stripe

Soil Value Exchange

APPLICATION FOR STRIPE 2020 NEGATIVE EMISSIONS PURCHASE

Section 1: Project Info and Core Approach

1. Project name

Soil Value Exchange

2. Project description. ***Max 10 words***

Stripe negative emission purchase launches grassland ecology regeneration at scale

3. Please describe your negative emissions solution in detail, making sure to cover the following points:
    a) Provide a technical explanation of the project, including demonstrations of success so far (preferably including data), and future development plans. Try to be as specific as possible: all relevant site locations (e.g. geographic regions), scale, timeline, etc. Feel free to include figures/diagrams if helpful. Be sure to discuss your key assumptions and constraints.
    b) If your primary role is to enable other underlying project(s) (e.g. you are a project coordinator or monitoring service), describe both the core underlying technology/approach with project-specific details (site locations, scale, timeline, etc.), and describe the function provided by your company/organization with respect to the underlying technology/approach.
    c) Please include or link to supplemental data and relevant references.

Max 1,500 words *(feel free to include figures)*

Stripe's 2020 purchase of 33,000 tonnes of soil carbon storage will have an important catalytic impact, enabling the launch of Soil Value Exchange, a Public Benefit LLC. Stripe's support will unlock investments from several other parties who have expressed their interest to us. Stripe's purchase enables us to embark on a path to a scale that matters: storage of >100 million tonnes of CO_2 per year by 2030.

Stripe's purchase not only supports your mission to become a carbon negative business, but positions Stripe as a regenerative business, helping restore the ecosystems that form the foundation for our living planet.

Soil Value Exchange [SVX] promotes the use of regenerative land management techniques that work with nature to enhance natural carbon storage. In 2020 we aim to provide measured and independently validated soil carbon storage certificates for 33,000 metric tonnes of CO_2 equivalent [tCO_2]. Collectively these certificates represent the guaranteed removal of atmospheric CO_2 and its storage in the soils of about 33,000 acres of U.S. ranch land. We guarantee carbon removal by using a qualified measurement contractor to measure soil carbon content at participating ranches. Measurements are taken in two phases: An initial set of measurements in 2020, and a second set approximately 3 to 5 years later. Our 2020 soil carbon storage certificates will be issued based on very conservative estimates of carbon storage [e.g. 1 tCO_2/acre/yr] supported by published scientific literature, corresponding to each site's local ecology, climate and land management techniques. All estimates will be independently validated. The second set of measurements determines the actual soil carbon stored, which is expected to be much higher than the initial estimate [e.g. 2.0-6.0 tCO_2/acre/yr]. Once the carbon storage calculations are corrected for life cycle impacts, the additional remaining measured soil carbon storage certificates can be offered for purchase.

3.1. Background:

Large scale, relatively inexpensive, robust, reliable and effective carbon capture and storage is available through natural ecological systems. America's grassland soils have the capacity to capture and store about 1 billion tonnes of atmospheric CO_2 per year.

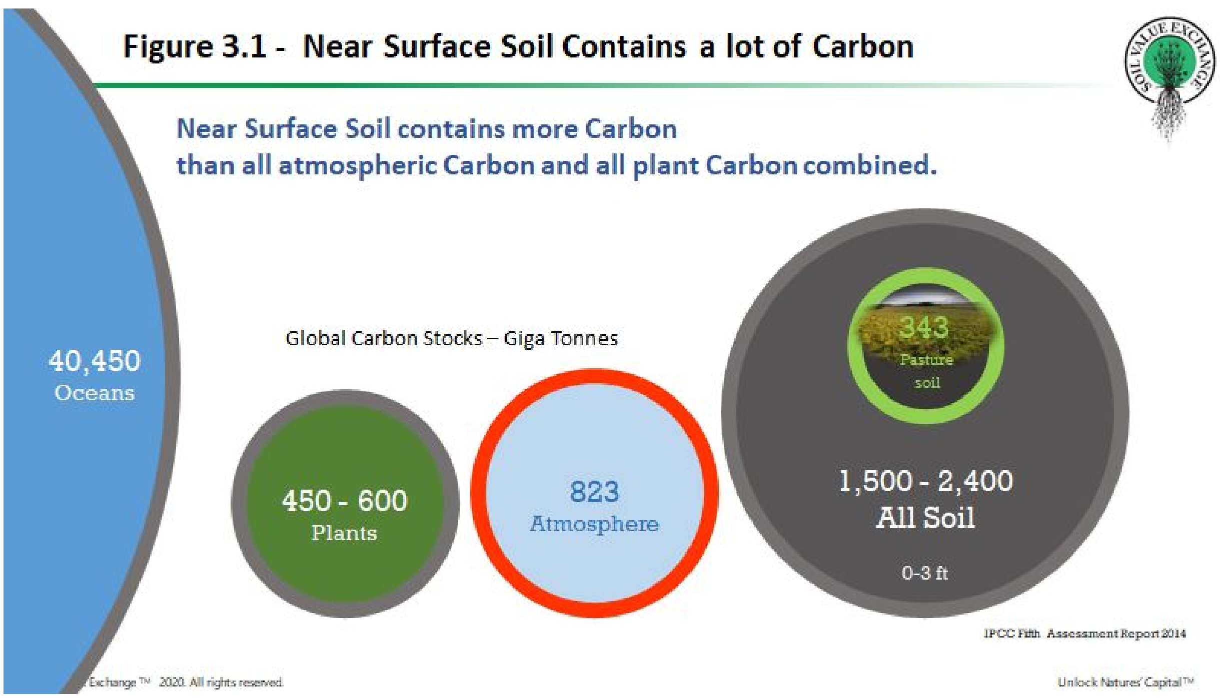
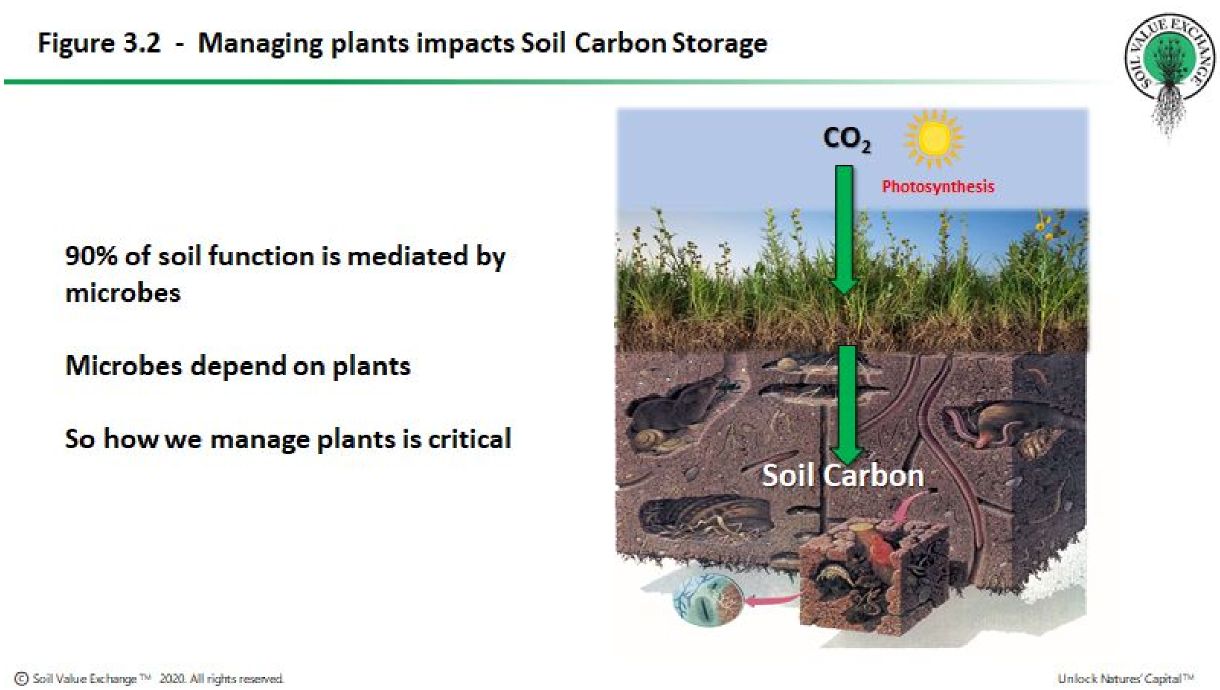
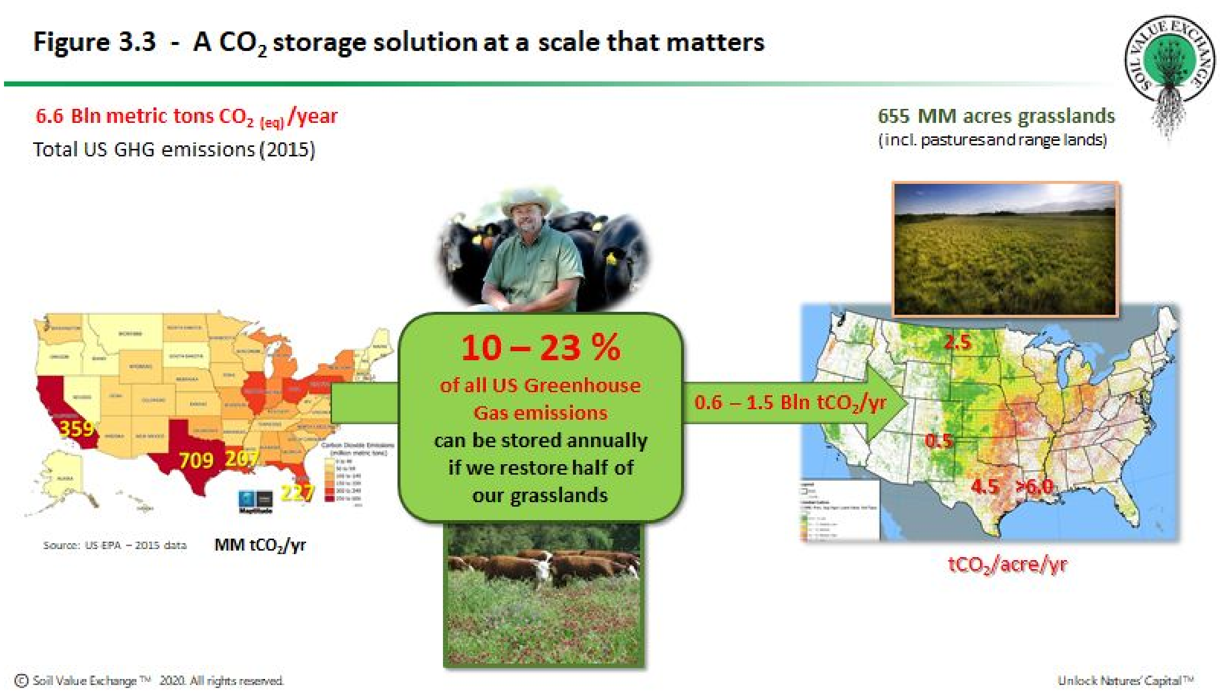


Figure 3.1 - Near Surface Soil Contains a lot of Carbon

On our planet, the first three feet of soil contains more carbon than all biomass and atmospheric carbon combined. [Figure 3.1] For hundreds of millions of years, the photosynthesis process in trees, shrubs and grasses have taken carbon dioxide out of the atmosphere and turned it into sugars. The sugars are transported through the roots and provided to microorganisms in exchange for nutrients. In this way the plant captures atmospheric carbon dioxide and pumps it into the soil. When plants degrade or are consumed, part of the carbon eventually returns to the atmosphere as carbon dioxide. This is the Earth's natural carbon cycle – a cycle that is now out of balance due to humans emitting CO_2 at unprecedented rates. One way to restore this balance is to protect and enhance the natural ecosystems that capture and store carbon dioxide. Doing this requires landowners to adapt their land management practices enhancing the focus on soil health and ecological health. [Figure 3.2]. Grasslands managed in a regenerative way have the capacity to store between 0.5 to >6 tCO_2/acre/year, depending on local soil and climate conditions. [Figure

3.3]





3.2. Soil Carbon storage potential

Depending on the region, local climate and land management techniques, regenerative grassland soil carbon storage can range from <0.5 tCO_2/acre/yr [arid regions] to >6 tCO_2/acre/yr. [Figure 3.3]

