Our broken food systems need surgery, not duct tape solutions.

Food 4 Future Whitepaper #F4F

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Executive Summary

The world needs food. And food needs climate finance. If we do not comprehend and address this undeniable fact, and continue expanding the current food systems, the planet - as we know it - will soon cease to exist. Some of us may be lucky to never experience food insecurity in our lifetime but our children (and those yet to be born) may not be so lucky.

World population will reach 9.8 billion by 2050. Over 1.8 billion more people will need access to nutritious and affordable food over the next 27 years. For everyone to have enough to eat, we will need to produce up to 60% more calories than we did in 2010. However, globally agriculture is the main driver of deforestation and food systems account for more than a third of global greenhouse gas (GHG) emissions, while remaining extremely vulnerable to repercussions of climate change. Importantly 82% of our food emissions occur at the farm stage itself. This is due to the fact that 52% of all soils are degraded from decades of bad agricultural practices. The root cause is that whereas the majority of food supplies in the developing and underdeveloped world come from smallholder farmers, our food systems have kept smallholder farmers cut off from the global food trade and offer no incentive to care for their land.

The only way to reverse this trend is to create new systems from the ground up that incentivize the smallholders to care for their land through regenerative practices and bring them into the mainstream of food commerce. The United Nations Food System Summit in 2021 highlighted that time is of the essence and that we may have less than a decade to transform the entire food system.

Against this backdrop of irrefutable facts, we utilize first principles thinking to demonstrate that transitioning to Regenerative Agriculture (RegenAg) can be scalable, replicable, and profitable. Profitability hinges on understanding the innate regenerative nature of soil. **Our approach combines precision farming and regenerative agriculture to create optimized carbon sinks and biodiversity-rejuvenating food systems**.

This method brings an innovative approach to generate a best practice in agriculture and create a (new) asset class in climate finance that can tackle food insecurity and climate crisis attracting public and private investments. We seek seed investors who believe in RegenAg's power and potential as a game-changing asset class for revolutionizing our food systems. Together, we can create a world where hunger, food insecurity, and access to safe, healthy, and affordable food are issues of the past.

Triple Win – when do we take it from idea to execution?

Although agriculture has traditionally been a major contributor to the climate problem, it can now play a bigger role in the solution. The World Bank calls this a "triple win" idea. Climate-smart and regenerative agriculture are a set of measures designed to put farmers at the center, improve crop yield, and improve carbon mitigation and soil health all along the agrifood supply chain. Put simply, the triple win approach aims to turn three existential problems – climate change, biodiversity loss, food insecurity – into solutions that, once scaled, can become part of the green transition and put us on track to Net-Zero.
The World Bank estimates that nature-based solutions can reduce by 37% the carbon emissions reductions that are needed by 2030 to meet the Paris Agreement goals.
Despite the increasing interest and application of RegenAg, its mainstream adoption is impeded by three factors:

1. Smallholders lack financial access and resources to de-risk the near-term costs of transitioning on their own.
2. The absence of critical scientific analysis of its effectiveness on large-scale operations (landscapes) keeps large industrial farms invested in the status quo.
3. Seed investment does not flow from the Global North (developed world where money is parked) to the Global South (underdeveloped world with large farmlands but little-to-no financial access), due to the inherent lack of transparency and investor trust in the local ecosystem.

All three cases require an infusion of climate finance to bring RegenAg into the mainstream of agri-food systems.

The case for a new Asset Class of RegenAg

With a strong sense of urgency towards addressing food insecurity, we are launching the first of our RegenAg projects in Ghana. Our goal is to bring **true diversification to climate finance by creating a new thematic asset class** that allows private/public finance access to sustainable food production with a solid/sustainable rate of return.

This asset class will channel funds into RegenAg by connecting cultivable land in underserved communities in the Global South with socially responsible impact investors in the Global North. In parallel, we will create best practices and a tech stack that leverages the latest technologies to optimize scalability and replication of projects, while also providing traceability for land and produce through digitization of the farm-to-factory stage of our supply chain. We believe these efforts are critical for ensuring proper governance and practices for smallholders, investors, and consumers alike.

Food for Future, our holding company based in Luxembourg (EU), will own multiple RegenAg projects in different jurisdictions in the Global South. We currently have access to over 1,100 acres of agricultural land in Ghana and an MOU signed for another 2,500 acres in the state of Maharashtra, India. The desired financial and non-financial impacts of these projects will be evaluated based on three underlying areas/stakeholders - **community, environment, and investors** - over a ten-year time span, wherein we intend to bring RegenAg to the upwards of 20,000-25,000 acres of farmland:

a) **Community**: In Ghana, more than 80% of farmers are smallholders who play a crucial role in food production but face challenges due to limited resources and access to finance. However, by empowering smallholders to use RegenAg practices and participate in our circular business model (see below "Three Key Pillars to Food for Future"), we can help them become enablers of a new food system. With 75% of the world's poor being dependent on agriculture, by empowering smallholder farmers through best practices and rewarding them with a circular business model, we can realistically achieve the biggest poverty alleviation impact in recorded human history, simultaneously regaining biodiversity and soil health. According to a recent WEF paper, **GHGe can be reduced immediately by 6% annually, and soil health and incomes can be boosted by €2-9 billion through Climate Smart agriculture (or regenerative practices) in the EU alone**. With inflation reaching over 50% in Ghana in March 2023, 'Food for Future' can provide livelihood support for farmer communities by utilizing food from the land and offering potential wage increases of 3x-5x, among other financial benefits.

