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United States Department of Agriculture

USDA's  
93rd  
Annual

# Agricultural Outlook Forum

## A New Horizon: The Future of Agriculture

February 23-24, 2017 • Crystal Gateway Marriott Hotel, Arlington, Virginia

Presentation from the USDA Agricultural Outlook Forum 2017

United States Department of Agriculture  
93<sup>rd</sup> Annual Agricultural Outlook Forum  
“A New Horizon: The Future of Agriculture”

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# **USDA 2017 Ag Outlook**

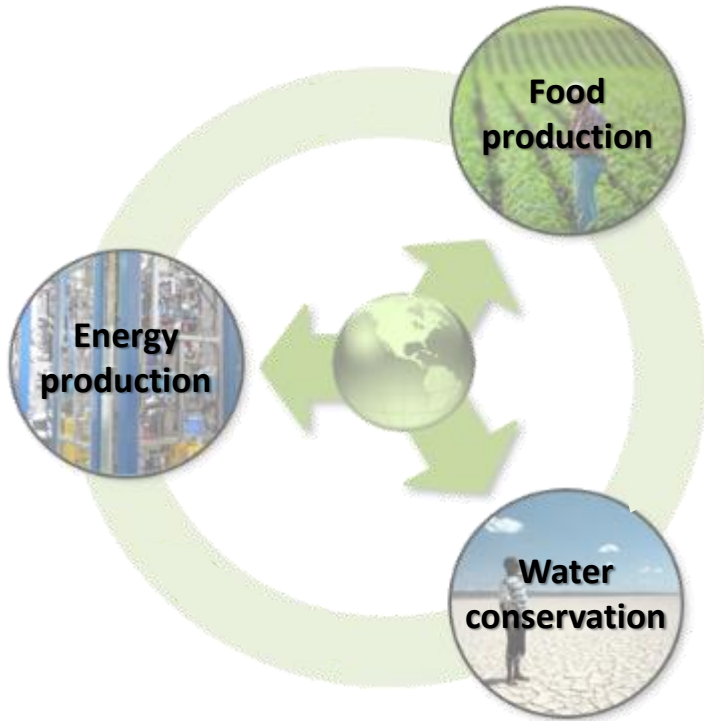
**Cool Planet and Cool Terra  
Engineered Biocarbon**



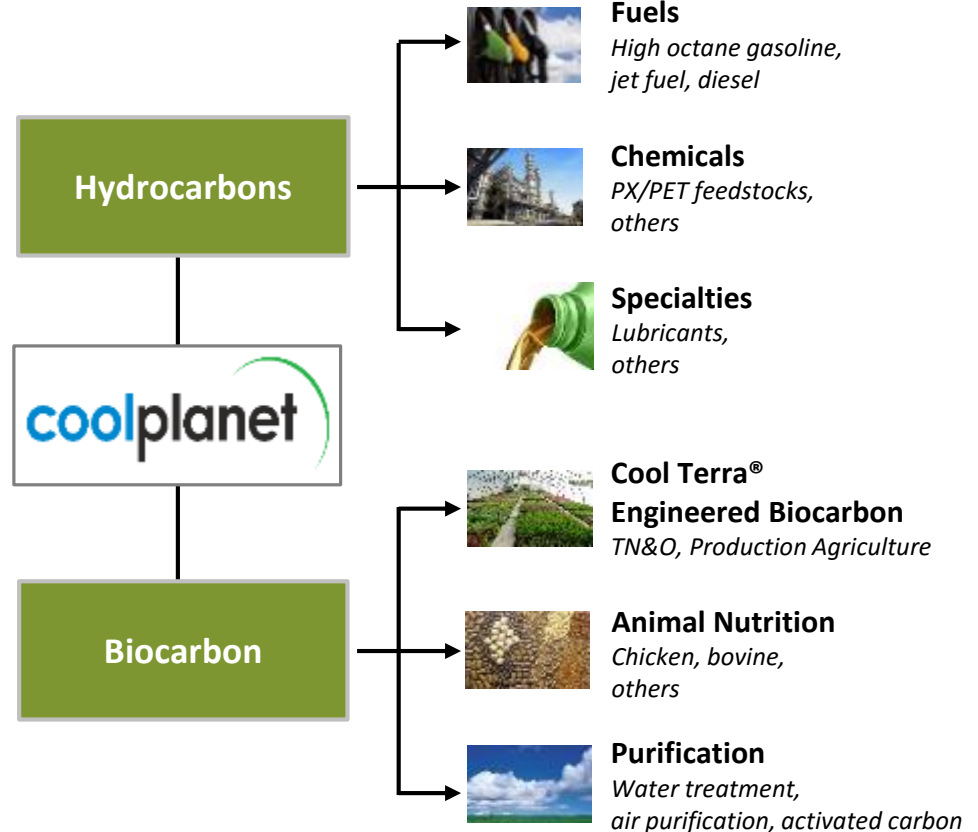
# Addressing key markets globally, diverse product suite