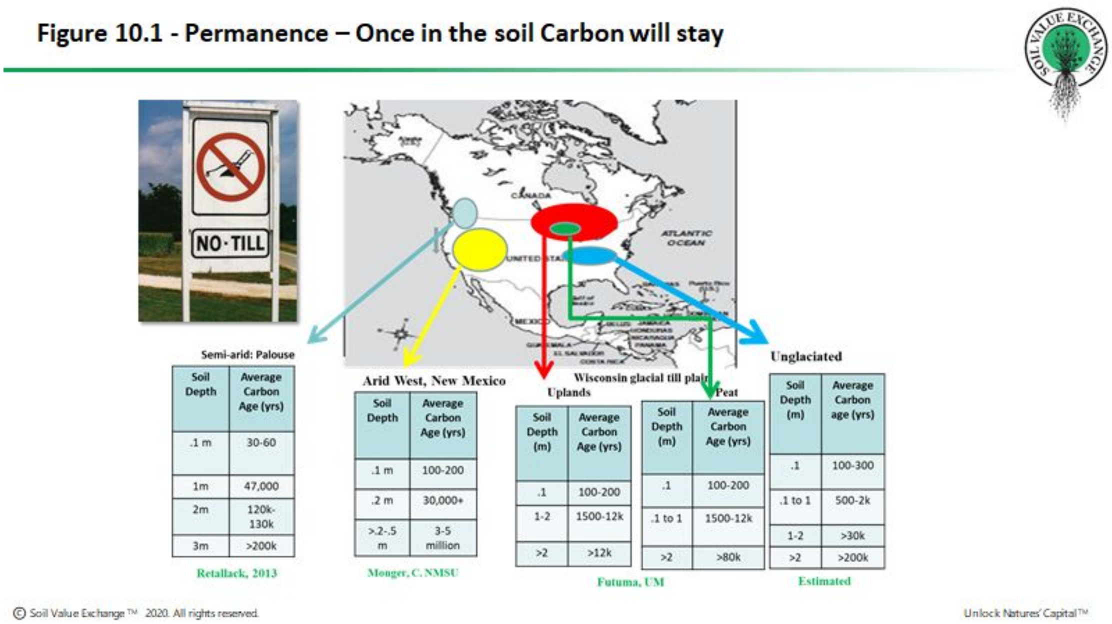
The USA has about 650 million acres of prairie and range lands. If 50% of these grasslands are managed in a regenerative way the annual CO_2 storage capacity could vary between 0.5 – 1.5 billion tCO_2/yr.

Further details:

Many papers have been published about soil carbon storage in grasslands or prairie systems and the impact of grazing, with a wide range of results. However much of the peer reviewed literature suffers from problems of scale, time, system definition and failure to use standard soil carbon sampling methods. Adequate understanding of soil carbon storage requires assessing the full landscape; however, most research is conducted at isolated subplots that do not accurately reflect results at a typical ranch or landscape. Furthermore, most soil carbon papers report on the soil carbon dynamics in the upper 30 cm of soil (which are the most dynamic), while standard scientific methods now require sampling to a depth of 1 meter. Finally, intrinsic to the technique of regenerative grazing is the practice of consistently adapting land management decisions to changing conditions. Yet most scientific studies prescribe techniques on a set schedule in time and space, which does not reflect true regenerative grazing and almost always leads to failure. For a more detailed discussion, see “Multi-paddock grazing on rangelands: Why the perceptual dichotomy between research results and rancher experience?” by Teague et. al. (2013).

3.3. Durability and Permanence

Carbon stored in soil is more ‘durable’ and longer lasting than other forms of nature-based carbon storage like forests, which can quickly release carbon back into the air during fires or pest infestations. The most durable forms of soil carbon are created below ground, through the annual senescence of plant roots and through exudates introduced by the plant through its roots, leaves and other tissues. This source of soil organic carbon has slow turnover rates and is stable for long time periods. A large percentage of the sequestered soil carbon introduced below ground through these mechanisms remains for periods ranging from many decades to centuries and millennia, provided the management practices that create the soil carbon sequestration remain in place. [Figure 10.1] Therefore, the ‘durability’ of soil carbon is primarily an issue of ongoing land management behaviors, thus economic, social and political systems, not of the natural ‘technical’ cycle of the carbon itself. Thus, if we successfully implement socioeconomic systems that allow nature to work, net soil carbon will increase and will stay in the ground for millennia.



3.4. How Soil Carbon Storage Certificates will be offered

Our protocol [See Figure 3.4] is currently in the process of being endorsed by a large diverse working group facilitated by Rice University's Baker Institute of Public Policy. [http://news.rice.edu/2019/12/03/baker-institute-led-group-to-develop-nationwide-protocol-for-storing-carbon/]

a) Selected farmers and ranchers sign a soil carbon storage service consignment agreement with SVX. The agreement is simple, transparent and was developed with input from ranchers.

b) An appointment is made for an independent measurement contractor to take initial soil carbon measurements [using existing Verra / VCS protocol] and make an initial on-site soil carbon storage estimate

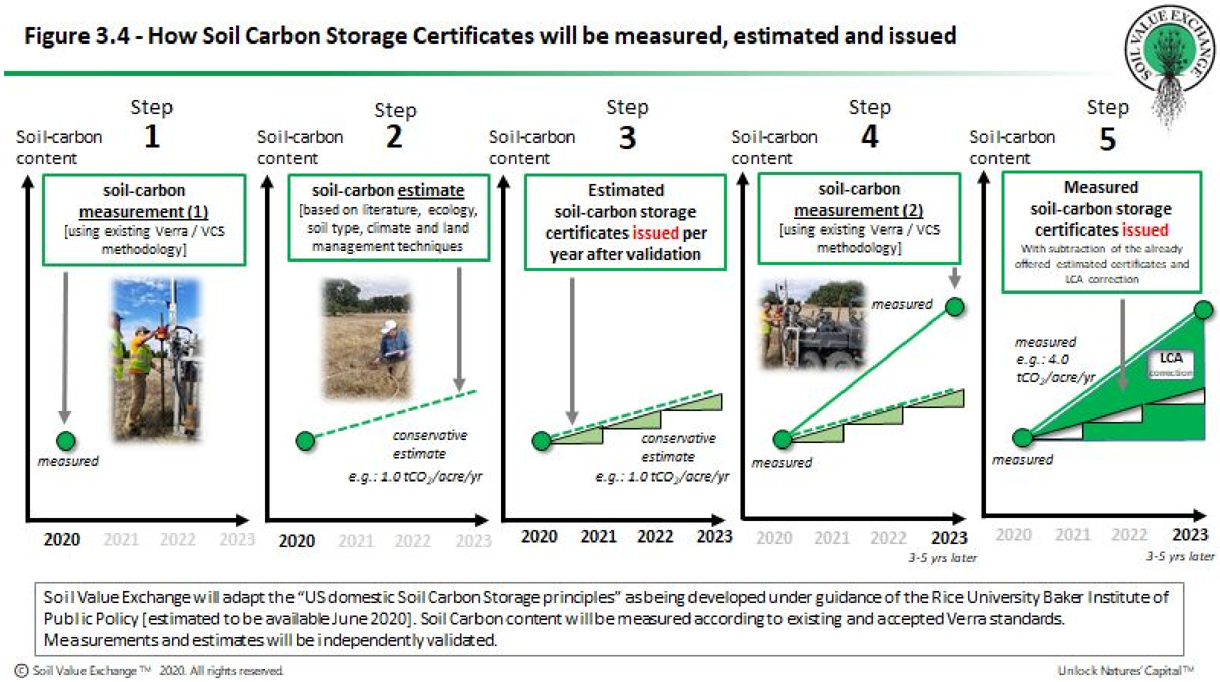
c) Soil carbon storage estimates are validated by an independent 3rd party verification company

d) Soil Value Exchange issues location-specific soil carbon storage certificates valid for an indicated amount of CO_2 storage in 2020.

e) Annually upon validation of continued rancher compliance with the consignment agreement, carbon storage certificates are issued corresponding to the estimated CO_2 storage amount [2021-2024].

f) 3 to 5 years after the initial 2020 measurements in 2020, a second set of soil-carbon measurements is executed by the independent measurement contractor.

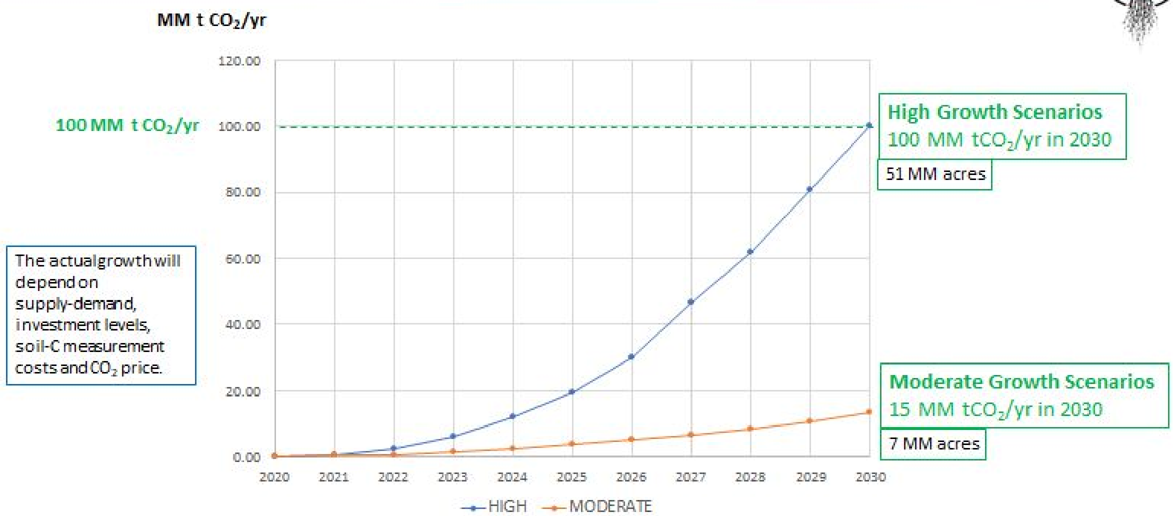
g) After validation of the measurements by an independent 3rd party verification company the total amount of soil carbon storage in the period between measurements is determined. After subtraction of the amount of soil carbon estimated, lifecycle corrections and buffer [see section C] the remaining amount of measured soil carbon storage certificates will be issued.



3.5. Scale

We aim to responsibly grow to a scale that matters and are using two realistic growth scenarios [see Figure 3.5]. Actual growth will depend on investment levels, soil carbon measurement costs and CO_2 price. By 2030, the moderate growth scenario reaches CO_2 storage of 15 million [MM] tCO_2/yr, whereas the high growth scenario reaches 100 MM tCO_2/yr. The level of investment required to create a self-sustaining cash flow positive business will be between 7-30 MM$ over a 4-year period [@$30/$tCO_2$]. SVX profits will be reinvested in the company to unlock access to larger scale and reach more ranchers.

Figure 3.5 - Growth Scenarios



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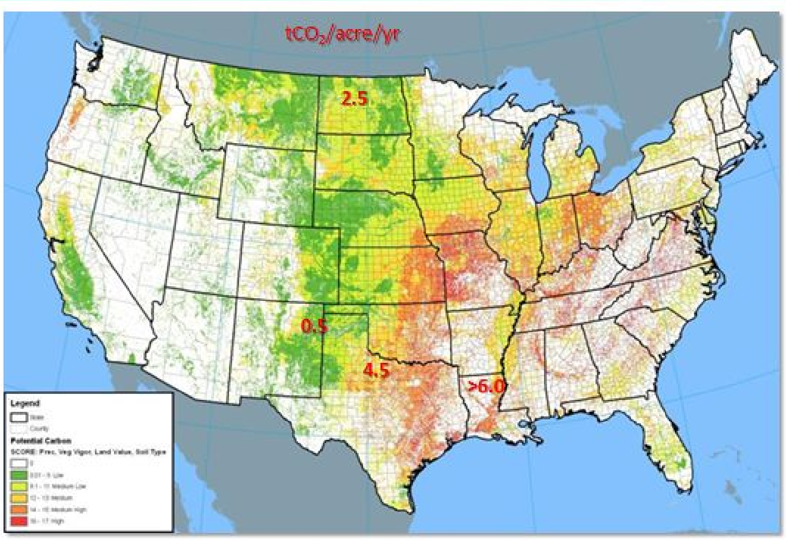
3.6. Where are the ranches that will store Stripe's negative emission

Soil carbon storage is driven by photosynthesis and hence most effective in areas with abundant sunlight and rainfall. The map in Figure 3.6 shows the range of grasslands where the highest soil carbon storage is anticipated.