b) **Environment**: The EU Green Deal aims to reduce agriculture's contribution to greenhouse gas emissions to at least 55% by 2030. This includes bringing 25% of agricultural land under organic farming and reducing fertilizer and chemical pesticides use by at least 20% and 50% respectively. RegenAg must gain critical mass to help meet these ambitious targets. Agriculture currently generates 19-29% of total greenhouse gas emissions. As other sectors vulnerable to geopolitics of energy fail to reduce their emissions, agriculture needs to double down on its promise of the elusive triple win. As a proof of financial feasibility, an investment of $800M into agro-forestry programs has provided a return of $240b in economic returns, avoided losses, and conservation benefits, according to CIFOR Director General Robert Nasi's keynote speech at GLF Luxembourg on 7th March.

c) **Impact Investors**: Currently, most of the climate finance has been directed to the energy and transport sectors. But the global RegenAg market size crossed $8 billion in 2022 and is projected to grow fourfold by 2030, with a CAGR of over 14% (**Appendix 1**). The market size of RegenAg can grow faster than the stated 14.4% with demonstrable results in the next 5-7 years, boosting the confidence of markets and regulators. The critical regulation to come into effect is the EU Green Deal and its Farm-to-Fork strategy. The EU is

the world's third-largest importer of agri-food products, and its Farm-to-Fork strategy highlights that Europe cannot make a significant change unless the rest of the world is in some form of alignment. The Global North and South need to work together.
Agriculture in the Global South is limited by a lack of trust and transparency. We are bridging this North-South divide through a) precision farming and data-driven agriculture and b) validating its impact with the transparency and trust of web 3.0. Investing in RegenAg can provide portfolio diversification for investors, while also providing the following financial and non-financial returns:

i. Financial returns of over 20% IRR over a minimum 3-year period.
ii. Producing roughly 10 million calories per acre in the first year in Ghana.
iii. Success in SDG2 (Zero Hunger) directly impacts SDG1 (No Poverty).

An Innovative Approach (that shall work...)

"*To bring trust where trust is badly needed because the world cannot wait.*"
- Antonio Gueteras (Secretary General, UN) at COP27, Sharm El-Sheikh

Our sense of urgency drives our innovation. Assuming an average of 2.5 crop cycles per year, there are only 70 harvests remaining until 2050. To tackle challenges such as climate change, biodiversity loss, growing inequity, inadequate food systems, and conflict, we need to invest massively upfront and sustainably before reaping the benefits. Any potential solution to these crises could induce a positive tipping point, if applied at scale. There is ample evidence to support the claim that we cannot afford to delay giving agriculture its due of climate finance, especially given its potential to address three of the most pressing existential crises simultaneously.

Finance flow to nature based solutions (currently at $150B per year) is less than half of $380B that is needed by 2025 and one-third of $480B needed in 2030. The Food for Future initiative is to innovate the speed and scale of sustainable finance by connecting and bridging the trust deficit between the global north and south. Our headquarters are located in Luxembourg, a country with the highest minimum wage, while we run ground operations in Ghana, where the minimum wage is one of the lowest (**Appendix 2**). This gives us a unique perspective on the ground reality, and allows us to address both the concerns of our investors in the North and the genuine needs of the smallholder communities in the South. We are here to redefine how agriculture and land stewardship are conducted, unlocking greater opportunities for food security, conservation, and improved economic conditions around the world.

Our goal is to establish best practices that are measurable, auditable, and replicable on a global scale for anyone to use. Put simply, we aim to create an open-source RegenAg

playbook that allows anyone, regardless of land size, to build their agrarian models on top of our intellectual property. Through our efforts, we seek to deliver attractive financial returns to investors while also catapulting smallholder farmers from the brink to the center of the mainstream global food trade.

The Three Key Pillars of Food For Future:

1. **In-house R&D on RegenAg in partnership with Luxembourg Institute of Science & Technology (LIST)**: The most critical part of the farm is the topsoil. No tilling methodology allows seeds to be planted with minimum disruption to top soil. Roots grow deeper and healthier, bringing enhanced resilience against climate change while consistently keeping the carbon content in the topsoil over 3%. Soil scientists from the renowned Luxembourg Institute of Science and Technology (LIST) will co-sponsor this scientific study of regenerative agriculture with us, with the aim to share the results with the larger agricultural community.