## Converting non-food biomass into hydrocarbons and engineered biocarbons

### Addressing key markets globally...



### Diverse product suite





# Society demands more food grown more sustainably

How can we feed a growing population?

A nearly 50% increase in food production is required worldwide...



...at a time when agriculture is under stress globally



*Limited arable land*



*Degraded soil*



*Water scarcity*



*Fertilizer runoff*

***New technologies are critical to address this challenge***

# Cool Planet sits at the confluence of three megatrends in agriculture

## Food Security



Higher crop yield

## Soil Health



Enhanced soil  
microbiome, microbial  
delivery system

## Sustainability

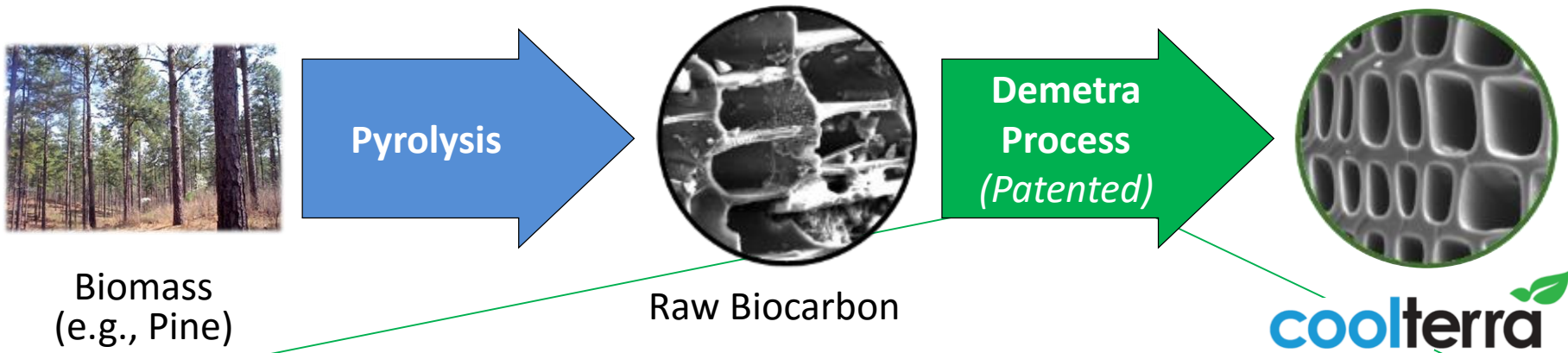


Carbon sequestration,  
clean water,  
less fertilizer

*A healthy planet feeding more people with higher grower profitability*

# Production of Cool Terra<sup>®</sup> engineered biocarbon

Pyrolysis expertise and patented 'Demetra' process maximize consistency & effectiveness