Figure 3.6 - No land Change required - 41% of U.S. land revolves around livestock.



NO land change required.

We "only" have to change HOW we manage pasture and range land

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3.7. Rancher support Model

We make it easier for ranchers to adapt their land management practices for healthy soils by providing the following support:

- free access to consultant support on their ranch
- inclusion in a network of ranchers to share best practices and lessons learned
- free initial soil carbon measurements
- the opportunity for additional income from SVX sales of soil carbon storage certificates

3.8. Key assumptions and risks

The following key risks are expected to impact on the SVX's success and growth rate.

- Willingness of soil carbon storage buyers to pay a fair price
- Access to impact investment to enable the growth of SVX
- Capacity of qualified soil measurement contractors to keep up with demand
- Speed at which ranchers implement change in practices
- Legislation or government support for specific solutions

Section 2: 2020 Net-Negative Sequestration Volume

See Stripe Purchase Criteria 1: The project has volume available for purchase in 2020.

4. Based on the above, please estimate the **total net-negative sequestration volume** of your project (and/or the underlying technology) in 2020, in tons of CO2. (Note: We're looking for the net negative amount sequestered here, net lifecycle emissions. In Section 3; you'll discuss your lifecycle and why this number is what it is).

33,000 tCO2 [33 ktcO2]

5. Please estimate how many of those tons are still available for purchase in 2020 (i.e. how many tons not yet committed). This may or may not be the same as the number above.

33,000 tCO2 [33 ktcO2]

6. (Optional) Provide any other detail or explanation on the above numbers if it'd be helpful.

Max 100 words.

We are thrilled to offer Stripe in 2020 the capture and robust storage of 33,000 metric tons of atmospheric CO_2, in the soils of 10-30 ranches (depending on ranch size) totaling about 33,000 acres. This assumes the initial conservative carbon storage estimate [see 3.4.b] will be about 1.0 tCO_2/acre/yr. After the second soil carbon measurement is performed (3-5 years later) [see 3.4.f-g], we anticipate the 33,000 acres will have captured and stored a significantly higher amount of atmospheric CO_2. Once measured and validated, the additional lifecycle-corrected CO_2 storage will be offered for purchase as well.

Section 3: Life Cycle Analysis

See Stripe Purchase Criteria 2: The project has a carbon negative complete lifecycle (including energy use, etc).

7. Provide a life cycle analysis of your negative emissions solution demonstrating its carbon negativity, as complete as possible given limited space, and making sure to cover the following points:

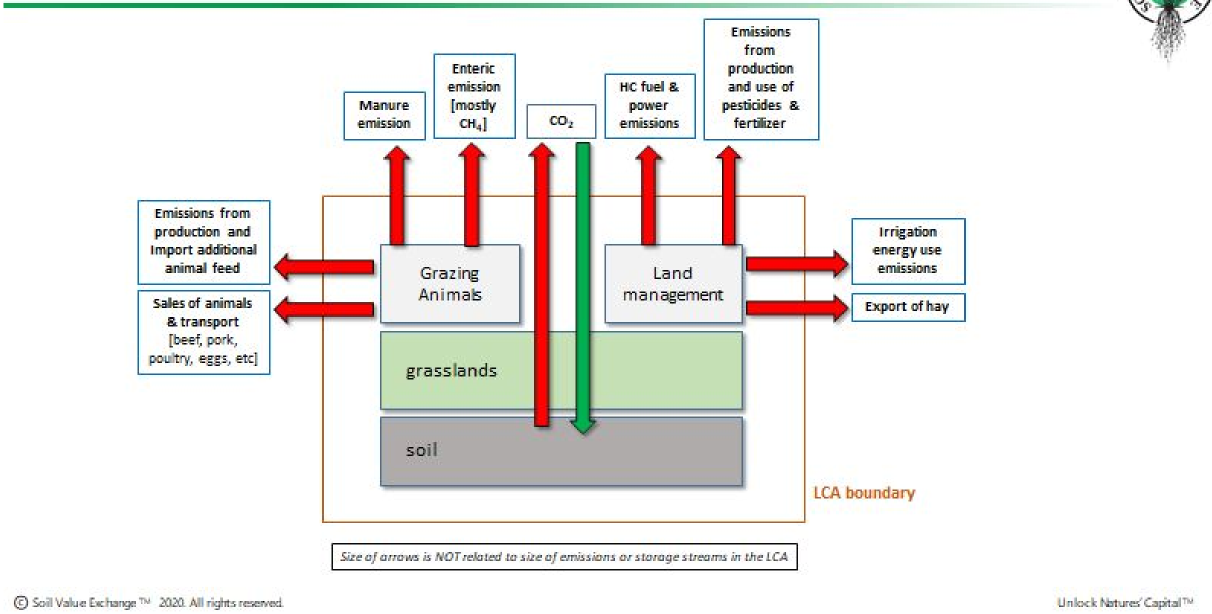
a) Include a flow sheet diagram of direct ingoing and outgoing flows (GHG, energy, materials, etc) that bear on the LCA.
b) Please be explicit about the boundary conditions of your LCA, and implications of those boundaries on your life cycle. Let us know why the conditions you've set are appropriate to analyze your project.
c) Make sure to identify assumptions, limitations, constraints, or factors that relate to ingoing and outgoing flows, citing values and sources (for example: land and resource scarcity, limitations on a required chemical, energy requirements). Also identify key sources of uncertainty in determining these values.
d) If your solution results in non-CO2 GHG emissions, please be sure to separately specify that (e.g. in units of GWP 20 or 100 years, ideally both).
e) For solutions that rely on modular components (for example: incoming energy flows or outgoing CO2 streams), feel free to cite values associated with those interfaces instead of fully explaining those components. For these values, please identify the upstream and downstream life cycle emissions of the component.
f) Explain how you would approach a more comprehensive LCA by citing references and underlying data needed for the analysis.

Max 1,000 words *(feel free to include figures or link to an external PDF)*

7.a Flow sheet diagram

To provide insights in the net carbon storage of regenerative grazing systems we refer to four published lifecycle analysis (LCA) studies. A generic outline flow-sheet diagram for grassland regeneration with the aid of grazing animals, is shown in Figure 7.1.

Figure 7.1 – Ranch basic LCA factors



LCA study 1 – Absolute and Comparative LCA Grazing methods - 2019 study by Quantis

https://www.csrwire.com/press_releases/41932-Study-White-Oak-Pastures-Beef-Reduces-Atmospheric-Carbon.

A 2019 LCA study by Quantis, a respected international research firm, and funded by General Mills, was executed on beef raised by White Oak Pastures ranch, using regenerative grazing methods. The study included all energy and environmental impacts at all stages of the product's life cycle. The research team was so astounded by the results that they called in academics from other universities to confirm the methodology. Results will be published in a peer-reviewed journal later this year.

See Figures 7.2 and 7.3

- Holistically managed fields went from 1 percent soil organic matter to 5 percent. Soil organic matter is a key indicator for soil health.
- Improved soil health resulted in more carbon being stored in the soil than the cattle emit. The net Kg CO_2-eq emissions per Kg fresh meat was -3.5 kg CO2-eq.
- White Oak Pastures' beef has a carbon footprint 111% lower than a conventional US beef systems. The carbon footprint of regeneratively produced beef is 36.5 kg CO_2-eq /kg fresh meat lower than conventional US beef.
- In order to err on the conservative side, Quantis researchers mentioned they could be overestimating enteric methane emissions. There are relatively few direct measures of methane emission rates from cattle while grazing in such systems. Some experts (e.g. Dr. J. Rowntree) believe that the IPCC references used here are likely to overestimate the true enteric emissions. If overestimated, the results would show even stronger negative carbon footprints.

Figure 7.2 – Absolute LCA – 2019 Quantis study White Oak Pastures shows net carbon negative beef

Quantis LCA:
Likely to be an overestimate of the true enteric emissions. If indeed overestimated, the results could show a more highly positive carbon emission benefit for WOP beef.

There are relatively few direct measures of methane emissions rates from cattle while grazing in such systems. Some experts (e.g., J. Rowntree) believe that the IPCC references used here are likely to be an overestimate of the true enteric emissions. We have erred on the conservative side for these results.

Robust, peer reviewed results, from a Carbon Nation / Arizona State University – AMP Grazing LCA study, using extensive multi-year eddy covariance flux towers measurements, are expected to be available in 2021. Initial results seem to indicate that methane emissions from regenerative grazed cattle are much lower, or even negative, compared to methane emissions from feeding lot cattle on a corn diet.

Source: https://holisticmanagement.org/featured-blog-posts/regenerative-grazing-integrated-system-6-times-more-carbon-efficient/

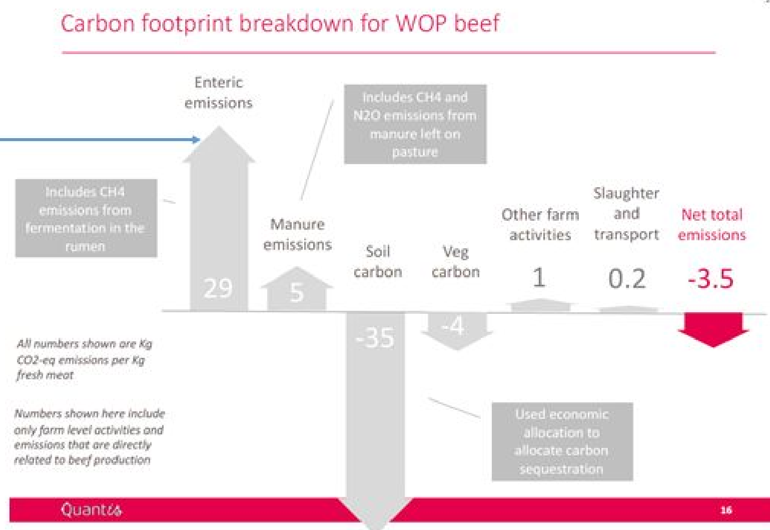


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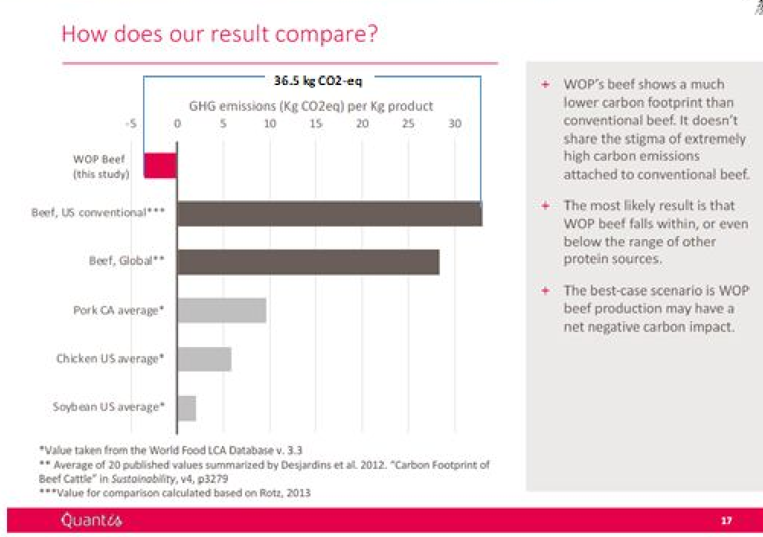
Figure 7.3 – Comparative LCA – 2019 Quantis study White Oak Pastures shows significant CO2 reduction

A 2019 LCA study executed by Quantis, a respected international research firm, and funded by General Mills was executed on beef raised by White Oak Pastures (using regenerative grazing methods) included all energy and environmental impacts at all stages of the product's life cycle showed that the soil and increasing soil health results in more carbon stored in the soil than the cattle emit. The net Kg CO2-eq emissions per Kg fresh meat from White Oak Pastures was **-3.5 kg CO2-eq**.