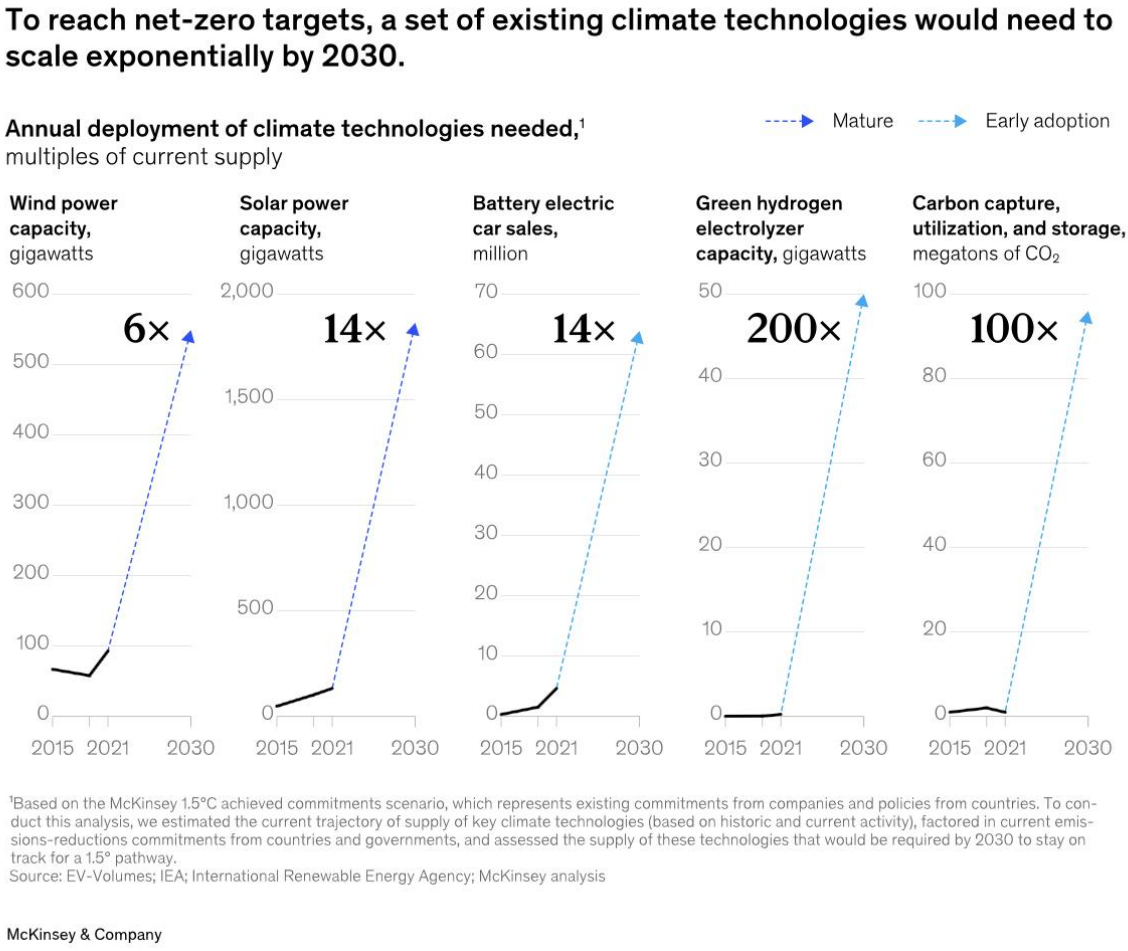
"Amount of CO2 which is in the air used to be in our soils. There are a billion people working in agriculture. If we start paying them to farm with the best agriculture practices, we can put that carbon back to where it belongs."

Sam Kass (Partner, Acre Venture Partners)
at WEF Agenda Dialogues Oct 2022

According to the European Academies Science Advisory Council (EASAC), the effectiveness of RegenAg on landscape farms has not been scientifically tested and remains an initial important step to meet the ambitious targets of the EU Green Deal. See **Appendix 3** for the RegenAg practices (highlighted in yellow) that will be deployed in Ghana during the first year of operations, addressing both carbon capture and biodiversity.