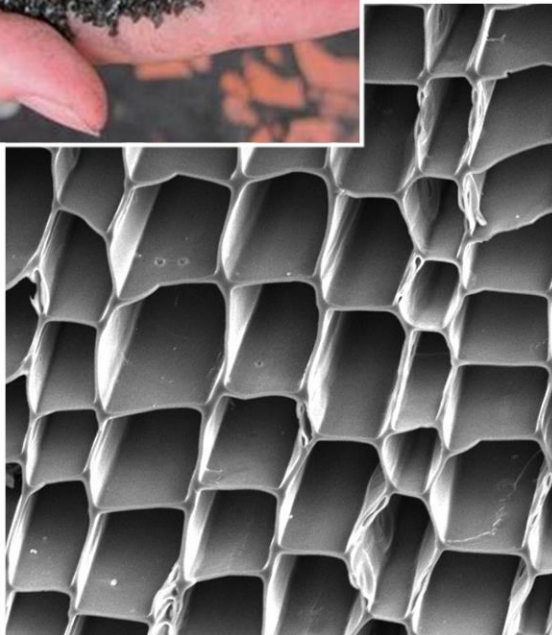
40,000 yd<sup>3</sup> capacity in Camarillo, CA

- ✓ **Balance pH** – Optimizing pH to maximize germination and growth
- ✓ **Detoxify Raw Biocarbon** – Micropores cleaned to eliminate toxicity
- ✓ **Maximize Capacity** – Improves input holding capacity in pores
- ✓ **Size for soil** – Consistent particle sizes designed for consistent results



# The Cool Terra® engineered biocarbon platform

Physical structure enables improvement in yield, microbial life, and sustainability



*Cool Terra® structure under a scanning electron microscope*

1

**Adsorptive /  
Desorptive**

- Improves water holding
- Retains nutrients

2

**Porous**

- Anchors micro-roots
- Promotes microbial growth
- Delivery system

3

**Aerating**

- Structure clears pathway for water and oxygen

4

**Sequesters  
Carbon**

- Chemically stable



# Different forms of soil carbon have varying properties

Similar end results shaped by different mechanisms

*Different forms of Carbon in Soil*

← Labile
→ Recalcitrant

	Compost	Humic Substance*	Cool Terra®
<b>Plant Nutrition</b>	Yes, Macro (N) and Micro Nutrients	To a degree, some micro nutrients	To a degree, small levels
<b>Microbial Nutrition</b>	Yes, various stages of decay, readily digestible for rapid breakdown	Yes, humic acid portion particularly, humin portion more recalcitrant	No
<b>Microbial Habitat</b>	To a degree, has structure and food, but limited air space	No for humic acid. To a small degree for humin portion	Yes, pore and surface area optimal for water, air, microbial life
<b>Soil Persistence</b>	Low persistence through rapid biological de-composition	Low persistence through chemical and biological reactivity, soluble leaching in soil	Highly persistent. Some migration, but generally stable and consistent
<b>Application Needs</b>	High Dosage (multiple tons/acre) Re-application needed seasonally	Low Dosage (gallons/acre) Re-application needed seasonally	Medium Dosage (<1000 lbs/acre) Can be one-time application

