

Environmental Credits

Soil Carbon – GHGs - Water - Biodiversity

Will Ecosystem Markets be a new frontier in agriculture?

Is this an Opportunity or Not?

Private carbon/ecosystem markets may offer both economic & environmental value to farmers and their land. But are they willing, and are they ready, to seize this evolving opportunity?

Carbon – Ag's new frontier?

Today's topics

1. What's behind the carbon craze.
2. How private carbon markets work.
3. Farmer views of carbon markets.
4. Knowns and Unknowns & MO Pilots.
5. The Future.



What is an environmental credit

An action taken that improves an environmental condition, examples:

- Restoring a wetland (wetland mitigation credits),
- Enhancing biodiversity or an endangered species (biodiversity credits)
- Reducing nutrient/soil runoff (water quality credit),
- Conserving water use (water quantity credit),
- Sequestering Carbon in soil (carbon credit)
- Reducing greenhouse gas emissions (carbon credit)

If you can quantify the benefit or outcome from an action, in theory a credit (or asset) can be generated and earned.

“Climate Smart” good for the planet...or...bottom line?



Bottom line - In the corporate world, no matter how popular your brand is, if you don't have a climate change busting goal, you simply don't sit at the cool kids table anymore.

Is this about the planet? Is it marketing? Is it about money? The answer is likely yes, yes and yes.

- Paris Agreement – limit global temp rise to 1.5°C.
- Corporate ESG goals & reporting.
- Reducing carbon footprints is trendy.
- Projecting a green image - necessary corporate PR.
- The millennials factor - tend to vote with their purchases.
- And You, the general public, are creating action by your spending habits.

What's driving the carbon market craze?

A corporate race to “Net-Zero”

Forbes

Jan 21, 2021, 09:30am EST | 8,918 views

Empowered Consumers Call For Sustainability Transformation

FORRESTER

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Enterprise Tech

IMPACT INVESTING



\$7 trillion asset manager BlackRock makes climate change central to its investment strategy for 2021

PUBLISHED WED, DEC 16 2020 8:31 AM EST | UPDATED WED, DEC 16 2020 9:55 AM EST



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The race to “Net-Zero”

McDonald's Climate Action

Our target is equal to taking
32 million
passenger cars off the
road for an entire year



SCALE FOR
GOOD



Goal

By 2030, reduce emissions intensity (per metric ton of food and packaging) by 31% across our supply chain from 2015 levels.



News Releases

SEP 21, 2020

General Mills to reduce absolute greenhouse gas emissions by 30% across its full value chain over next decade

Share:  

- Aa + 

Commitment emphasizes the company's dedication to regenerative agriculture, aligns with United Nations' 1.5°C target

News Releases

MAR 04, 2019

General Mills to advance regenerative agriculture practices on one million acres of farmland by 2030

Share:  

- Aa + 

Long-term company efforts are focused on addressing soil health, biodiversity, farmer economic resilience and climate change by reducing greenhouse gas emissions

MINNEAPOLIS, Minnesota - General Mills today announced its commitment to advance regenerative agriculture



MISSOURI
SOYBEANS

The race to “Net-Zero”



FINANCE • NESTLÉ

FORTUNE

Nestlé trumpets its green credentials as shareholders approve \$3.5 billion net-zero plan

BY SOPHIE MELLOR
April 15, 2021 11:41 AM CDT

Nestlé, the world's biggest food conglomerate, is boosting its green credentials with a wide-ranging set of initiatives costing 3.2 billion francs (\$3.5 billion) over the next five years, including a 1.2 billion franc (\$1.3 billion) investment in regenerative agriculture.

Nestlé published the most important regenerative farming practices that the company wants to promote. They include, among others, enhancement of biodiversity, soil conservation, regeneration of water cycles and integration of livestock.



<https://youtu.be/IWwVMTQYdtA>



A person in a dark suit stands in a grassy field, looking towards a vibrant sunset. The sky is filled with streaks of orange, pink, and blue. The text 'We will reach' is in a small, white, sans-serif font. Below it, 'NET' is in a large, white, bold, sans-serif font. 'ZERO' is in a large, bold, black, sans-serif font, enclosed within a white rectangular box. At the bottom, 'By 2050' is in a small, white, sans-serif font.