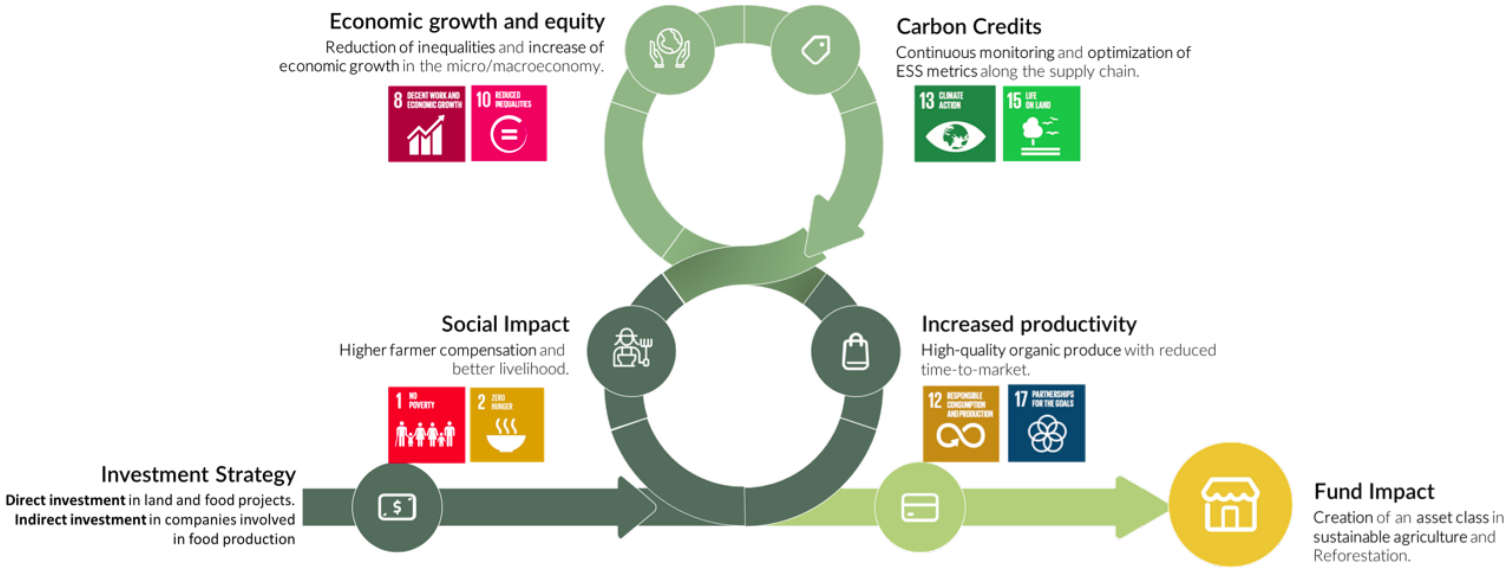
EU Green Deal 2030 Targets	Potential Implications on RegenAg
Selected targets with greatest relevance to agricultural production: • Agriculture to contribute to reduction of **at least 55%** in net GHGe • **25% of agricultural land** under organic farming by 2030 • Reduce the use of fertilizers by **at least 20% by 2030** • Reduce the use and risk of chemical pesticides by **50% by 2030**	In order for these goals to materialize, the following pre-requisites need to exist: • **Standardized toolkit** for transitioning from business-as-usual to Regenerative Agriculture. • Concrete data on the effectiveness of regenerative agriculture practices on **different landscape regions, soil types** and **crop combinations**. • **Identify innovative ways** to absorb carbon out of the atmosphere.

According to Mckinsey, existing “carbon capture, utilization and storage” technologies need to grow 100 times by 2030 to meet Net-Zero goals. One of the biggest environmental wins from this R&D program would be to identify new ways to convert atmospheric carbon into soil carbon and start a secondary revenue stream from the voluntary carbon offset market. Despite agriculture's significant contribution to greenhouse gas emissions, it surprisingly accounts for only 1% of the global carbon credit market (**Appendix 4**). This highlights the potential for increasing its contribution to double digits in the near future.



2. **Circular Business Model applied to both operations (waste/byproduct management) and finances (profit sharing with smallholders):** The current food and climate crises have arisen because our food systems have marginalized, rather than empowered, the most important stakeholder in the ecosystem: the farmer. In doing so, we have created a sustainability paradox in the global agricultural supply

chain. While sustainably certified products are in high demand, the producers (farmers) at the bottom of this supply chain are completely cut-off from the value their work yields. Without giving a piece of this sustainability premium back to this section, no Sustainable Development Goals (SDGs) can be met since farmers are at the forefront of the consequences of climate change and biodiversity loss. Food for Future brings farmers to the center of this agro supply chain by digitizing the first mile (farm-to-factory) while rewarding farmers for doing so. As a RegenAg enterprise, we aim to offer farmers digital identities, skill development, employment opportunities, and at a later stage self-sustaining farming cooperatives.