**Research suggests Cool Terra® can be complementary with both compost and humic\***

\*Humic substance includes Humic Acid, Fulvic Acid, Humin

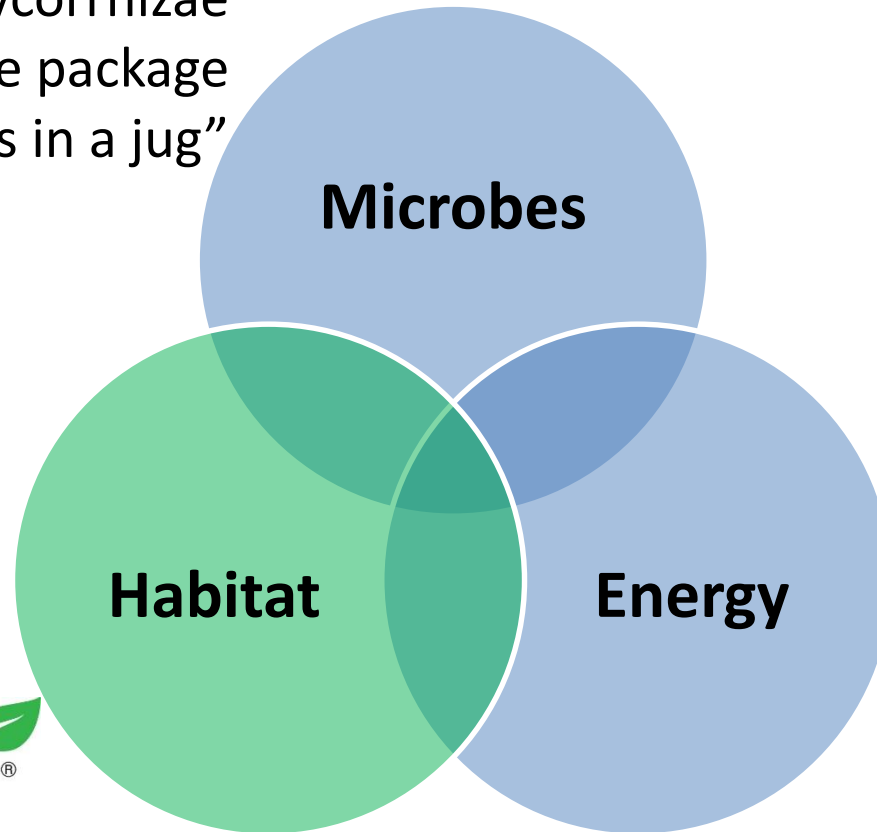
\*\*Zhang, Sun, Tian, Gong, *Scientia Horticulturae*, Volume 176, 11 September 2014, Pages 70–78,

\*\*Bakhry, Ibrahim, Eid, Badr, *Agricultural Sciences*, Volume 05 No.14(2014), Article ID:52357

# Multi-dimensional ecosystem vital for thriving soil biome

Each part can have impact, but the full system can be very powerful for soil health

- Mycorrhizae
- Beneficial microbe package
- Proprietary “bugs in a jug”