We will reach

NET
ZERO

By 2050

Path to net-zero = demand for carbon credits

Accelerate, Transform, Regenerate:

NESTLÉ'S NET ZERO ROADMAP

February 2021

Nearly 95% are outside direct company control

Nestlé's total GHG emissions by Scope

million tonnes of CO₂e, in 2018

Scope 1

Emitted directly 3.3 3.0%

from sources we own or control such as on-site combustion (coal, natural gas, fuel for company's vehicle fleet).

Scope 2

Emitted indirectly 2.5 2.2%

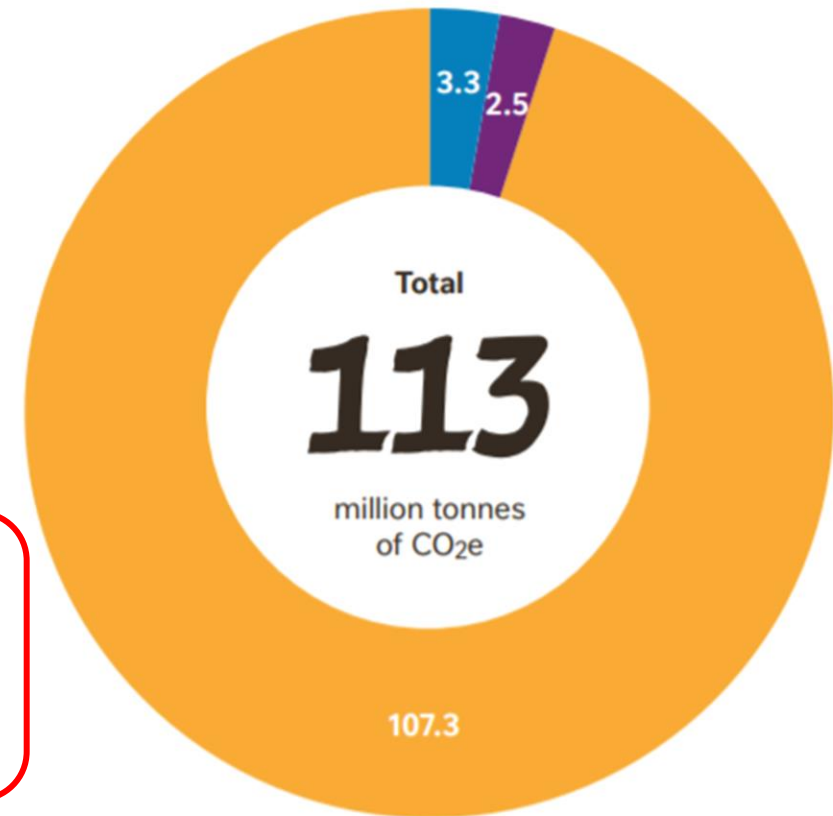
from the generation of purchased energy like electricity and heating/cooling network.

Scope 3

All other indirect emissions 107.3 94.8%

in our value chain, both upstream and downstream, such as sourcing and use of sold products.

Figures have been rounded.



Path to net-zero = demand for carbon credits

Accelerate, Transform, Regenerate:

NESTLÉ'S NET ZERO ROADMAP

February 2021

Nestlé's in-scope GHG emissions by operation (92 out of 113) million tonnes of CO₂e, in 2018