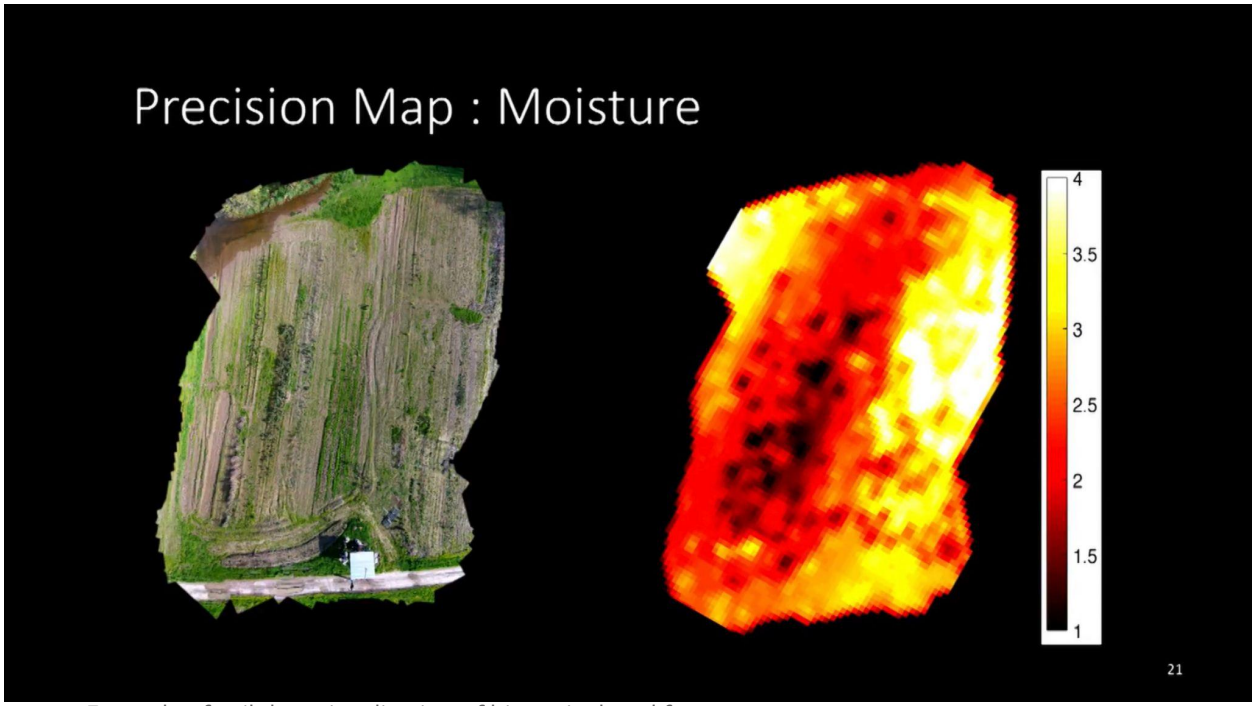


Double Sustainability Flywheel

As stated earlier, smallholders don't have the resources or financial access to bear the near term cost of transition to RegenAg. They can now experience its benefits without having to invest their own capital. Our project rewards farmers with a share of company profits (10%) for farming and validating good agricultural practices on blockchain. The tipping point in poverty alleviation will come as and when 'Food for Future' scales and moves up the food chain from production to processing, allowing our circular economic model to score big with SDGs 1 and 8.

3. **Precision Farming Technology Stack that harnesses the full potential of Regenerative Agriculture by optimizing every acre of land for higher yields, carbon farming, and biodiversity rejuvenation**: Potentially, the most important long-term asset we are building is the precision farming technology stack that will allow us to scale RegenAg to its tipping point. The biggest challenge in doing RegenAg on landscapes is knowing how the underlying soil pattern changes with acreage. Our technology stack is a **combination of IoT, AI (Computer Vision) and**

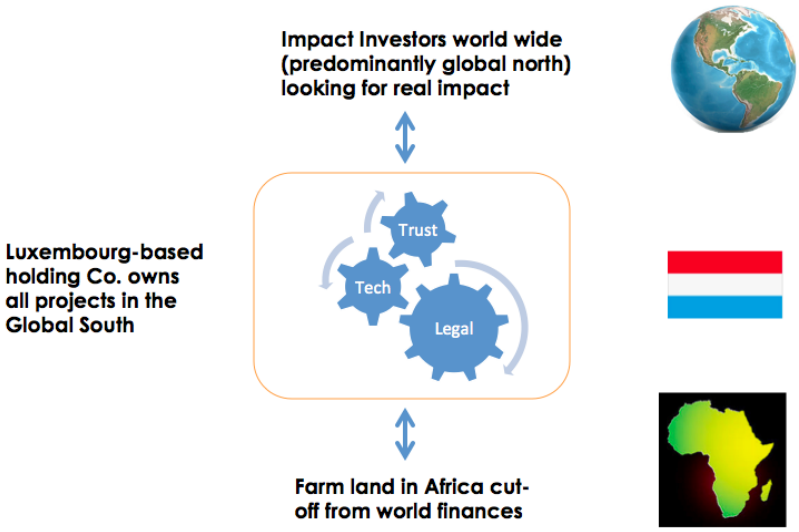
Blockchain technologies purpose designed to provide us with a precision map of the soil type over large areas. This allows us to optimize our input costs, especially limiting the use of nitrogen-based fertilizers while boosting yields. Overtime, we collect concrete data/metadata on the effectiveness of RegenAg on different landscape regions, soil types and crop combinations, allowing de-risking of agricultural financing for RegenAg and sharing valuable anonymized data for crop insurance companies. Our three technology partners are Databourg Systems, responsible for satellite data gathering and precision mapping of land, Pixuate for automating precision mapping through computer vision and Telos Blockchain for storing that data on its decentralized public ledger. Databourg (also called the rain company) is based out of Luxembourg and is a R&D grant winner from the European Space Agency. It combines proprietary data from IoT sensors in the soil with satellite imagery to create precision heat maps of different soil qualities such as moisture, pH levels, etc. Pixuate is a deep tech edge processing and video analytics company based out of Bangalore. Its state-of-the-art computer vision and edge processing technology will help automate precision mapping to scale through drones and other remote monitoring cameras.