Compared to conventional US beef production the reduction is **36.5 kg CO2-eq** /kg fresh meat



Source: https://holisticmanagement.org/featured-blog-posts/regenerative-grazing-integrated-system-6-times-more-carbon-efficient/

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LCA study 2 - Comparative LCA grazing methods: Stanley et al 2018

[Agricultural Systems Volume 162, May 2018, Pages 249-258]

- Adaptive multi-paddock (AMP) grazing (= regenerative) can sequester large amounts of soil C.
- Emissions from the grazing system were offset completely by soil C sequestration.
- Across-farm soil organic carbon data showed 4-year C sequestration rate of 3.59 Mg C ha^{-1} yr^{-1} [= 5.3 tCO_2-eq/acre/yr] in AMP grazed pastures.

· Absolute greenhouse gas footprint for AMP grazed systems was -6.65 $kgCO_2$-eq/kg carcass weight.
· Compared to conventional grazing systems, AMP grazing showed a reduction of 16.27 kgCO2-eq/kg carcass weight.
· Soil C sequestration from well managed grazing may help to mitigate climate change.

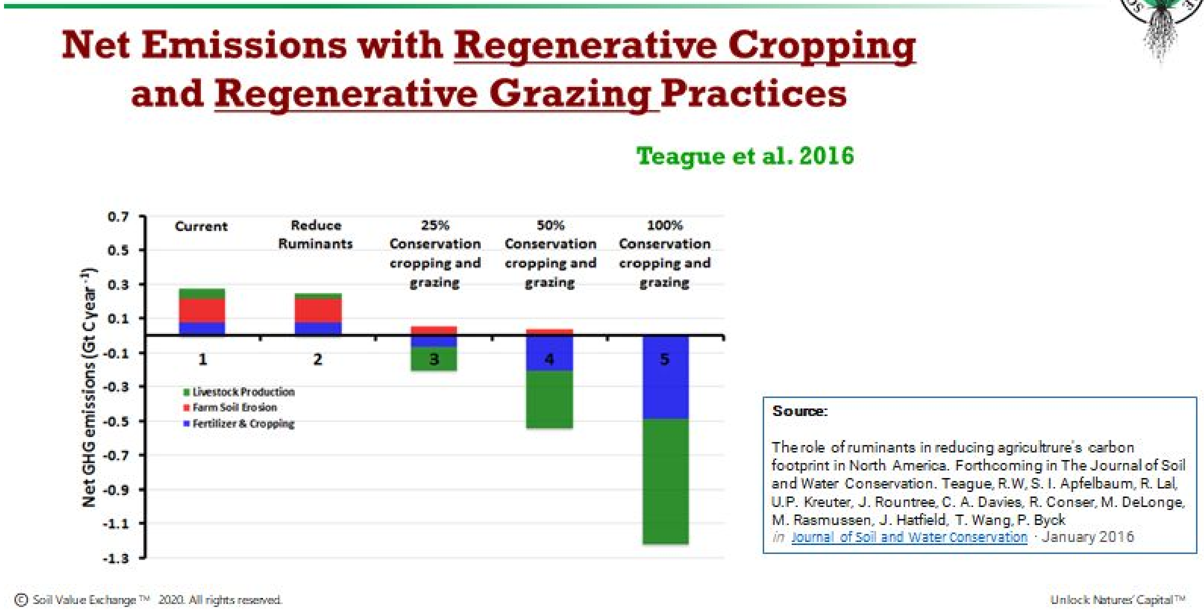
LCA study 3 - High level LCA North America agriculture and impact of grazing: Teague et al 2016

[Journal of Soil and Water Conservation · MARCH/APRIL 2016—VOL. 71, NO. 2]

· Regenerative crop and grazing management, ruminants reduce overall GHG emissions, and facilitate provision of essential ecosystem services, increase soil carbon sequestration, and reduce environmental damage.

See Figure 7.4

Figure 7.4 – With regenerative grazing management, ruminants reduce overall GHG emissions



LCA study 4 - Comparative LCA grazing methods: Wang et al 2015

[Sustainability 7(10):13500-13521 · September 2015]

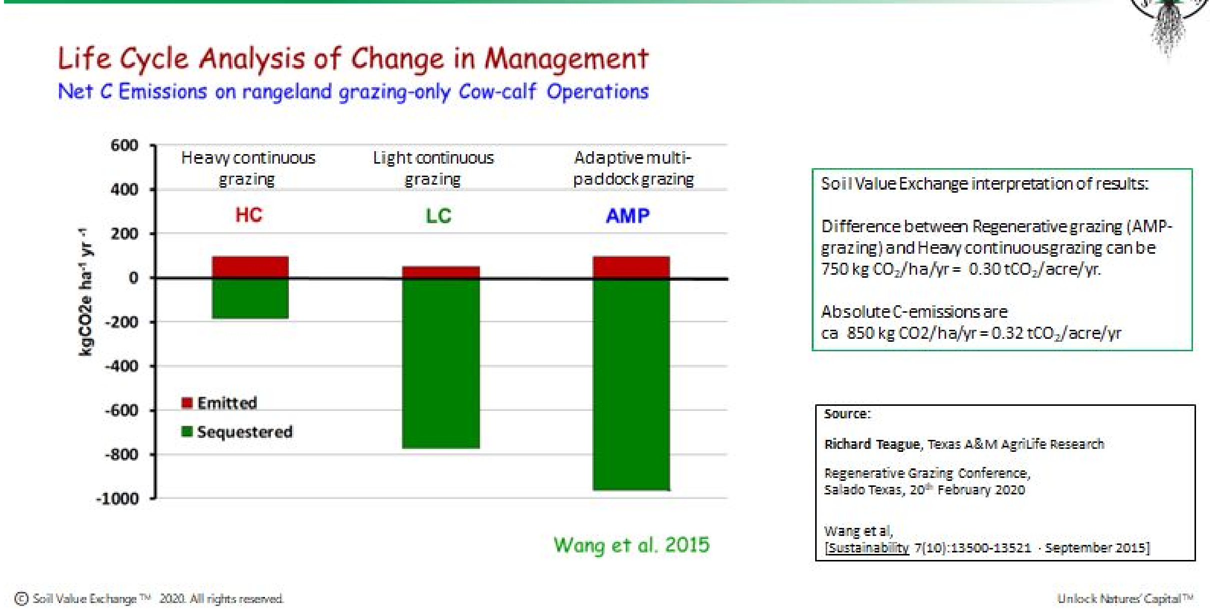
· LCA Analysis indicated that cow-calf farms converting from conventional grazing to regenerative (AMP) grazing in Southern Great Plain region are likely net carbon sinks.

· Migration from high continuous grazing to AMP grazing has a net C-emission of -0.8 tCO_2/acre/yr.

· The study reports that enteric CH_4 emissions in the SGP regions is high compared to other regions. Sensitivity analyses on AMP grazing strategy showed that an increase in grass quality and digestibility could potentially reduce GHG emission by 30%.

See Figure 7.5

Figure 7.5 – Converting from conventional grazing to regenerative (AMP) grazing in Southern Great Plain (SGP) region are likely net carbon sinks.



7.b. LCA Boundary conditions

At least 3 cases need to be analyzed to obtain a meaningful LCA: 1) the absolute LCA for regenerative grazing, 2) a comparative LCA with conventional grazing, 3) a comparative LCA with feedlot animal production (the current predominant method to produce beef in the USA). These cases are shown in Figures 7.6 and 7.7.

Figure 7.6 – Comparative LCAs grazing and animal production

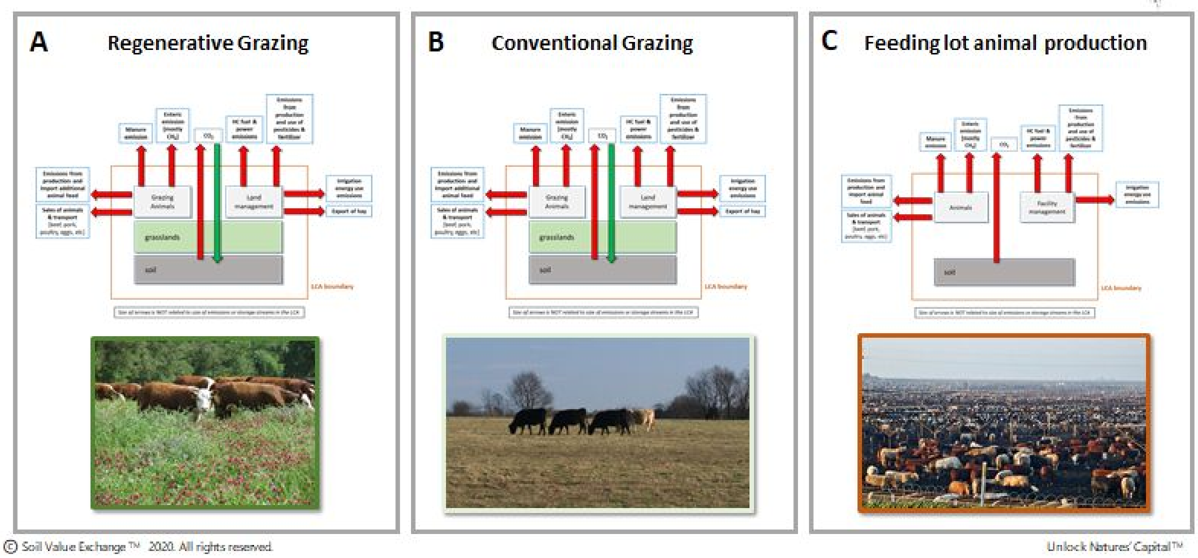
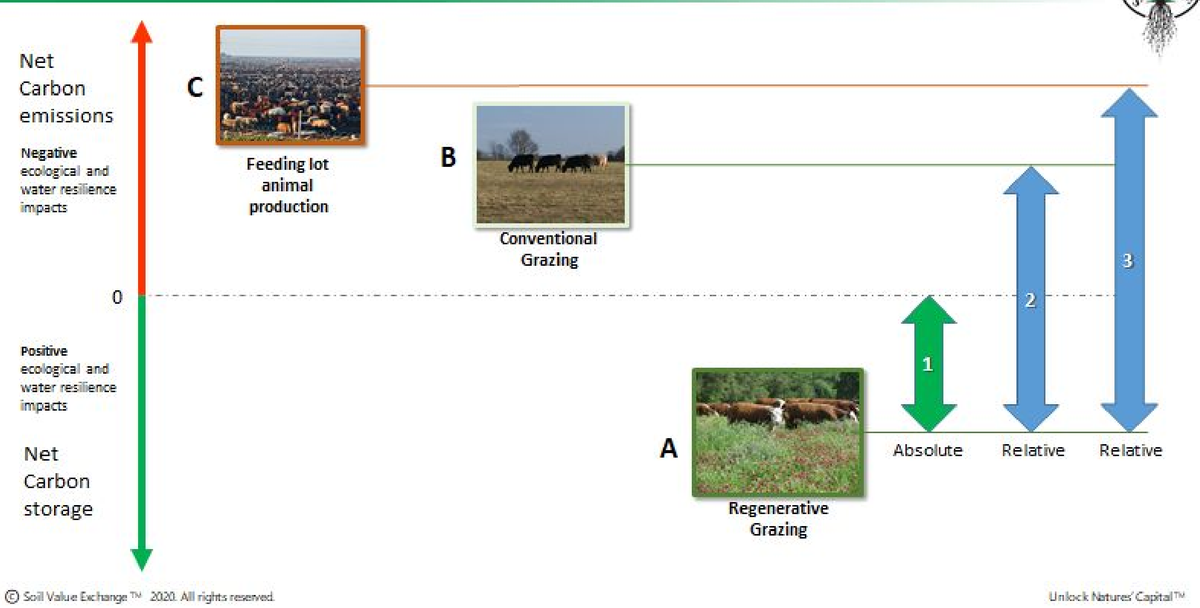


