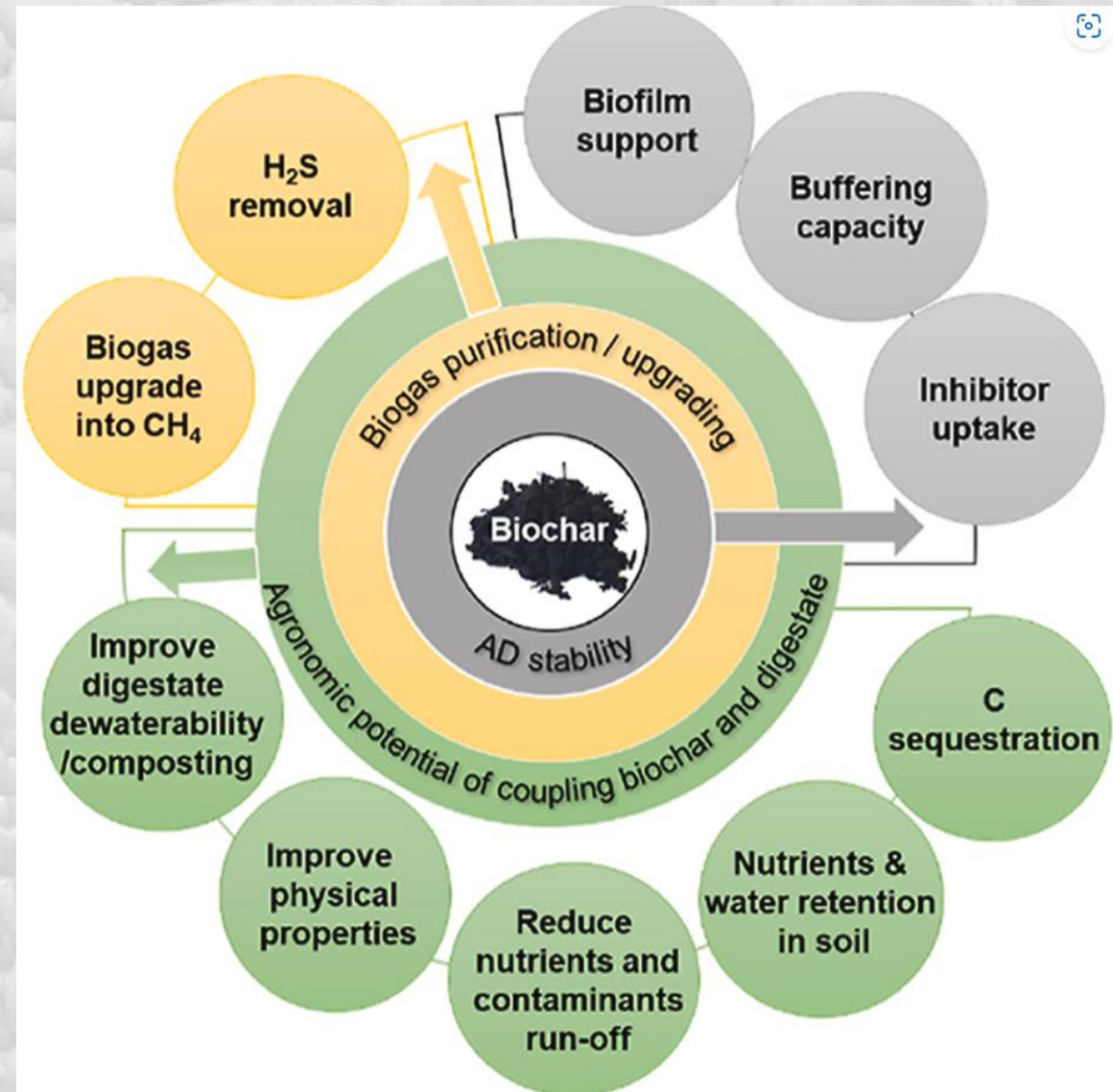


T. Jobson, Washington State University

Figure 7.5. Incorporation of biochar in composting operations can yield multiple benefits.

Anaerobic digestion & biochar

- **Reduces volume of digestate quickly**
- **Improve quality & quantity of CH₄**
- **Heat can be used to heat up digester**
- **Longer lasting carbon**



Federal Support



- **NRCS Soil Carbon Amendment Protocol**
- **USFS support for US Biochar Initiative**

Want more info?

- **IBI Biochar Academy** (June 19 – 30) & **Field Days** (June 22 – 23)
- **International Biochar Initiative**
- **US Biochar Initiative**
- **US Forest Service Webinars**



**CHARpe
Diem!**