- Compost
- Humic
- Plant Symbiosis
- Other

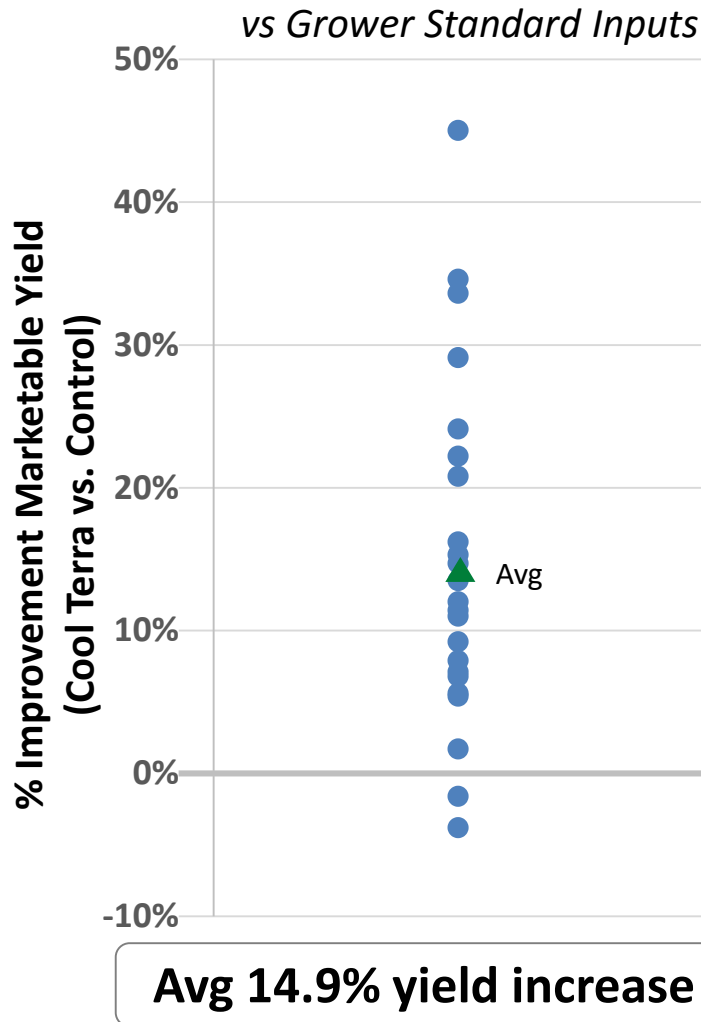


*Could you create a program for your customers that is unique and valuable?*

# Extensive biocarbon field trials delivered yield increases to dramatically improve grower ROI



Food Security



## Selected Trial Results

Crop, Location	Grower Standard	
	<i>Typical levels of water and fertilizer</i>	
	Yield	Grower ROI
Tomato (FM), FL	9%	5.1x
Lettuce, CA	45%	5.8x
Potato, OR	35%	4.9x
Corn, KS	15%	8.2x

Confidential

\*Each plotted point represents the best performing Cool Terra block for that trial in the grower standard or reduced input program.

Removed trials with execution issues that compromised accurate results

# Distribution partners are mobilized; partner list is growing

## Key Channel Partners

## Relationship Status

### Established Partners in Production Ag / TNO



#2 ag retailer in US (450 stores). Completed six trials w/ private R&D group (all strong), Agreement signed December 15, 2016



#6 retailer in US (90 stores) heavy presence in Western Region. Deep engagement from executive level down to PCA. Core participants on SHAAC, leading several trials



Regional Southeast Distributor (24 locations, high service and focus in specialty crops). Deep engagement from executive level down to PCA. Core participants on SHAAC, leading several trials



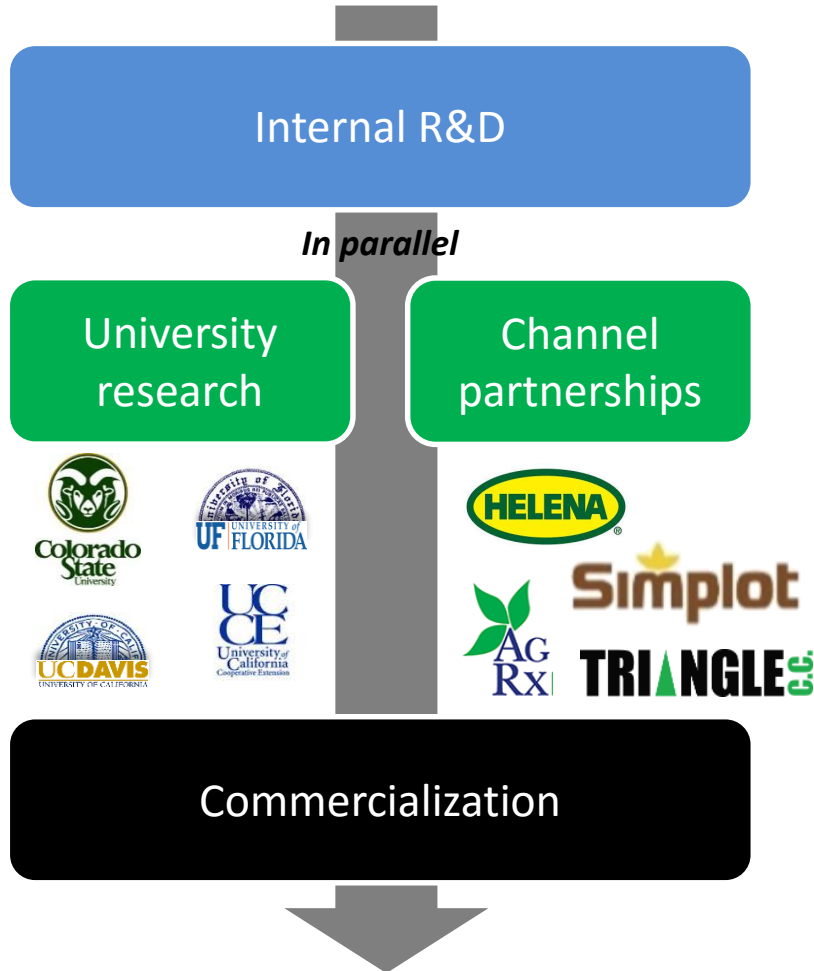
Regional upstart (SoCal based), high service model. Extremely excited about Cool Terra®, pushing aggressively on trials