Figure 7.7 – Comparative LCAs grazing and animal production

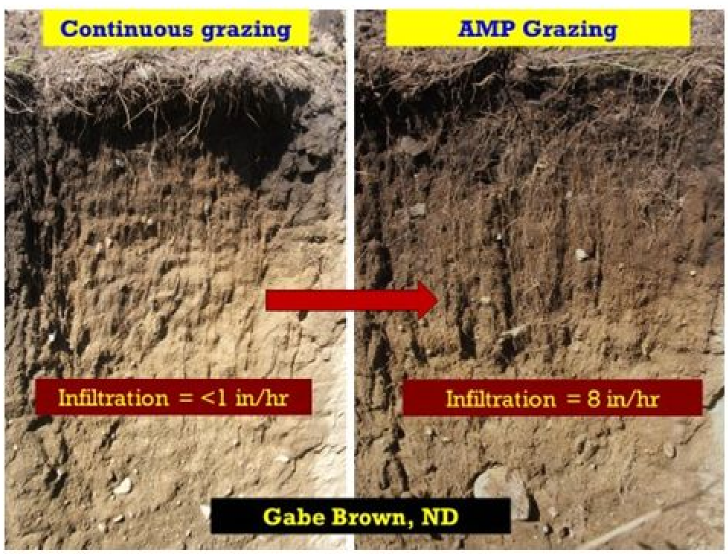


7.c. Key assumptions, limitations, constraints

The real environmental and societal impacts of regenerative grazing systems are much broader and incredibly complex and often not incorporated into LCAs. Regenerative grazing has a very strong positive impact on:

- Soil water absorption (8-10x higher), regenerates water resilience [Figure 7.8]
- Cooling effect of thriving grasses, including water vapor effects
- Erosion prevention – preventing runoff of valuable soils
- Healthy soils and ecology: microbes, insects, vegetation, birds, wildlife
- Healthy food systems with abundant essential micronutrients
- No (or strongly reduced) use of fertilizer, pesticides, insecticides, antibiotics and worming agents
- Replacing monoculture growth of corn as cattle feed, which has a strong negative environmental impact

Figure 7.8 - AMP grazing improves water resilience and blocks erosion



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7.d. Non-CO_2 greenhouse gas emissions

Concerns related to grazing include enteric methane (CH_4) emissions from cattle as well as NO_x from fertilizer use. Regenerative grazing systems do NOT use ammonia-based fertilizer, eliminating most of the NO_x concerns. Initial results from a large AMP-grazing LCA study (see section 7.f) indicate that methane emissions from regeneratively grazed cattle are much lower, or even negative, compared to emissions from feedlot cattle on a corn diet.

7.e. Modular components in the LCA

Several modular components were used in the different LCA studies – Details available in the studies.

7.f. How to approach a more comprehensive LCA

Carbon Nation / Arizona State University (ASU) – AMP Grazing study.

A significant multi-year regenerative AMP grazing research project is currently executed and led by Carbon Nation / ASU and a range of top scientists from different universities. https://carboncowboys org/research. Peer reviewed results are expected to be available in 2021. Soil Value Exchange will use the results to determine a responsible correction factor for soil carbon storage certificates. Initial results indicate that methane emissions from AMP grazed cattle are much lower compared to emissions from feedlot cattle on a corn diet. This is expected to increase the net carbon storage capacity of regenerative grazing significantly. The initial data will be confirmed and validated.

Input to 8:

SVX will use the Carbon Nation/ASU LCA study results available in 2021 and the Rice Baker Institute working group guidelines to correct the amount of carbon certificates issued after the 2nd series of measurements [section 3.4.f-g and Figure 3.4 - step 5].

8. Based on the above, for your project, what is the ratio of emissions produced as any part of your project life cycle to CO2 removal from the atmosphere? For true negative emissions solutions, we'd expect this ratio to be less than 1.

Current conservative indicative estimate used by Soil Value Exchange: 0.5

50 CO2-eq emitted/ 100 CO2-eg captured and stored.

(1) absolute emissions, not relative to conventional grazing, the ratio will then likely be much lower: e.g. 0.1 , (2) lower CH4 emissions in AMP grazing are expected to drastically improve this ratio (3) The ratio will be corrected on basis of the extensive 2021 LCA study results

Section 4: Permanence and Durability

See Stripe Purchase Criteria 3: The project provides durable, long-term storage of carbon.

9. Provide an upper and lower bound on the likely durability / permanence of sequestered carbon provided by your project, in years:

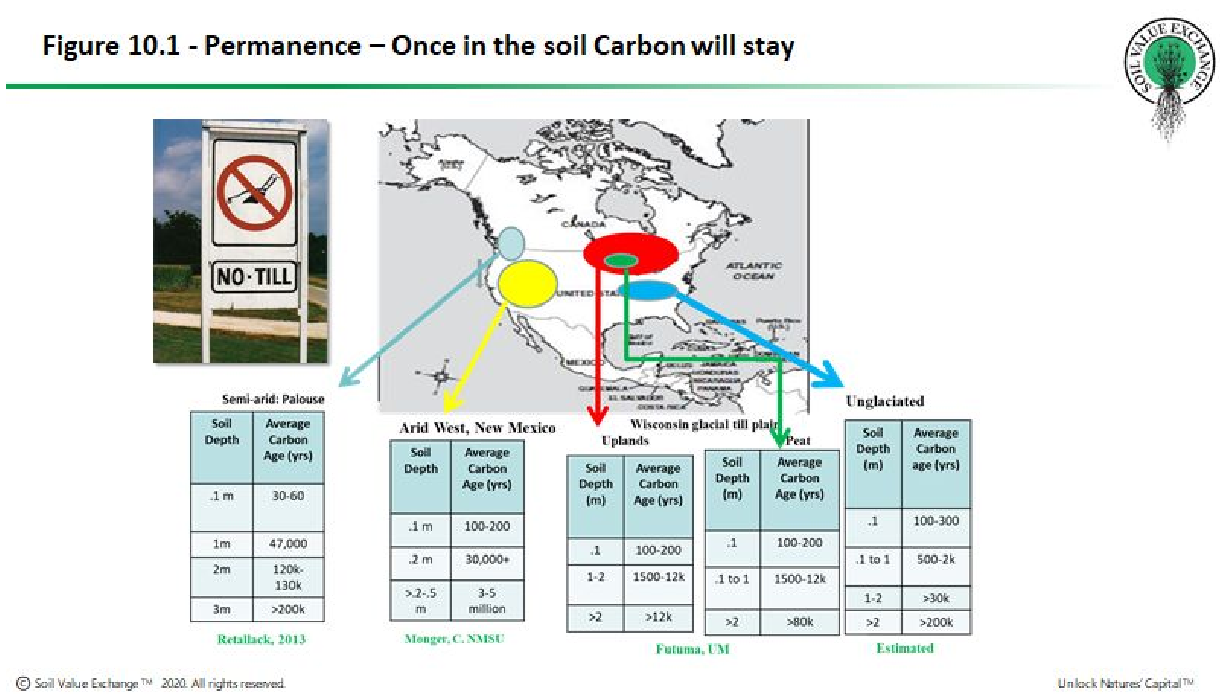
>> 1000 years – if soil not tilled

10. Please provide a justification for your estimates, and describe sources of uncertainty related to: the form of storage, effects of environmental or climatic variability, difficulty in monitoring or quantification, etc. Specifically, discuss the risks to permanence for your project, the estimated severity/frequency of those risks (e.g. 10% of the acres of forest in this forest type are burned by fire over a 100 year period), and the time-horizon of permanence given those risks.
Max 500 words

Soil carbon is one of the most durable forms of carbon stored and will stay in the ground for millennia, if the soil is not disturbed.

Carbon stored in soil is more 'durable' and longer lasting than other forms of nature-based carbon storage like forests, which can quickly release carbon back into the air during fires or pest infestations. The most durable forms of soil carbon are created below ground, through the annual senescence of plant roots and through exudates introduced by the plant through its roots, leaves and other tissues. This source of soil organic carbon has slow turnover rates and is stable for long time periods. A large percentage of the sequestered soil carbon introduced below ground through these mechanisms remains for periods ranging from many decades to centuries and millennia, provided the management practices that create the soil carbon sequestration remain in place. For this reason, the 'durability' of soil carbon is primarily an issue of ongoing land management behaviors, thus economic, social and political systems, not of the natural 'technical' cycle of the carbon itself.

Thus, if we successfully implement socio-economic systems that allow nature to work, net soil carbon will increase and will stay in the ground for millennia. [Figure 10.1]



Semi-arid: Palouse

Soil Depth	Average Carbon Age (yrs)
.1 m	30-60
1m	47,000
2m	120k-130k
3m	>200k

Arid West, New Mexico

Soil Depth	Average Carbon Age (yrs)
.1 m	100-200
.2 m	30,000+
>.2-.5 m	3-5 million

Wisconsin glacial till plain – Uplands

Soil Depth (m)	Average Carbon Age (yrs)
.1	100-200
1-2	1500-12k
>2	>12k

Wisconsin glacial till plain – Peat

Soil Depth (m)	Average Carbon Age (yrs)
.1	100-200
.1 to 1	1500-12k
>2	>80k

Unglaciated

Soil Depth (m)	Average Carbon age (yrs)
.1	100-300
.1 to 1	500-2k
1-2	>30k
>2	>200k

Because carbon in soil is an asset that makes land more productive, we think the largest opportunity to make soil carbon permanently durable in a way that persists throughout generations and despite changing policies, is to support ranchers in adopting these practices to help their agricultural businesses thrive.

Soil Value Exchange is actively working with the Baker Institute of Public Policy's US Domestic Soil Carbon storage principles working group to develop clear standards related to durability and permanence.

To become eligible for a carbon storage transaction and hence payments, a landowner must agree that the land will be managed, maintained and protected in a natural state to secure the soil carbon for ten years. Transactions occurring in subsequent years will require renewal of the ten-year commitment, creating a "forward-rolling" ten-year requirement.

A ten-year rolling agreement was accepted in order to get large numbers of landowners to participate and represents a practical limit to the willingness of various landowners to tie up their land. This compromise was considered desirable in order to create the potential for large-scale implementation of this soil carbon storage standard.

"Maintained and protected in a natural state," for the purposes of this agreement, is defined as allowing natural processes to proceed unhindered, and does not require but allows active management to improve the ecosystem health. Disturbance of the soil by mechanical means, such as paving, plowing, digging or building is not allowed.

In addition, Soil Value Exchange will maintain a buffer of 15% of the soil carbon storage certificates offered after measurement series 2 (see Figure 3.4) for a duration of 10 years. In the unlikely case of reversals, an equivalent amount of buffer certificates will be released and retired.

Section 5: Verification and Accounting

See Stripe Purchase Criteria 4: The project uses scientifically rigorous and transparent methods to verify that they're storing the carbon that they claim, over the period of time they claim to.