Scope 3



**Sourcing
our ingredients**

65.6

71.4%

Scope 1, 2 & 3



**Manufacturing
our products**

7.0

7.7%

Scope 3



**Packaging
our products**

11.0

11.9%

Scope 3



**Managing
logistics**

7.5

8.2%

Scope 3

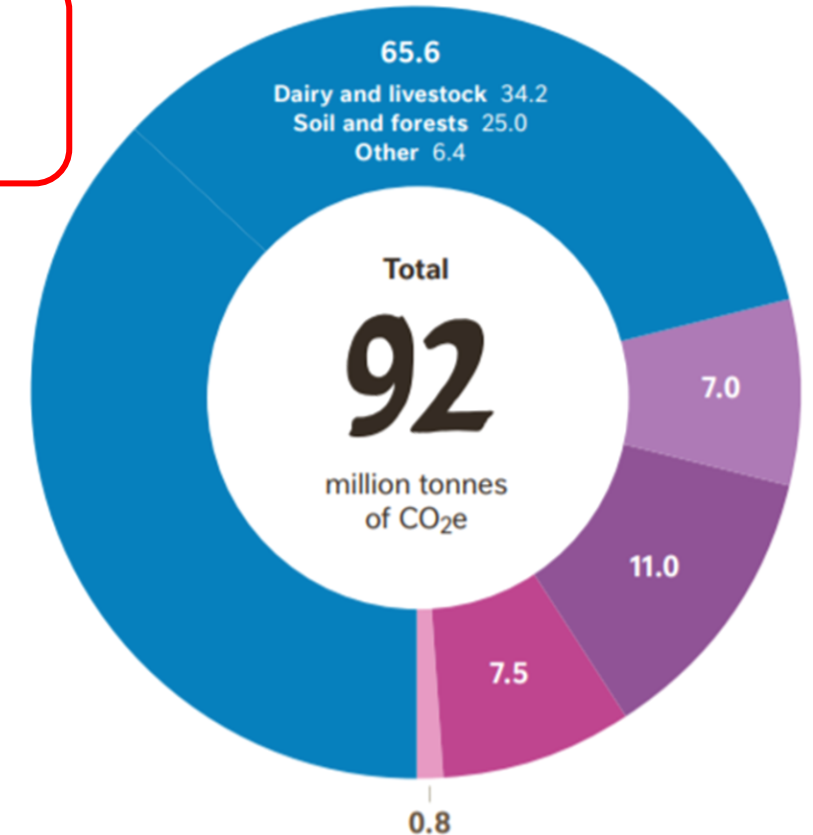


**Travel and employee
commuting**

0.8

0.8%

Figures have been rounded.



71% are sourced ingredients...ie ag inputs.

34% - dairy/livestock
25% - soils/forests
6% - other

OUR KEY ACTIONS AT A GLANCE

Accelerate, Transform, Regenerate:

NESTLÉ'S NET ZERO ROADMAP

February 2021

Sourcing our ingredients sustainably

Working with farmers, suppliers and communities to source ways that protect ecosystems, reduce emissions and enhance livelihoods.

➡ Dairy and livestock
Page 9

➡ Soil and forests
Page 14



Evolving our packaging

Packaging helps keep our food safe but causes waste. Investments in packaging innovations and new business models help keep waste out of landfill.

➡ Page 23



Driving toward cleaner logistics

Optimizing routes, filling vehicles more efficiently, switching to low-emission fuels and renewable electricity and using more rail transport.

➡ Page 32



Moving toward carbon-neutral brands

As consumers demand increasingly transparent and sustainable products, our brands will continue to adapt, embracing sustainability.

➡ Page 40



Transforming our product portfolio

Creating new, low-carbon products, and reformulating existing ones using ingredients and processes that are good for both consumers and planet.

➡ Page 19



Using renewable energy to manufacture our products

Making products more sustainably by switching to renewable electricity, using more renewable fuels and investing in energy efficiency.

➡ Page 28



Removing carbon from the atmosphere

Using nature's own solutions such as agroforestry, soil management, and restoring peatlands and forests to lock GHGs in the ground.

➡ Page 37



Using our voice to galvanize action

Forging deep engagement on climate issues with farmers, industry, governments, NGOs and communities.

➡ Page 44



How Private Carbon Markets Work

Supply

FARMERS

- Enroll fields/land
- Adopt Practices
- Generate credits

PRIVATE MARKET PROGRAMS

- Measure, report, verify
- Facilitate credit sales

Demand

PRIVATE COMPANIES

- Buy credits
- Report progress - ESG

A market will exist as long as there is demand by private companies for credits.

Private Carbon (ecosystem) Markets

Most Common Eligible Practices

- Cover crops
- Diversifying crop rotation
- Reducing tillage – going no-till
- Changing nitrogen/manure practices
- Buffer strips/grass waterways
- Rotational Grazing

Currently many companies only want carbon credits from newly adopted practices.

In most cases, credits are stackable with government programs, cost-share, etc.



