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Platform for a Thriving Planet

REGEN NETWORK
American farmers continue to struggle.
They don't just grow our food, they steward the health of our landscapes. They don't just grow our food, they steward the health of our landscapes.
A platform that helps farmers sell more than their potatoes.
What's necessary:

Science

User Experience

Infrastructure

 SDK Toolkit

Credit Functionality

Registry and Exchange

Farmer - verification and monetization

Buyer - data visualization and credit purchasing

Data Collection

Protocol Creation

Education and Implementation
$35 billion

CORPORATIONS
GOVERNMENTS

around the world
183 countries
Budget Projections

Currently raising: $4.8 million

Implementation
Education and
Protocol Creation
Data Collection

Easy credit purchasing
Buyer - data visualization,
Issuance
Farmer - verification and

Science
User Experience

Registry and Exchange
Credit Functionality
SDK Toolkit

Infrastructure

Currently raising: $4.8 million

Budget Projections
Budget Projections

Currently raising: $4.8 Million

For 12-18 months

$1.25m - 1.75m
$1.3m - 1.6m
$700K - 850K

Science
User Experience
Infrastructure
Global Case Studies

Proof of Concept

Budget Projections

$350k - 550k
Existing Funding

Private Investors

$1.7 million + in private investment to date
With every transaction our platform appreciates;
the planet regenerates.

With every transaction with every transaction

Network Regen
Existing partnerships
IN JUST 3 WEEKS... we signed up:

135

5.3M

FARMERS & RANCHERS

ACRES OF LAND
Science Development
towards a global ecological state assessment capacity
Ecological State Assessments: The Indicators

Regen Network is in the process of developing monitoring protocols that can assess changes in ecosystems. We are constantly reviewing our methods and finding new ways to perform monitoring, because as we build our product, we want to produce the most scientifically-robust information. One of the first steps is to identify the best indicators that can be monitored accurately and cost-efficiently through the different ecoregions and land uses.

We have defined two main groups of indicators, depending on the case:

1. **Short Term-Assessment Indicators**, which are land management practices that can be monitored through remote sensing and show changes towards (or against) land regeneration within 1 year; and
2. **Long Term-Assessment Indicators**, which are the outcomes of the land management practices, and need longer periods of time (2-5 years) to show noticeable changes in soil parameters and environmental health.
During 2018 and 2019, Regen Network has worked with several organizations and ecoregions at specific pilot areas.
From Quarry to Food Forest:

Regenerative land management, reforestation, wetland restoration, and sand dune re-vegetation efforts began at a decommissioned sand quarry in 2015. This management partner wanted Regen Network to monitor the changes that have taken place over the past few years, and moving forward.

A Sand Quarry Restoration Assessment (Barbados)

Land Conversion
Land cover change assessments for the Time of Interest (TOI). Which land covers were replaced with what?

Landscape Diversity
Landscape composition analysis through diversity, richness and evenness indexes.

Carbon Sequestration
Potential changes in the Carbon sequestration rates (ton C/ha.yr), according to land cover changes and data from similar systems.

Land Regeneration
Trends of steady changes in quantity, quality and development of vegetation through time, based on NDVI time series.

Landscape composition changes between 2017 and 2018

2018 PS- Kln - Dzetsaika
Potential carbon sequestration rate increments due to land cover changes between 2017 and 2018 within The Wetlands (empirical data from tropical areas)
Polyculture in the Tropics (Esmeraldas, Ecuador)

Threats to forests in the tropical areas include the intensification and expansion of monocultures. Regen Network wants to help those sustainable polyculture producers in preserving forests in their lands. We are working with a cacao cooperative in Esmeraldas to build their capacity in monitoring and verifying ecologically-beneficial management practices in their farms, and to add value to their cacao production by adding transparency and accuracy to their verification process. One of the ways we are doing this is by building their capacity to monitor from satellite remote sensing. Here’s an example of how a monoculture versus polyculture verification scheme could look.

Our colleagues at Terra Genesis International have shared updated (2019) ground truth information (i.e. geolocated polygons of different land cover classes) for the area of interest. Based on such information, we are currently training algorithms and developing a methodology to classify and monitor changes in the area annually through free satellite data (sentinel-2) – and not only for cacao farms. Other application uses include primary and secondary forest patches in the area, for example. Resolution of the imagery is between 20 and 10 m pixels, and it has a revisit frequency of 5 days globally, which is helpful to avoid clouds in these cloudy areas of the planet. Classifications, so far, are more than 90% accurate in differentiating most of the classes (see list of classes in the legend on map above).
Measuring and verifying soil organic carbon (SOC) improvements due to good management practices is key for linking carbon markets to farmers. Currently, this verification is an exhaustive process of farm soil sampling and extrapolating such measurements to each represented sampling area based on known equations. To create a more efficient verification process, we began working with Impact Ag Partners, who manage over 75,000 acres across multiple properties around Australia and have been applying regenerative management practices. Together with the Wilmot Cattle Company, they have been soil sampling during autumn-winter in 10% of fields and sending those samples to a lab for SOC analysis since 2011. Additionally, they have registered the exact geolocation of the sampling points.