11. Provide detailed plans for how you will measure, report, and verify the negative emissions you are offering. Describe key sources of uncertainty associated with your monitoring, and how you plan to overcome them.
Max 500 words

11. Measure, report, and verify the negative emissions

11.a Measurement

To offer robust and validated soil carbon storage certificates SVX will follow the following protocol [See Figure 3.4]. This protocol is currently in the process of being endorsed by a large diverse working group facilitated by Rice University's Baker Institute of Public Policy.
[http://news.rice.edu/2019/12/03/baker-institute-led-group-to-develop-nationwide-protocol-for-storing-carbon/]

a) Selected farmers and ranchers sign a soil carbon storage service consignment agreement with SVX. The agreement is simple, transparent and was developed with input from ranchers.

b) An appointment is made for an independent measurement contractor to take initial soil carbon measurements [using existing Verra / VCS protocol] and make an initial on-site soil carbon storage estimate

c) Soil carbon storage estimates are validated by an independent 3rd party verification company

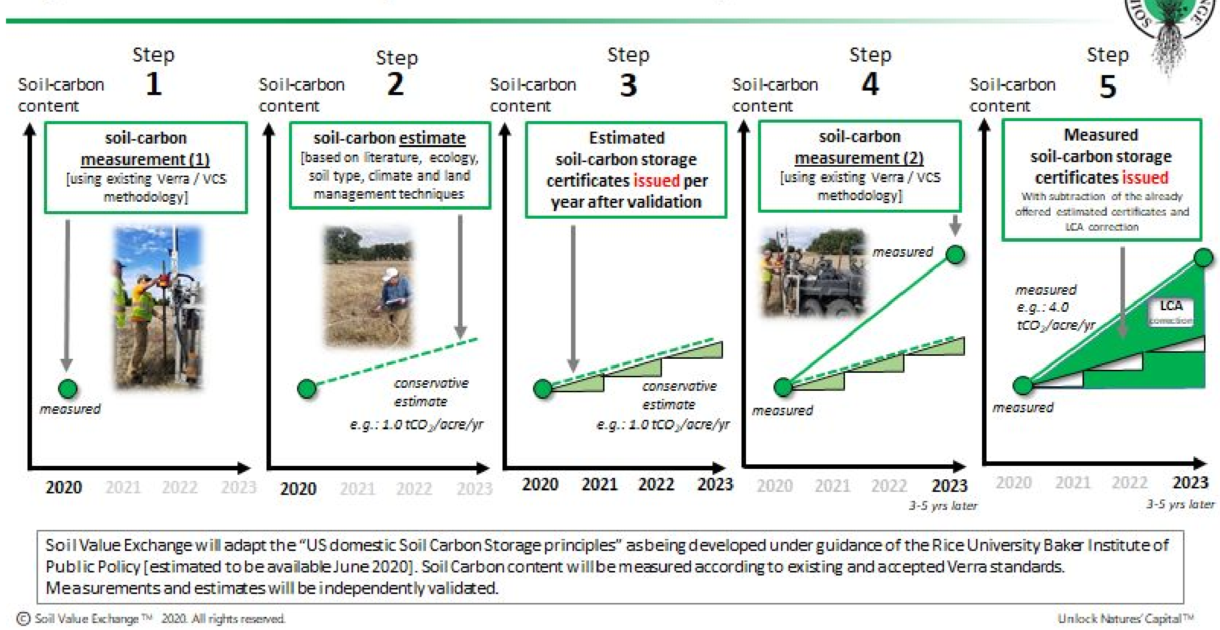
d) Soil Value Exchange issues location-specific soil carbon storage certificates valid for an indicated amount of CO_2 storage in 2020.

e) Annually upon validation of continued rancher compliance with the consignment agreement, carbon storage certificates are issued corresponding to the estimated CO_2 storage amount [2021-2024].

f) 3 to 5 years after the initial 2020 measurements in 2020, a second set of soil-carbon measurements is executed by the independent measurement contractor.

g) After validation of the measurements by an independent 3rd party verification company the total amount of soil carbon storage in the period between measurements is determined. After subtraction of the amount of soil carbon estimated, lifecycle corrections and buffer [see section C] the remaining amount of measured soil carbon storage certificates will be issued.

Figure 3.4 - How Soil Carbon Storage Certificates will be measured, estimated and issued



11.b Reporting and verification

Soil Value Exchange will use a transparent reporting and tracking system to enable independent audit and verification of data.

Over time, when the number of measurements and transactions are increasing, management of the soil carbon certificate accounting system will likely be contracted to a third party.

Soil carbon measurements, initial soil carbon estimates and the associated accounting systems will be verified and validated by an independent third party.

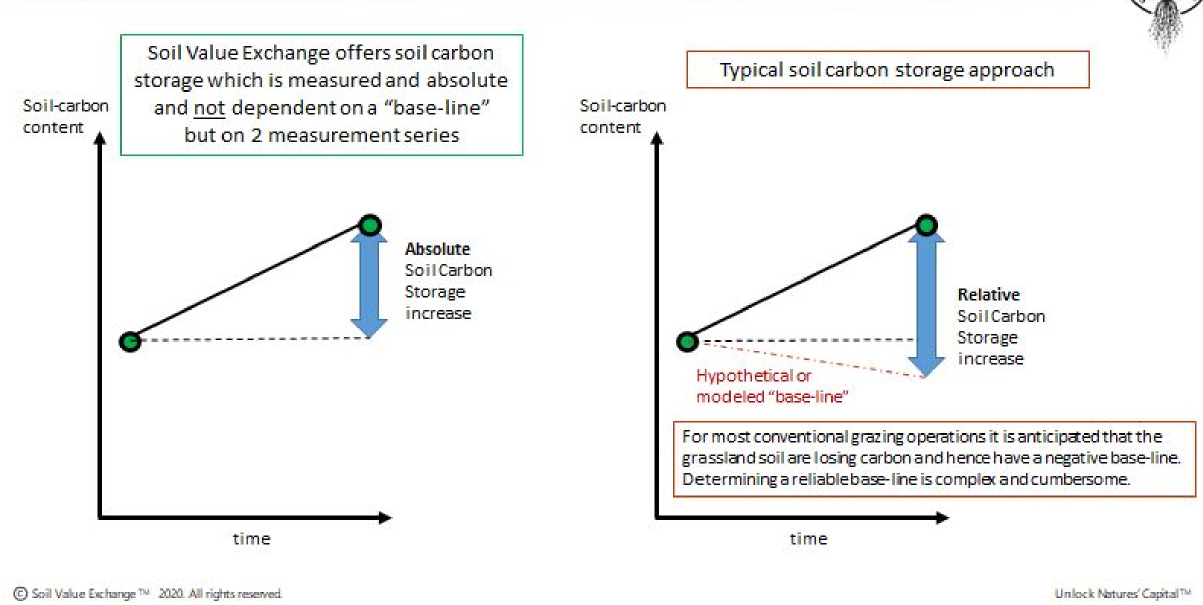
The US domestic soil carbon principles working group, facilitated by Rice University's Baker Institute of Public Policy, is developing guidelines for robust independent verification. Soil Value Exchange plans to adhere to these guidelines.

11.c Key uncertainties

Key uncertainties are related to the application of general LCA results to specific farms and ranches [see paragraph 7].

The strongest SVX mitigation approach is applying conservative absolute soil carbon measurements instead of measurements relative to a hypothetical baseline. [See Figure 11.1]. SVX offers negative emissions via an absolute increase in soil carbon, measured and verified. It is therefore anticipated that the SVX certificates are conservative. For any given farm or ranch, determining a reliable hypothetical baseline is incredibly complicated and prone to significant errors. The SVX approach to use absolute data is more conservative, transparent and reliable.

Figure 11.1 – Soil value Exchange offers absolute soil carbon storage.



As mentioned, most additional benefits of regenerative land management are hardly covered in LCA [see paragraph 7.c. and 19]

12. Explain your precise claim to ownership of the negative emissions that you are offering. In particular, explain your ownership claim: 1) in cases in which your solution indirectly enables the direct negative emissions technology and 2) when, based on the LCA above, your solution relies on an additional upstream or

downstream activity before resulting in negative emissions. Please address the notion of "double counting" if applicable to your project, and how you'll prevent it.
Max 200 words

Landowners who sign a consignment agreement with Soil Value Exchange [SVX] are eligible to offer their soil carbon storage services as a carbon storage consignment to SVX.

The Landowner agrees to allow SVX to list Landowner's Consigned Goods in the SVX sales system. SVX agrees to list the Consigned Goods for purchase and further agrees to mediate the transaction between the Landowner and the Carbon Storage Service Buyer. SVX neither now nor in the future, owns in whole or in part any of the Consigned Goods.

Landowner warrants, covenants and agrees that the Consigned Goods are owned by the Landowner and that there are no liens, judgments, or other encumbrances against the ownership.

The Parties agree that title and possession of the Consignment shall remain with Landowner, and that the Carbon Storage Service Buyer has purchased only the ecological service of soil carbon storage sequestered in the soil of Landowner. Consequently, the Carbon Storage Service Buyer has no right to physical possession or to remove, influence or alter the stored soil carbon.

The net overall negative emissions, or soil carbon storage offered for purchase will be corrected for key LCA emissions [paragraph 7]

Section 6: Potential Risks

This section aims to capture Stripe Purchase Criteria 5: The project is globally responsible, considering possible risks and negative externalities.

13. Describe any risks or externalities, any uncertainties associated with them, and how you plan to mitigate them. Consider economic externalities, regulatory constraints, environmental risk, social and political risk. For example: does your project rely on a banned or regulated chemical/process/product? What's the social attitude towards your project in the region(s) it's deployed, and what's the risk of negative public opinion or regulatory reaction?
Max 300 words

- Willingness of soil carbon storage buyers to pay a fair price
- Access to impact investment to enable the growth of SVX
- Capacity of qualified soil measurement contractors to keep up with demand
- Speed at which ranchers implement change in practices
- Legislation or government support for specific solutions

13.1 Key risks to the startup phase of SVX:

	Key Risks	Key Mitigation
1	Lack of buyers willing to buy soil carbon storage certificates and pay a fair price in a voluntary market	· Apply for Stripe negative emission purchase, which will launch SVX and demonstrate the potential. · Actively target companies and organizations with strong consumer interfaces for which a lower or negative carbon footprint is a value proposition. · Target companies and organizations who value the "Soil Carbon Plus" benefits – value beyond just carbon.
2	Economic crisis [COVID-19 related] puts climate crisis mitigation on a lower priority	Consider re-designing the value proposition to a stronger emphasis on the "plus" benefits: water, ecology and rural economic resilience and regeneration of our ecosystems.
3	Participating ranchers postponing sales in anticipation of a higher price	Aim to offer ranchers a "fair" price which is attractive enough. Enable price modifications on a yearly basis.
4	Baker Institute for Public Policy – US Domestic soil carbon storage principles, not widely accepted	Ensure the Baker working group is broadly represented: governments, potential buyers, potential sellers, key NGOs
5	Lack of startup investments in SVX	Active engagement with impact investors
6	Ranchers too slow in adapting land management practices to rapidly increase soil carbon content	· Offer grants to ranchers to get free or low-cost access to regenerative grazing consultants. · SVX will launch an organization to make it easier for ranchers to share lessons earned.

7	Competition from e.g. Indigo and Nori	· SVX, a public benefit LLC, will offer its Soil Carbon Plus approach, aiming to make it easier for ranchers to manage for soil health. This is a clearly different proposition than the other soil carbon providers. · Indigo Ag is focused on row crops, taking a big-ag approach by "harnessing nature" · Nori is focused on offering a transaction platform, likely based on crypto currency.

13.2 Key risks to the growth of SVX to reach a scale that matters:

	Key Risks	**Key Mitigation**
1	Carbon Tax excludes carbon emission reduction using soil carbon storage	Rice University Baker Institute actions to create political awareness about the importance of soil carbon storage.
2	Lack of buyers willing to buy soil carbon storage certificates and pay a fair price	Aim to contract large buyers with multi-year contracts
3	Opposition from anti-meat NGOs	Maintain respectful communication. The SVX approach doesn't increase animal production. It migrates to grass fed, healthy, antibiotic free animals managed in a humane way. It's not the cow; it's the how!
4	Opposition from NGOs not supporting offsets	Maintain respectful communication. The SVX approach delivers Soil Carbon Plus – a portfolio of additional benefits. This is not an offset, but a robust measured storage of carbon. Use carbon funds to regenerate land.
5	Measurement companies can't keep up with demand	· Additional investment in the growth of measurement capabilities. · Utilize alternative measurement techniques: faster and cheaper will become available.

6	Insufficient ranchers willing to participate	· Offer a fair CO_2 storage price. · Offer additional incentives to remove participation barriers. · Work with large landowner organizations.

Section 7: Potential to Scale

This section aims to capture Stripe Purchase Criteria 6: The project has the potential to scale to high net-negative volume and low cost (subject to the other criteria).

14. Help us understand how the cost and net-negative volume of your solution will change over time. Note that we aren't looking for perfect estimates. Instead, we're trying to understand what the long-term potential is and what the general cost curve to get there looks like. (Note: by "cost" here we mean the amount Stripe or any other customer would pay for your solution):

	Today	In ~5 years	In ~20 years
Est. Cost per net-negative ton (in $)	30	25	15
Est. Net-negative volume (in tons of CO2)	0.33 MM tCO_2/yr	3.5 – 20 MM tCO_2/yr	40 - >> 200 MM tCO_2/yr

15. What are the drivers of cost? Which aspects of your costs could come down over the next 5 years, and by how much? Do you think your eventual scale potential is limited by cost or by volume? Why? Refer to any relevant constraints from question #7, like land or materials scarcity, and specify the boundary conditions for which you consider those constraints.