Ecosystem Credit Markets

- ✓ An “outcomes” and market-based approach to agricultural conservation. Think pay for performance.
- ✓ Ecosystem Market Programs quantify, and exchange verified credits of environmental outcomes.....carbon, water quality, biodiversity, etc.
- ✓ Markets may provide new opportunities and revenue for farmers thru sales of credits generated on the farm.
- ✓ Markets enable private entities to more quickly, more efficiently, and more cost effectively achieve their voluntary sustainability goals.



Missouri Soybean Magazine – April 2021



Carbon Markets, Credits & Trading

As investments in soil health continue, Missouri welcomes a pilot project to evaluate innovation and market opportunities around soil carbon.

By Darrick Steen

Soil health research and education have been an important checkoff investment area for the Missouri Soybean Merchandising Council for many years. That research has led to new grower insights and recommendations for using cover crops, as well as other management practices to further soybean production and conservation goals. More recent developments around the emerging field of agricultural carbon markets are raising questions, and driving new interest and optimism about income opportunities from growers' soil health investments.



Ag Ecosystem Market Providers

several options – many differences

True Ecosystem Markets

- Ecosystem Services Market Consortium (ESMC)
- Soil & Water Outcomes Fund

Carbon-only Market

- Indigo-Ag
- Nori



Input Supply Companies

- Bayer
- Corteva
- Nutrien

Data Platforms

- CIBO
- Gradable Carbon (FBN)
- TruCarbon
- Farmers Edge

This is not intended to be a complete list.

Ecosystem Market Economics



Notes:

- Amt's are as of Aug 2021.
- Most are still in pilot form.
- Some report price per acre, others per ton.

Current carbon price offerings being reported:

- Bayer: \$9/ac/yr (\$3/acre for reduced tillage; \$6/acre for cover crops)
- Soil and Water Outcomes Fund: up to \$40/ac/yr (*carbon and water quality*)
- Indigo Ag: \$10-15/ton
- Land O'Lakes TruCarbon: \$20/ton
- Nori: \$15/credit + 1 unit of Nori cryptocurrency called NORI token restricted for 10 years.
- Corteva: \$15/ton

Source: American Soybean Association <https://soygrowers.com/news-releases/economists-angle-carbon-market-snapshot/>



Ecosystem Market Economics

Carbon credit price = \$10-\$20/metric ton CO²-eq

- Lets use \$15 mt CO²-eq
- Cover crop
- Reduced to No-till

Carbon generated = 1.0 mt CO²-eq/acre

1.0 x \$15 = \$15/acre

Minus transaction and processing fee ??

Carbon smart practice	Carbon Potential mt CO ² -eq/acre
Reduced-Till to No-Till	0.40
Conv-Till to No-Till	0.65
Cover Crop	0.6

Rates shown for illustrative purposes only

What's the break-even Carbon price to adopt the practice?

Example: a \$30/ac cover crop practice breaks even at \$50/ton CO²-eq.