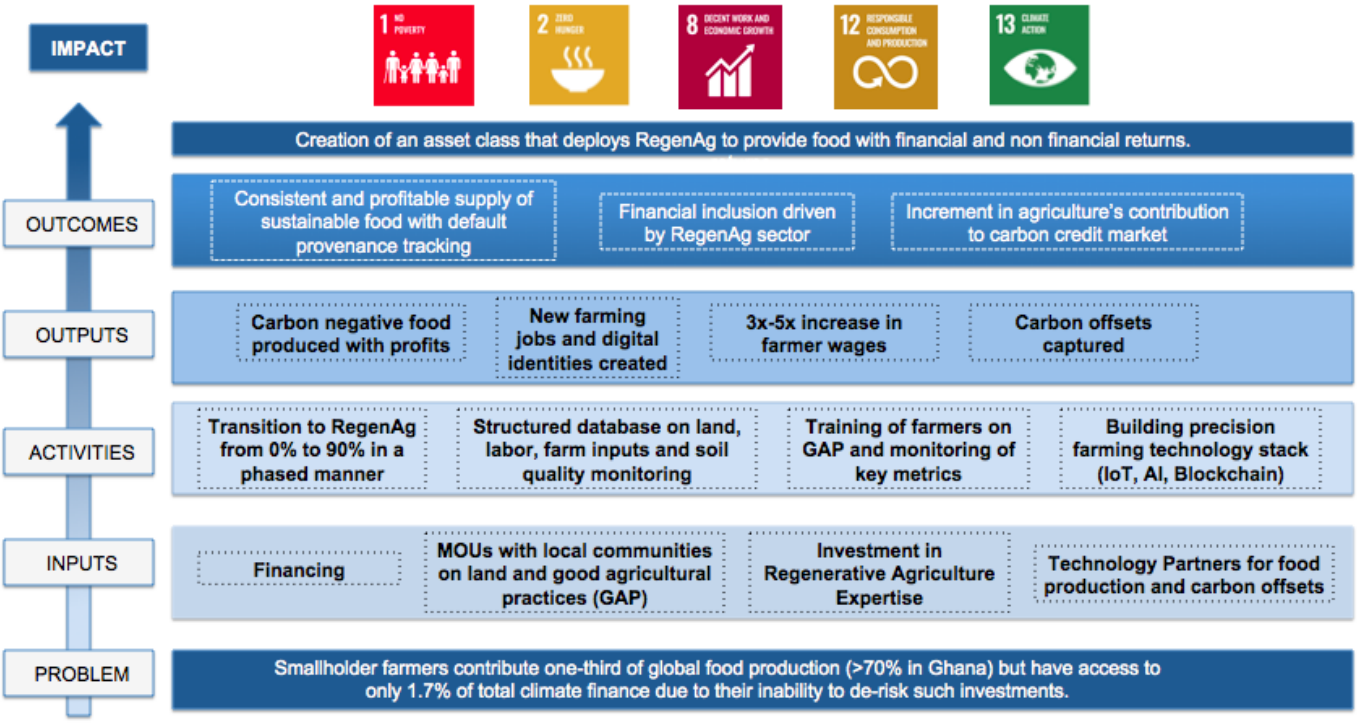
Example of soil data visualization of big agricultural farms.

Telos is a carbon-neutral, third-generation, ESG-focused layer-1 blockchain based in Seattle. It funded our 50-acre corn plantation pilot in Ghana last year. Telos will capture the impact on the ground in terms of SDG goals through blockchain technology.

Bringing it all together



Our impact strategy portrays the change process and causal linkages between necessary inputs and desired outcomes and eventual impact for stakeholders.



Where are we on our journey?

We have been active in Ghana for the last 5 years under the name of Green Earth Agro (GEA), which now metamorphs into the first of our RegenAg portfolio projects. GEA was started by our Founder-CEO Rushank Bardolia as a farmers cooperative for sustainable palm oil. Since 2018, GEA has created 50+ jobs, 200+ tons of food processed per month, employs 65% female staff and sponsored a health clinic, a computer center and local football club for the community.

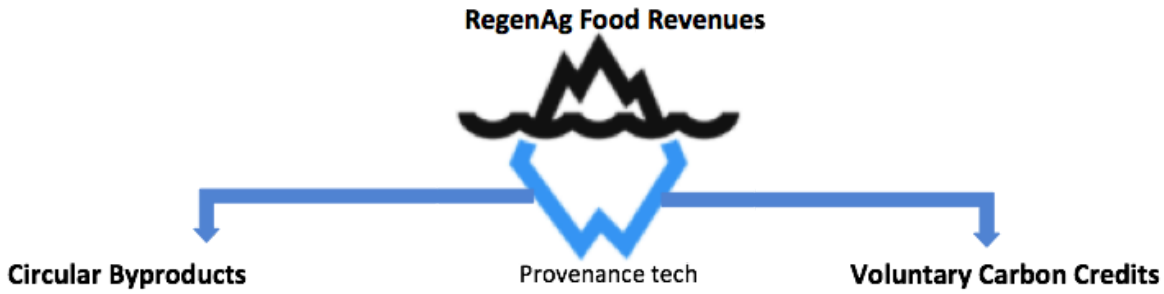
In Sept 2022, backed by the Telos Foundation's support, GEA conducted a pilot project in Corn plantation on 50 acres that made a tremendous impact on the local community. Building on this success, the Telos Foundation provided further support for the GEA to cultivate an additional 130 acres of land that had been provided by the locals. This extension allowed the GEA to scale up operations and make an even greater impact in the community.