# Partnerships are the proven path to commercialization

Leverages existing assets, credibility, funding, and expertise of leaders in Ag

## Partnerships are the established path to new product adoption in Ag



## Potential partnerships that could advance the technology in new areas

- R&D to create new product combinations, formulations, and value capture
- Incorporation of Cool Terra® into new, innovative products

# Cool Planet can participate in the new wave of investment in soil health and crop biologicals



Soil Health

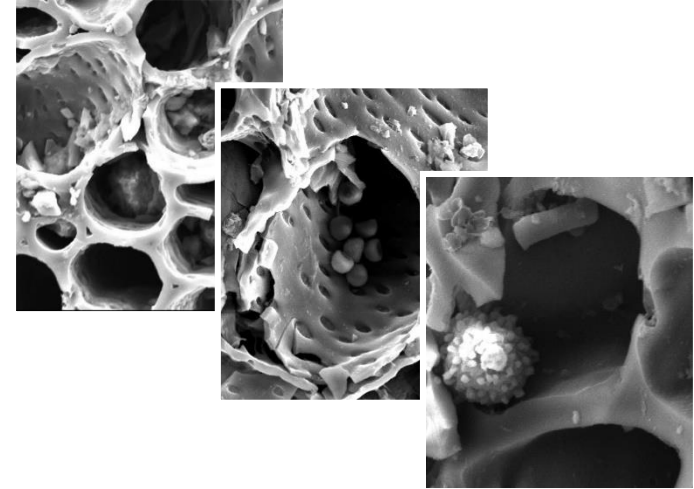
Consumers are demanding less chemical use in the production of their food. The challenge is to maintain grower yield while meeting consumer expectations

As a result, major agriculture companies are investing billions of dollars to develop biological products to achieve the same or improved results

The porosity and materials science of Cool Terra makes it an ideal substrate for biologicals

- Potential to serve as the delivery mechanism of the biological industry (what UPS/FedEx is for the online economy)

Cool Planet is working with leading AgTech companies to establish research partnerships that will advance our microbial delivery capabilities