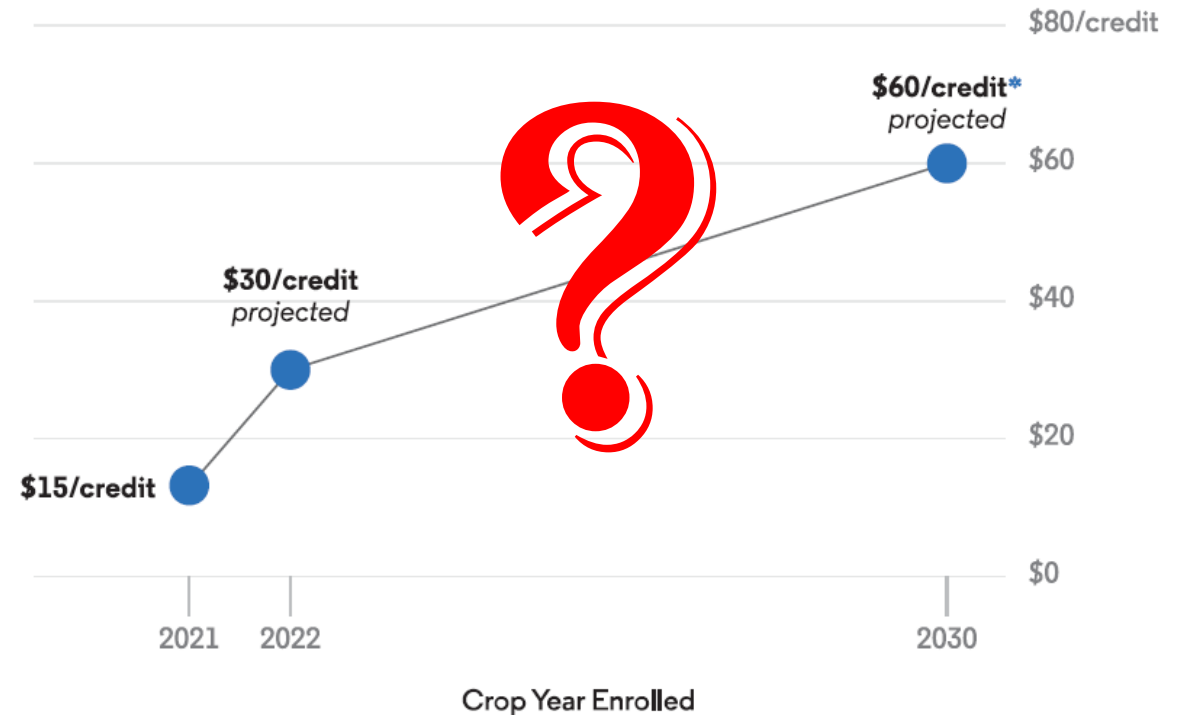
Ecosystem Market Economics

What should or could the price of carbon be down the road?

$$1.0 \times \$60 = \$60/\text{acre}$$

and what about Water Quality and Biodiversity credits?

Carbon credit payments are projected to increase dramatically



*Source: Forest Trends' Ecosystem Marketplace, "Financing Emissions Reductions for the Future: State of Voluntary Carbon Markets 2019," Washington DC: Forest Trends, 2019.

Ecosystem Market Economics

What could the price of a water quality credit be down the road?

\$15-20/ac

What could the price of a biodiversity credit be down the road?

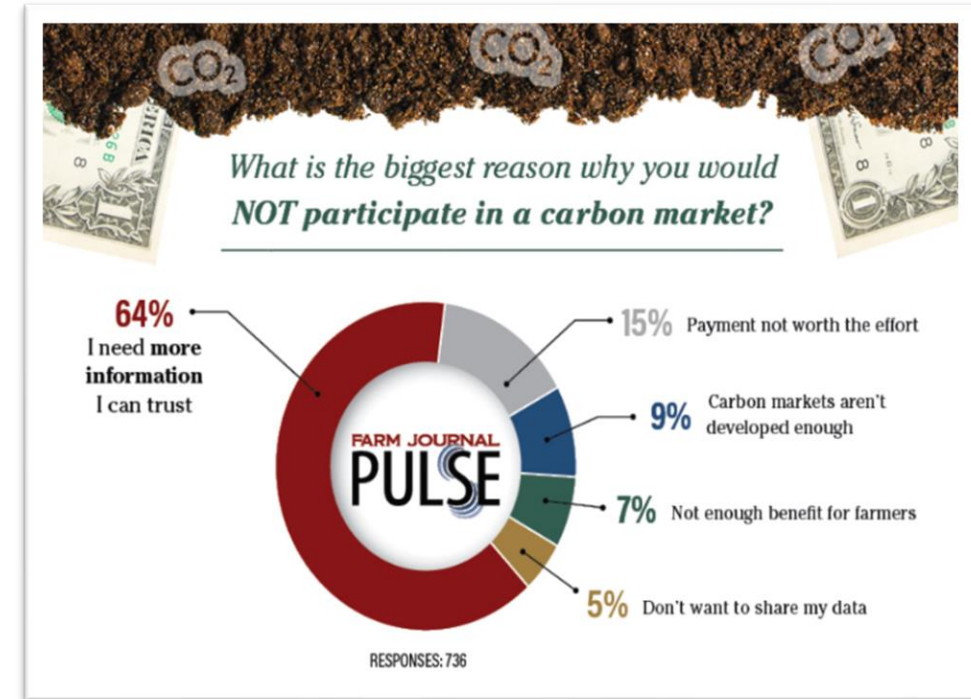
???