Looking Forward

Farming is of two general types: seasonal (cash) crops with up to three harvests per year, and perennial oil palm orchards with high annual yields starting in the fourth year after planting and continuing over 30 years of productivity before replanting is required. Both types of crops will be targeted at the Ghanaian market, improving local food security. Palm oil is the staple cooking oil used in Ghana. Unlike other areas of the world that are being deforested to grow imported oil palm plantations for the export market, in Ghana, oil palms are a native species that grows wild in native forests.

GEA currently has access to over 1,100 acres of agricultural land in the Ajamaku district of Ghana on a 50-year lease. We are testing the deployment of RegenAg practices using a combination of perennial and cash crops. 30% of this 1k acres will exclusively raise highly productive seasonal crops (primarily maize, cassava and Nitrogen-fixing legumes) to provide consistent revenues and improve food security. Around 60% of the farmland will be a mix of corn/legume crops for the first 3-4 years followed by planting palm and coconut seedlings intercropped with seasonal crops. Each year, the amount of intercropping will be successively reduced as the palm and coconut grow to their mature size and shade the former intercropped areas. Once perennial crop production reaches viable amounts, GEA will set up community run oil processing plants.

Future revenue streams



Conclusion:

The world is facing a complex challenge as we confront the three-headed monster of greenhouse gas emissions, biodiversity loss, and worsening food insecurity. It is clear that we need to accelerate the green transition at a much larger and faster pace. Fortunately, there is hope: agriculture can and should play a larger role in the solution. However, to make this a reality, we need to overcome the challenge of easing financial access to this sector.

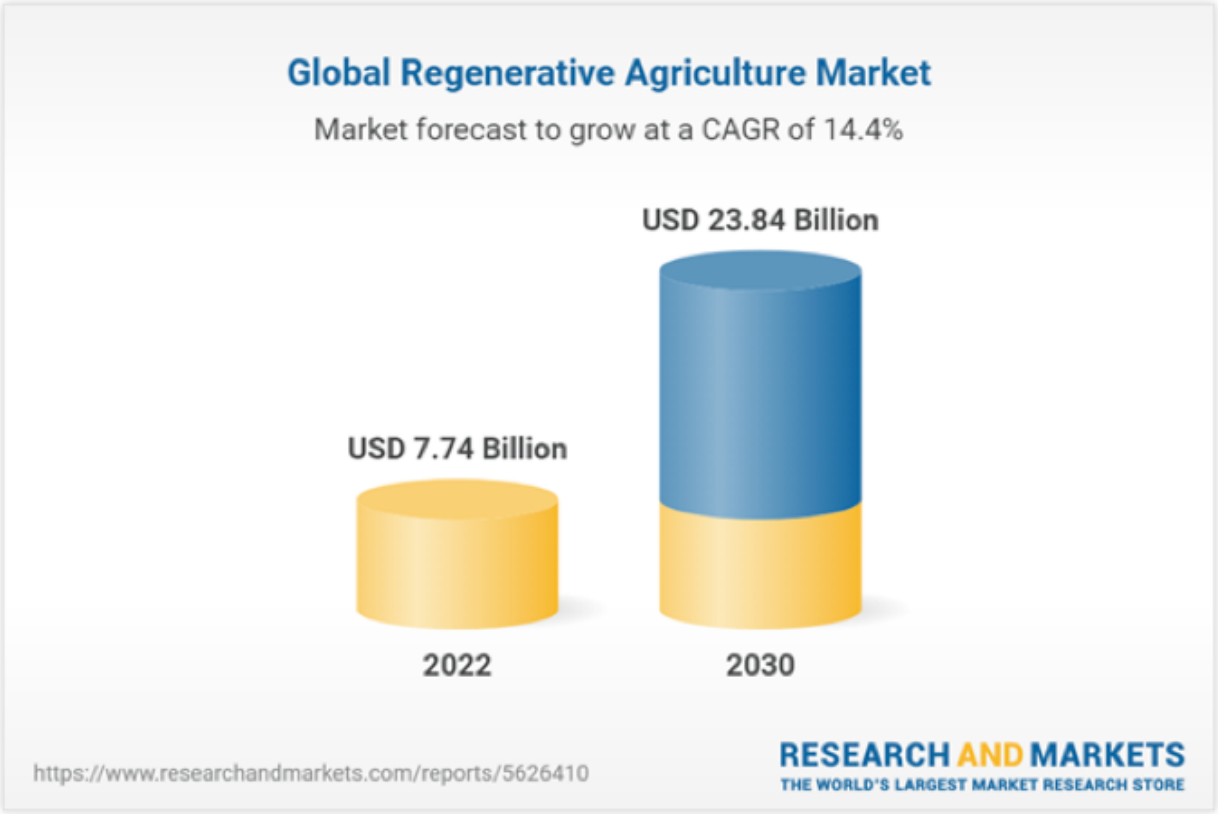
Food for Future is an innovative approach that presents RegenAg as an asset class to people who have the resources and intent to make it scale. We have attempted to reduce the risks commonly associated with agriculture by combining traditional farming practices with state-of-the-art technologies. By doing so, we are not reinventing the wheel; rather, we are creating an environmentally friendly investment vehicle that addresses multiple existential needs, is grounded in best practices, and is available right now.