Max 300 words

15.1 Cost

The cost of soil carbon storage is mainly determined by: 1) payment of a fair price to landowners, 2) the cost of measuring soil carbon, 3) the cost of regenerative grazing consultancy grants, 4) the cost of operating SVX to find additional ranchers, buyers and facilitation of transactions.

The current cost of soil carbon measurement is high, due to the elaborate tasks of sampling 3 ft deep cores on a ranch. Over time these costs are expected to reduce due to economies of scale and the introduction of novel intelligent measurement approaches (drones, soil-probes, etc) in combination with modelling.

15.2 Price

The price SVX will set for soil carbon storage is determined by: 1) a market price and competition, 2) a fair price for "Soil Carbon Storage Plus" – the value of the additional benefits (ecology, water, rural economics resilience) perceived by the carbon storage buyer.

We anticipate that the price for opportunities to store atmospheric carbon will (significantly) increase over time, due to a higher demand and potentially tighter supply.

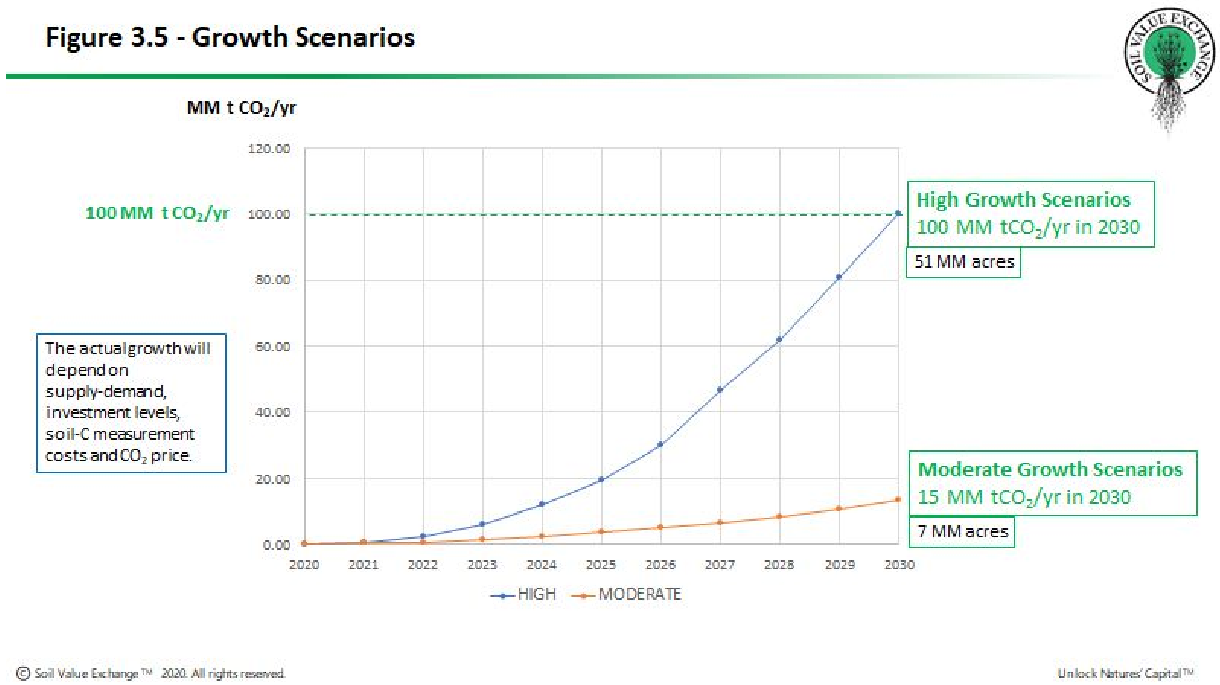
As in any business, the sales price is based on value and is not coupled to cost (as long as price>cost).

15.3 Volume

SVX works with 2 growth scenarios [Figure 3.5]. These scenarios are not used to predict the future, but to prepare for potential alternative realities.

The high growth scenario reaches 100 MMtCO2/yr in 2030 and works with 51 MM acres of grazing land, or 51,000 ranchers [assuming 1000 acres/ranch] [eq to 7.8% of US grazing land].

The moderate growth scenario reaches 15 MMtCO2/yr in 2030 and works with 7 MM acres of grazing land, or 7,000 ranchers [assuming 1000 acres/ranch] [eq to 1.1 % of US grazing land].



We anticipate that growth will be determined by speed of growth of rancher participation.

Section 8: Only for projects with significant land usage

See Stripe's Purchase Criteria 2: The project has a net cooling effect on the climate (e.g. carbon negative complete life cycle, albedo impact, etc.) ***This section is only for projects with significant land usage requirements: Forest, Soil, and BECCS/Biochar/Biomass sequestration projects.***

16. Location: Please provide baseline information about the geographic location(s) of your project; and link shapefile(s) of project area(s).
Max 100 words

Soil Carbon storage is directly dependent on photosynthesis and thus on the availability of sunlight and water. Figure 3.6 shows the areas in the USA where soil types, land-use and climate will offer the highest soil carbon storage potential.

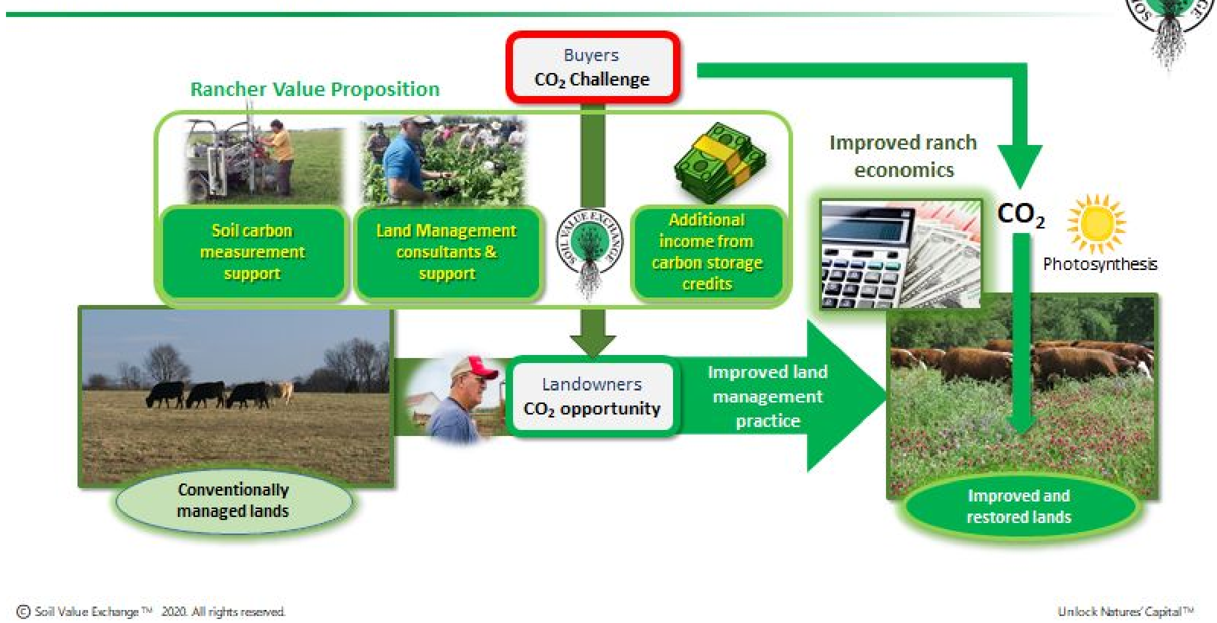
Landowners all over the world have demonstrated that regenerative grazing practices can work almost anywhere, from arid regions in Mexico and Africa, to grasslands in Canada, Australia and Europe.

The global soil carbon storage capacity is likely several gigatonnes. For now, SVX will focus on US domestic grazing lands.

17. Land ownership: Please describe the current (and historical as relevant) land ownership and management for the area(s) provided in (16). If your project is not the landowner, describe your relationship to the landowner.
Max 150 words

Soil carbon storage is based on healthy soils and healthy ecosystems. Hence landowners (farmers, ranchers, and land stewards) play a crucial role in managing for a healthy ecology and healthy soils. [Figure 3.2]. The landowner management approach is crucial. SVX aims to support landowners in management for healthy soils. SVX aims to reduce or eliminate barriers to migrate from conventional land management to regenerative land management. SVX will pay for soil carbon measurements, offer grants for access to regenerative grazing consultants and likely most impactful, pay landowners a fair price for the carbon storage service they provide. In addition, SVX will connect landowners to exchange best practices and lessons learned and facilitate mutual support initiatives. As the number of landowners in our network grows, we will adapt and modify the support packages to make transition easier for a larger number of landowners.

Figure 17.1 - SVX Supports ranchers to enable change at a scale that matters

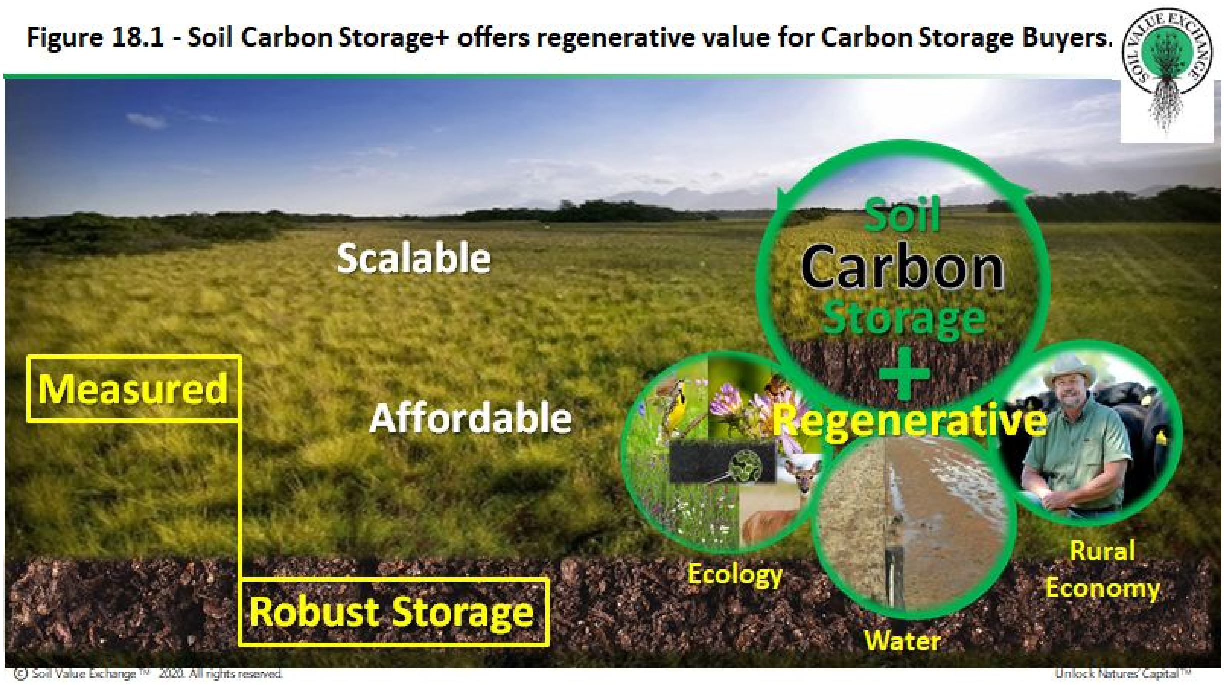


18. Land use: For forest projects, please provide details on forest composition as well as forest age and basal crop area/density. For soil projects, please provide details on land use and crop type (if agricultural), soil organic carbon baselines, and regenerative methodology. For BECCS, biochar, or wooden building materials projects, please provide details on biomass crop type and methodology as applicable.
Max 500 words

About 650 million [MM] acres or 41% of the US surface area is currently used for grazing. Regenerative grazing does NOT require change in land use. It “only” requires a change in how grazing land is managed. If regenerative grazing practices were used on half of the US grazing land, this would restore grassland ecology on 300 MM acres. [Figure 18.1] It would also regenerate water storage capacity on 300 MM acres of land, making our land more resilient against droughts and floods, and eliminate most of the soil erosion.