Stacking all 3 credits: Carbon + Water Quality + Biodiversity = \$30 - \$80/acre

Farmer views of markets

Farmer Questions -

- What if I'm already using eligible practices on my farm?
- How long am I locked in for?
- What if the price of carbon jumps up?
- Who owns the credit, the farmer or landowner?
- Am I getting a fair portion of the total sales revenue?
- How much time/effort will it involve for me?
- How much historical data/docs are needed?
- How is my data being used?
- What if I want out early?
- Can terms and conditions change during the contract?
- Does eligibility depend on purchase or use of other non-carbon services?



Ecosystem Market - Knowns & Unknowns

What we know -

- Ag conservation practices help mitigate GHG emissions.
- Carbon smart practices also have important co-benefits, like soil health, water quality, biodiversity, etc.
- Companies must make good on their ambitious climate goals and pledges.
- They must also respond to consumer demand, weave this into marketing, sales, PR, and business needs.
- These drivers create private sector demand for ecosystem credits derived from ag conservation practices.
- Attention and momentum to address climate change in the private sector is not going away anytime soon, there is substantial private money and effort committed to this.



Ecosystem Market - Knowns & Unknowns

What we know, that we don't know (yet) -

- Monitoring SOC change over time is challenging on a large scale. Not as easy as it sounds.
- How to quantify biodiversity benefits/outcomes.
- What a biodiversity credit may even be worth.
- What the true market price for a carbon credit is.
- Most cost-efficient way to monitor and verify ecosystem outcomes on farms.
- Are farmers on a large scale interested in selling credits to corporations.
- Whether markets present a real financial opportunity, a hassle, or a threat for farmers.



Ecosystem Market - Knowns & Unknowns

What we don't know, that we don't know -

- USDA's play and role with carbon and in ecosystem markets.
- EPA's future climate regulatory plans.
- IRS tax policy around carbon credits.
- US Congress's play in future climate policy.
- Consumers longer term demands around climate.
- Long term viability of ag carbon markets.
- And other unknown – unknowns.

There are known knowns; there are things we know that we know.

There are known unknowns; that is to say, there are things that we now know we don't know.

But there are also unknown unknowns – there are things we do not know we don't know.

-Donald Rumsfeld



CARBON PILOT Program

Partnership Opens Doors to Explore Carbon Markets, Credits and Trading

Missouri farmers looking to better understand carbon markets have a new opportunity through an entirely voluntary pilot project led by leading agricultural organizations. Farmers who choose to enroll will have **the opportunity to test new innovations in quantifying carbon and water quality benefits** and provide input to guide program development.

The pilot comes through partnership among Ecosystem Services Market Consortium (ESMC) and the Missouri Corn Merchandising Council, the Missouri Soybean Merchandising Council, and MFA Incorporated. Within the pilot program, farmers have **a low-risk opportunity** to better understand the agricultural carbon and water quality markets. The two-year pilot project began with the 2021 growing season, and is slated to continue through 2022.



There is no cost to the farmer to enroll in the pilot.

(573) 635-3819 | www.mocarbonpilot.com



- The program will **quantify and certify carbon and water quality credits** on enrolled acres from the adoption of eligible on-farm practices.
- **Soil sampling** is central to the pilot project, and made possible through the corn and soybean checkoff programs and MFA.
- **Farmers who are considering conservation practices**, such as cover crops, reduced tillage or precision nitrogen management, are great candidates for this pilot project.

Enrollment

- There are **no minimum acreage limits**. Farmers can choose to phase in more acres and/or practices over time.
- During the Missouri pilot, there will be a **limited number of total acres** that can be enrolled.
- In the pilot project, **farmer contracts with ESMC are annual**. At the conclusion of the pilot, farmers may have the option to roll into either a 5 or a 10-year contract.
- **There is no cost to the farmer to enroll in the pilot.**

Payment

Farmers who participate in this pilot have the **potential to generate certified ecosystem credits** that can be sold following certification of the credits.

About ESMC

Ecosystem Services Market Consortium is a non-profit organization that works to compensate farmers and ranchers for the value of positive environmental impacts made through the adoption of sustainable agricultural production systems.