We tracked back images from sentinel-2 for the sampling areas and dates, and started searching for relationships between the sentinel bands mentioned above and the topsoil SOC (first 15 cm) measurements at the sampling points. Correlations between bands 2, 3, and 4 and SOC were so robust that for some years, the regression coefficients were higher than 0.9. The estimated carbon stocks for the whole area were comparable to extrapolations from the samples, although a little bit more conservative.

This allows us to quantify carbon stocks in the topsoil for every pixel of grassland with less than 1% error and, based on a sample size, at least 10x smaller than requested by conventional methods to enter the carbon credits in Australia. Also, we can build maps to see the distribution of carbon and we can monitor the changes between years in the carbon stocks, to estimate very precise sequestration rates.
This assessment has inspired many organizations seeking to reduce costs for verification of increases in carbon sequestration rates, including Savory International, Cool Farm Alliance, and The Nature Conservancy. We are starting a pilot in Patagonia Argentina with Savory to test correlations for farms under holistic management, and are in discussion around two more pilots in New South Wales, Australia, to expand monitoring capacity to larger areas covered by protected grasslands and agricultural land. The potential to use this technology to monitor carbon in soils is huge, as there are large areas of the world covered by temperate grasslands that provide similar conditions and would likely correlate to the satellite sensors, too (see orange polygons in the map below).
Grazing in Vineyards (California)

Our partners from Fibershed were interested in verifying the impact of sheep grazing in their vineyards, as a study from UC Davis suggests that well-managed sheep grazing in Northern California increases the Soil Organic Carbon. This was a challenge, because even in winter the vineyards, biomass partially covers the grasslands from aerial view.

We found that NDVI from planet scope imagery and sentinel-2 is useful for detecting grazing. Here you can see the drops in NDVI caused by sheep grazing during the last winter (2019) in some vineyard parcels.

Current State:
Given our results from the last grazing season in just a few parcels within one of the farms, Fibershed is now expanding farm monitoring and train their shepherds to collect geolocations in real time through an app. This will allow us to increase the ground truth data for verifying grazing in larger areas, and thus build robust algorithms for sheep grazing verification.
Potential Future Assessments
Reforestation

Machine learning coupled with sentinel 2 time series allows for distinguishing recently-deforested areas, new afforestation, and other land cover classes. Here’s an example for a small area in the Peruvian Amazon analyzed by our science team through sentinel-2 imagery coupled with machine learning in GIS.

Below: In yellow, afforestation taking place. In red, recently deforested areas. Sentinel temporal revisit frequency is 5 days. That allows for early alerts within a 2 week period.
**No Till & Cover Crops**

One of the key management practices to reduce runoff, soil loss, and erosion in agricultural lands is no tilling or partial tilling. Cover crops have also proven beneficial for soil health, taking the place of chemical fertilizers. As a result, water quality and distribution of the whole watershed can be improved, and the flood risk for downstream communities can be reduced.

We are partnering Applied Geosolutions to build capacity to monitor these two best management practices through the Optis algorithms in the US and other countries as well.

**Nutrient Runoff**

Nutrient Runoff can be modeled in agricultural watersheds through different GIS tools and hydrogeological models. Inputs include land cover maps, soil maps, topographic maps, and nutrient export coefficients for the different land management practices that need to be specified and included in the land cover maps. By monitoring changes in the land cover and land management practices, changes in the nutrients loads during storm events can also be mapped.

**Riparian Buffer Zones**

Riparian buffer zones can be delineated in GIS according to legislation, and then the changes in land cover within those limits can be assessed from periodic land cover classifications.

**The Regenerative Potential Map**

One of Regen Network's longer-term goals is to build a global regenerative scenario map and a potential carbon sequestration global map. In order to achieve this, we have already compiled and mapped information of the mean carbon sequestration rates for each regenerative practice in the different ecoregions and countries that have been published in the Carbon Farming Solution Book and other scientific reports elsewhere. What's next? Taking these findings to a higher resolution level by identifying the main constraints for the different regenerative practices to be applied in the different ecoregions and biomes. Considering soils, slopes, climate, and other conditions for which we already have global maps, we can build several scenarios, based on different levels of adoption of regenerative practices. We consider this a mandatory outcome from our work, as it can be inspiring as well as very useful for building culture and knowledge around the adoption of the different regenerative practices. This map would also allow us to estimate potential revenues for farmers all over the world depending on their carbon sequestration and other ecosystem services they could provide to the markets.