*Microbes living in Cool Terra®*

# Cool Terra® makes agriculture more sustainable



Sustainability

## Carbon Sequestration

Trees **ABSORB** carbon as they grow

Cool Terra production converts and **STABILIZES** carbon



Cool Terra® use helps plants **THRIVE**

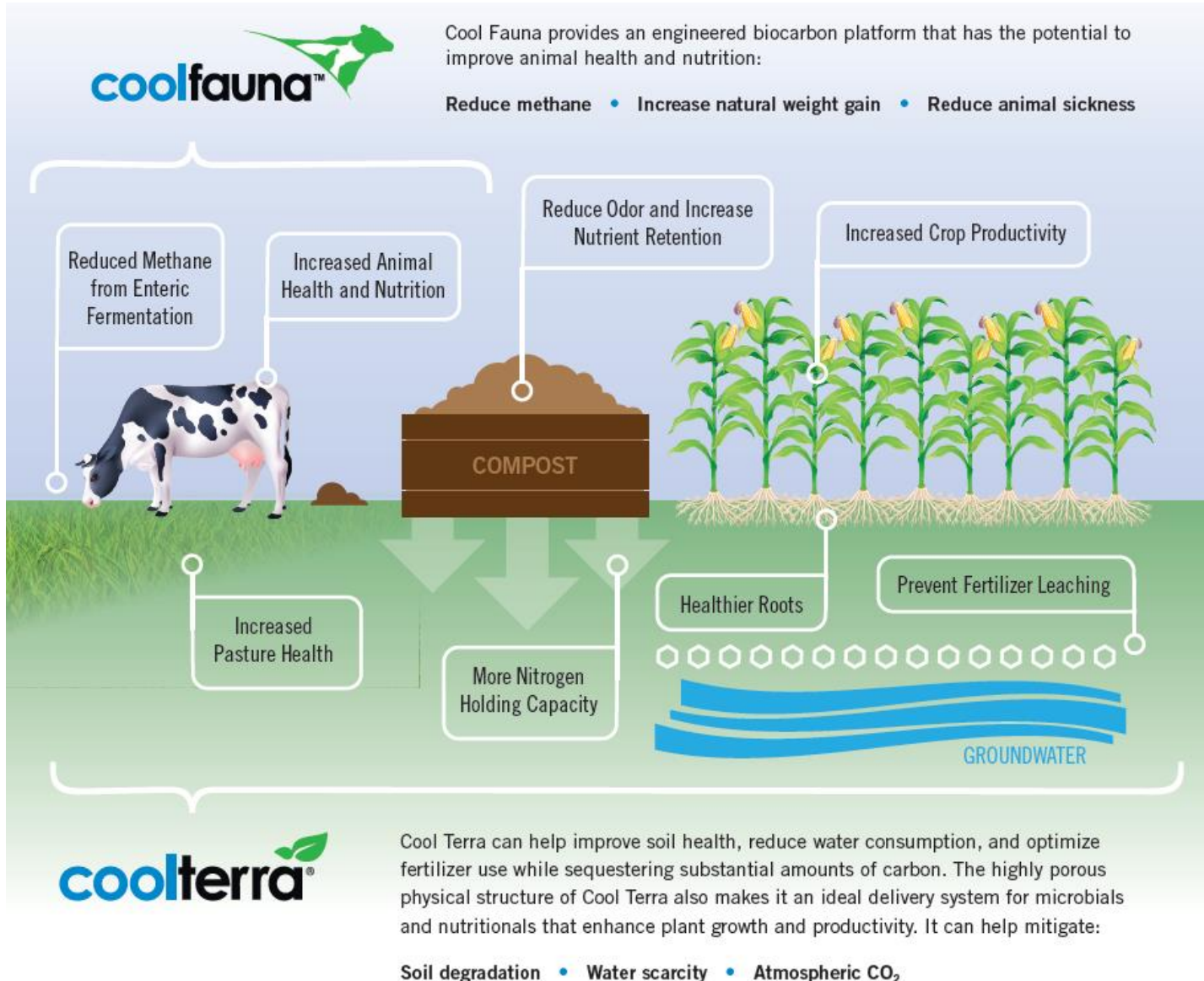
Application in crops **SEQUESTERS** carbon

## Water and Fertilizer Efficiency



Cool Terra acts like a “**nano sponge**,” holding water and nutrients in the root zone

# Sustainability for the entire farm/ranch system





# Full NEPA Certified site in Alexandria, LA: \$10+MM worth of site work and infrastructure complete



# Alexandria, Louisiana Capacity and Logistics

- 40,000 – 70,00 cubic yards/year capacity based on feedstock and pyrolysis unit(s) deployed. (\$20-\$35MM/yr. in revenue potential at \$500/cu yd.)
- Ability to bring in “raw biochar” to upgrade via Demetra back-end process
- Ample supply of wood biomass/wood residues in 30-50 mile radius
- Operations center on-site to ensure quality of Cool Terra being shipped
- Significant logistics and transportation cost reduction for Cool Terra delivered to Midwest and Eastern U.S. Markets
- Distributed Model – Easily replicated close to biomass sources and treatable acres.