Eventually, it's important that both the global North and South come together to address these interconnected issues. Food for Future is building that trust by digitizing the first mile of the agro supply chain (farm-to-factory) which is currently missing. Through collaboration and partnership, we can create a food system that's not only sustainable and resilient but also equitable and accessible to all. This will enable the RegenAg practices to be spread and shared across the globe, empowering smallholders and communities in the global South to scale and replicate successful projects.

The benefits of this approach are both financial and non-financial. Smallholders, their communities, consumers, and investors will all be able to play active roles in the solution, securing multiple SDG wins for everyone involved.

Appendices

1. Global RegenAg Market Size Projections

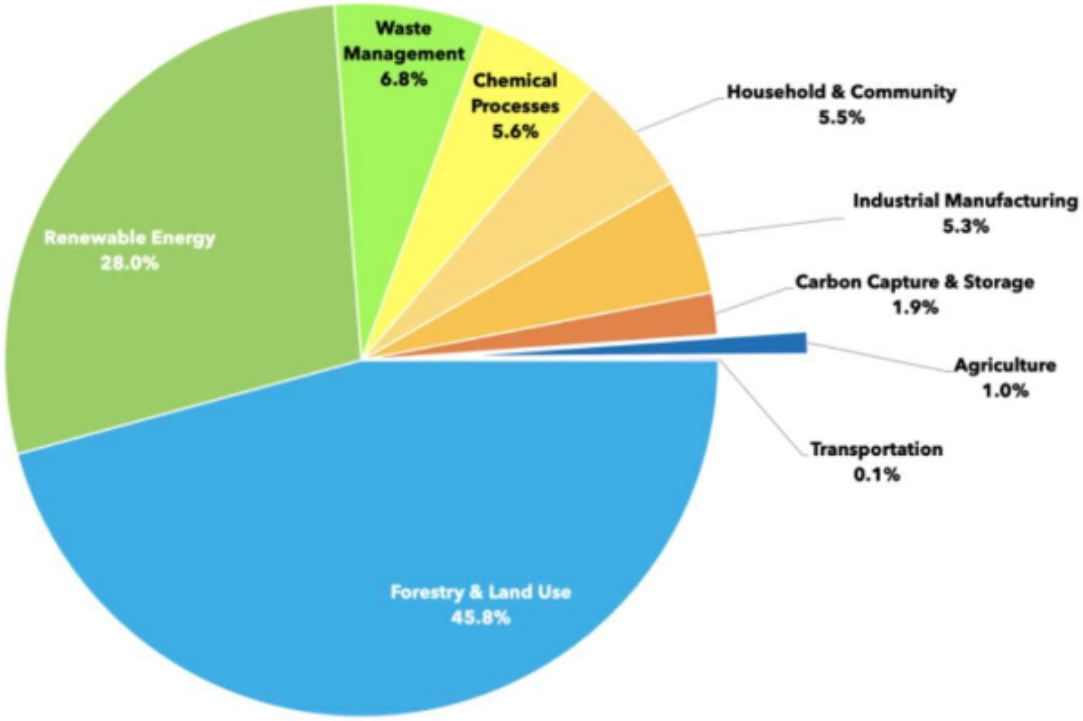


2. Minimum monthly wages across 67 countries

3. Regenerative Farming Practices. Highlighted line items are practices that will be deployed and metricized during the first year of operations. (x) refers to cases where there is no overall consensus. Source: EASAC: A critical analysis of Regenerative Agriculture, April 2022

Farming practice	Suggested for carbon capture and storage	Suggested for biodiversity
Conversion of arable land to grassland	X	X
Grassland management (to capture carbon)	X	X
Woodland (wood pastures; silvo-pasture)	X	X
Native tree plantations on arable land	X	(X)
Agroforestry	X	X
Hedgerows, woody buffer strips, farmland trees	X	X
Improved crop rotations	X	
Crop diversity in rotations	X	X
Crop diversity — intercropping	X	(X)
Crop diversity — in sown/relay cropping	X	(X)
Minimise tillage: reduced, minimum or no tillage	X	X
Cover crops	X	
Retaining crop residues/Leaving crop residues on soil surface	X	
Organic amendments	X	(X)
Biochar	X	
Perennial crops	X	
Avoid insecticides, fungicides and herbicides	(X)	X
Field borders, etc. for beneficial insects (mainly pollinators and natural enemies to pests)	(X)	X
Flower strips (pollinators)		X
Buffer strips (often mandated for environmental/erosion reasons)	(X)	(X)
Herbal leys and summer fallows in crop rotations		X
Natural and semi-natural habitats		X
Landscape mosaics in space and time	(X)	X
Switch from large- to small-scale landscape patterns, e.g. decreased field size	(X)	X
Supporting transitional habitats, reducing sharp boundary structures		X

4. Share attribution of global carbon credit market



Source: Agfunder Network