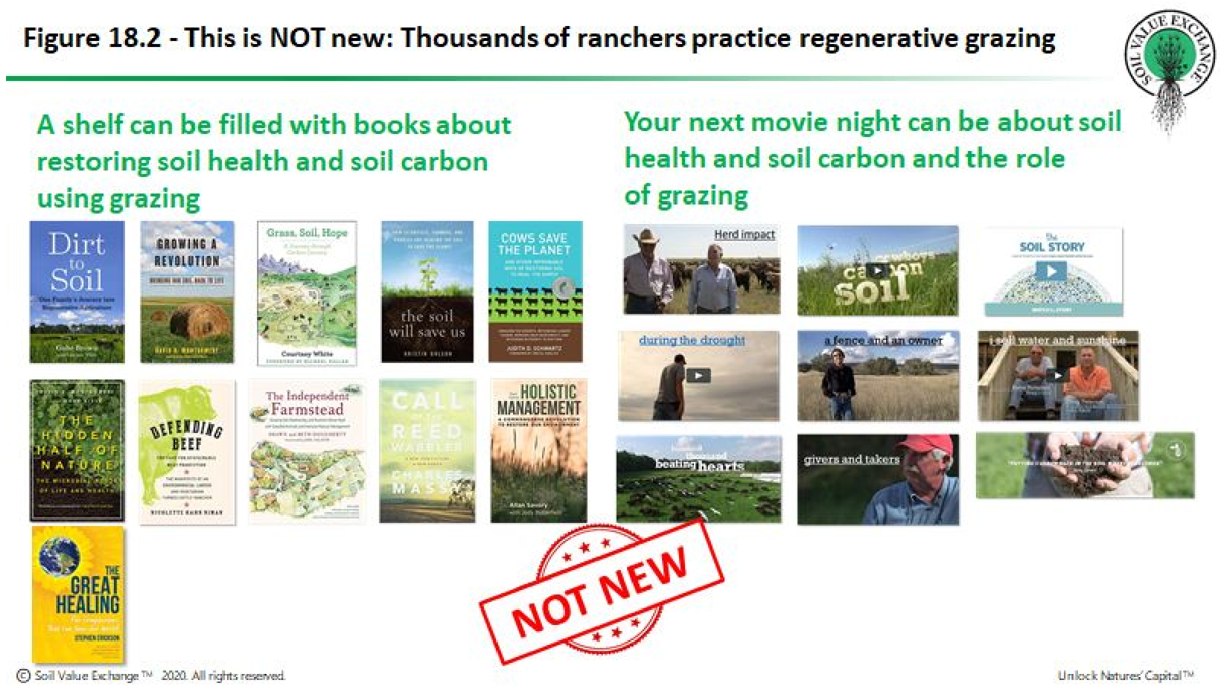
Regenerative grazing at this scale will regenerate vegetation, birds, insects and wildlife on a scale that matters. And it will strongly reduce or eliminate the use of fertilizer, antibiotics, pesticides, hormones and other big-Ag chemical solutions. It regenerates our agricultural communities and makes ranching profitable and attractive. In addition to all of this, half of our grazing lands have the capacity to annually store 0.5 – 1.5 Bln tCO_2.

Figure 18.1 - Soil Carbon Storage+ offers regenerative value for Carbon Storage Buyers.



This soil carbon storage solution is about working with nature, not against nature. It is about enabling natural ecology to do what it has been doing for billions of years. It is about undoing and reversing the impacts of an engineered mechanical mindset on our agricultural system. [https://vimeo com/80518559](https://vimeo.com/80518559)

Pioneering ranchers all over the world have demonstrated that regenerative and management practices can work basically anywhere. Obviously, the speed of regeneration and speed of soil carbon storage depends on soil type and climate. But even in arid regions, regenerative grazing practices have led to amazing successes. Figure 18.2 shows a range of books and movies featuring these regenerative principles and practices and the pioneers using and developing them [Figure 18.2].



Several organizations currently train ranchers in AMP grazing, or holistic grazing methods. We have a close relationship with Soil Health Consultants LLC, led by Dr Allen Williams, who has trained over 1000 ranchers, and the Savory Institute who has trained over 4000 ranchers in holistic land management techniques. These experts provide insights into required stocking densities, grazing times and resting periods, to obtain the highest AMP grazing benefits. Key to these practices is the "adaptive" aspect. The practices are not about simply following a few steps in a protocol; it is really about "reading" the land and continuously adapting to what is happening, using the framework of knowledge to rapidly improve soil health and ecology. It is about learning to work with nature, not against nature.

It appears that ranchers can be trained relatively quickly. In a full day course, a rancher receives a good understanding of the concepts, benefits and background. What is needed to apply this on any given ranch depends on the individual land manager. It helps a lot if there is some on-site support, showing you how to split up the paddocks, how to install water lines and get familiar with some best practices. The most important part is to learn to "read the land" and continuously learn and change and adapt grazing times and resting periods.

19. Net effect on climate: Please discuss the non-CO2 impacts of your project that may not be covered in your LCA, such as your impact on albedo.
Max 150 words

Grassland cooling effects.

Some researchers claim that the cooling effect of healthy grassland ecology might even be more substantial than the soil C storage impact. [Retallack et al, 2013, Annual review of Earth and Planetary Sciences – Vol 41: 69-86, 2014].

Soil erosion prevention.

Thanks to conventional farming practices, nearly half of the most productive soil has disappeared in the world in the last 150 years [UN FAO], threatening crop yields and contributing to nutrient pollution, dead zones and erosion. In the US alone, soil on cropland is eroding 10 times faster than it can be replenished.

Eliminating the need for big-ag industrial, chemically assisted animal feed corn production

In principle there is no need to grow corn to feed cattle. Cattle should graze grasslands in a regenerative way. This will further eliminate the use of fertilizer, pesticides, soil erosion and loss of soil carbon.

Section 9: Other

20. What one thing would allow you to supercharge your project's progress? This could be anything (offtakes/guaranteed annual demand, policy, press, etc.).

Max 100 words

How to supercharge Soil Value Exchange

A press conference at a ranch announcing that Stripe is buying 33,000 tonnes soil carbon storage in US grasslands, and in doing so restoring grassland ecology on 33,000 acres.

This would have a strong catalytic impact, attracting other buyers and impact investment.

SVX has received significant interest from many companies, accompanied by in-depth due diligence. Feedback was that this concept is science-based, robust and doable, but currently not a priority and their customers will not pay for it.

Stripe can break this situation and show that courageous leaders can make a huge difference.

21. (Optional) Is there anything else we should know about your project?

Max 500 words

Soil Value Exchange is absolutely thrilled by the opportunity to apply for a Stripe negative emission purchase. A Stripe purchase and the associated messaging will have a strong catalytic impact.

It shows that soil carbon storage is recognized as a potential solution.

It shows that a leading corporation is willing to explore and de-risk alternative solutions to migrate towards carbon negative operations.

It shows Stripe's customers – many of whom are well known, leading organizations – that solutions to the climate crisis are available right now.

It will make it much easier for Soil Value Exchange to attract other carbon storage buyers and impact investors, which will enable responsible growth to a scale that matters.

All of this is amazing and incredibly important.

Yet - maybe the real opportunity here is less about carbon and more about regeneration.

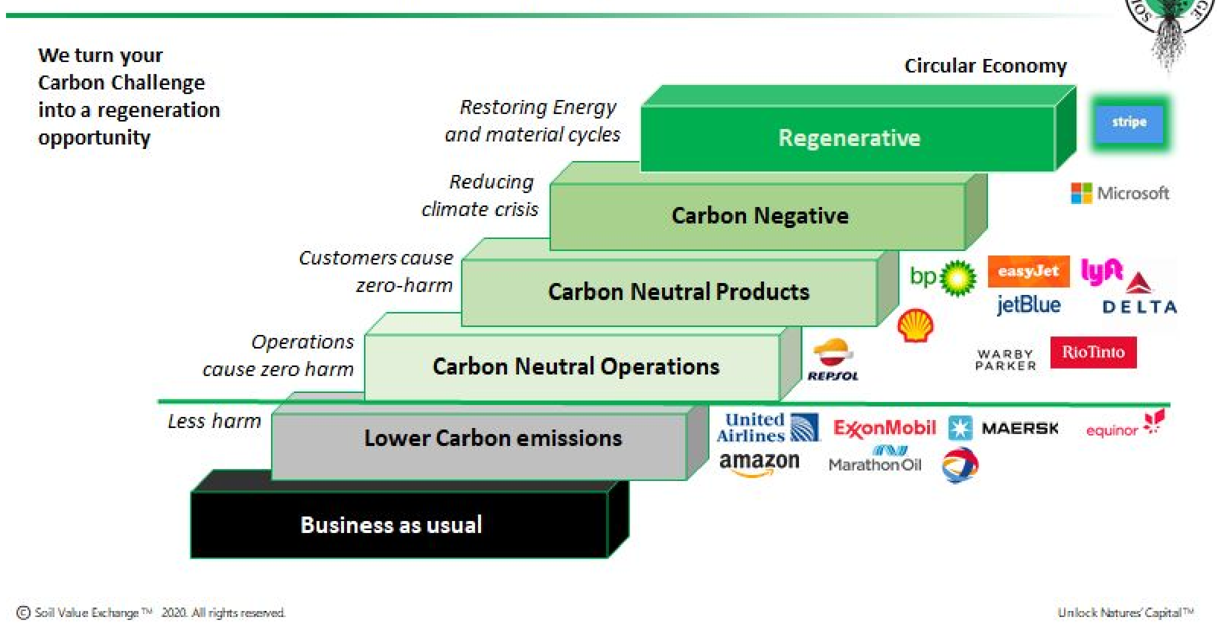
The current COVID-19 crisis and related economic crisis expose how vulnerable our complex systems are. It reveals that humanity is barely capable of thinking ahead and preparing for what is inevitable. Similarly, the climate crisis is rapidly developing, but we are way behind in taking actions that matter.

The opportunity we at Soil Value Exchange are pursuing is about regenerating the ecological systems that form the foundation of our living planet. It's about conducting agriculture in a way that regenerates healthy functioning ecosystems that can support humanity, rather than exploiting them.

This is about launching a truly regenerative and circular agricultural economy, a system we must re-establish if we want to live and thrive on a beautiful and healthy Earth.

And for Stripe, this is about demonstrating that Stripe can move beyond carbon negative and migrate towards becoming truly regenerative. [Figure 21.1]

Figure 21.1 Soil Value Exchange can help Stripe to set the bar and make it a reality



Stripe's investment in soil health creates a reality in which a customer of one of Stripe's clients, by simply making a payment, regenerates ecology and reduces the impact of the climate crisis.

Jim Blackburn, Megan Parks and Henk Mooiweer, founders of Soil Value Exchange Public benefit LLC are thrilled to cooperate with Stripe to make this opportunity a regenerative reality.

Thank you

Section 10: Submission details

*This section **will not** be made public.*

22. Please insert below the name and title of the person submitting this application on behalf of your company (or, if you are submitting this application on your own behalf, your own details). By submitting this application, you confirm that you have read and accept the Project Overview (available HERE), as well as the further conditions set out below. As a reminder, all submitted applications will be made public upon Stripe's announcement. *Once you've read and completed this section, submit your application by March 20th by clicking the blue "Share" button in the upper right, and share the document with **nets-review-2020@stripe.com**.*

Name of company or person submitting this application

[redacted]

Name and title of person submitting this application (may be same as above)

[redacted]

Date on which application is submitted

[redacted]

We intend to make the selection process as informal as possible. However, we do expect that (a) the content of your application is, to the best of your knowledge, complete and correct; (b) you do not include any content in your application that breaches any third party's rights, or discloses any third party's confidential information; (c) you understand that we will publicly publish your application, in full, at the conclusion of the selection process. You also understand that Stripe is not obliged to explain how it decided to fund the projects that are ultimately funded, and - although extremely unlikely - it is possible that Stripe may decide to not proceed, or only partially proceed, with the negative emissions purchase project. Finally, if you are selected as a recipient for funding, Stripe will not be under any obligation to provide you with funding until such time as you and Stripe sign a formal written agreement containing the funding commitment.