Missouri Corn, Missouri Soybean and MFA staff will be available to assist in the enrollment process.
To get started, visit www.mocarbonpilot.com.



Farmers who are considering conservation practices are great candidates for this pilot project.

(573) 635-3819 | www.mocarbonpilot.com



Biodiversity Credit Pilot

Exploring innovative ways to further wildlife conservation goals.

Goal - enhance native wildlife habitat and biodiversity on Mo farms through innovative market-based approach.

Opportunity – rewarding farmers for practices that produce positive wildlife biodiversity outcomes.

A partnership with the Missouri Dept. of Conservation.



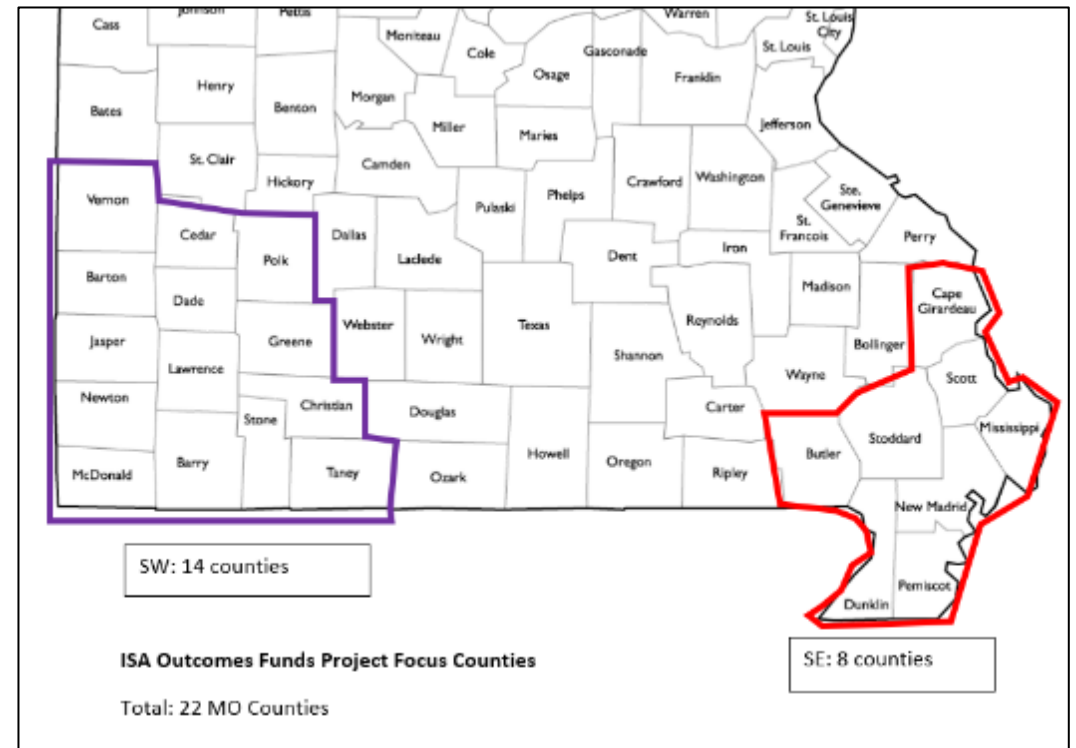
Goal – provide new opportunities to enhance soil, carbon and water quality on Missouri farms.

Opportunity –new revenue streams for farmers from sale of carbon and water quality “Outcomes” to public and private beneficiaries.

Crop Systems - Corn, Soybean and Rice.

Partnership with Iowa Soybean Assoc. and others.

Enrolling for 2022 in SE and SW MO.



Environmental Stewardship Programs

Science, data and knowledge will drive modern, “smart” sustainable agriculture

Farmers and ranchers are remarkable innovators who rely on 21st-century science, data, and precision technology.

The drive to continuously improve and embrace science & tech by US farmers has allowed our nation to grow more food on less land, with less inputs, and less impact.

Farming continues to be an innovative field - full of technology & science, but more importantly opportunity & promise.

At Missouri Corn and Missouri Soybean we work hard to invest farmers' checkoff dollars into research and programs to further 21st century innovation, opportunities and goals.

