

Roots of the Future

The businesses regenerating Africa's soils



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We asked leading thinkers, activists and farmers from Africa what they think farming across the continent could look like over the course of this critical decade.

Will it mean more monocropping, imported and costly synthetic fertiliser, and slash and burn? Will it involve ever intensifying use of land, capital and fossil-fuels, chasing higher and higher yields? Will the lion's share of profit continue to accrue to those outside the continent?

Or could it shift its focus from yield- to profit per acre, reducing costs and diversifying income sources? To prioritising soil fertility, ecosystem services and better adapting to climate change? To considering a fairer distribution of risk and returns?

Which of these versions of the future do you prefer?

At **Footprints Africa** we started work mapping the circular economy in Africa because we believe in its importance in the light of the extraordinary changes that will happen on the continent over the coming decades. We share tangible business models, give insights into what is possible and how it can be replicated in other contexts. As part of this we are publishing periodic reports on the practices that we are uncovering.

We started by building open access resources to give a platform to circular economy initiatives across the continent: on Circle Economy's Knowledge Hub, and on our geolocated map created by GRID-Arendal. We are now focusing on helping circular businesses build evidence of their impact and explore new business models. And we are laying the foundations for training and coaching tools that contribute to both business and systems change.

You can find our first report on the circular economy in Africa [here](#).

Read on for more information on how you can become involved in our work.

Why this report?

Our point of departure for this report is twofold. First, agriculture is the backbone of many African economies, so it's natural that we start here for our first thematic deep dive. Second, we believe many conventional agricultural practices are not working, either for people or the planet, and so alternatives based on circular and regenerative principles need urgently to be explored and put into action.

There's a lot that is already well-discussed in relation to farming in Africa, most notably the continent's natural resource wealth, the amount of arable land,¹ and the high proportion of Africans who work in agriculture.² What is largely unexplored in discussions on the future of farming is the opportunity that lies in regenerative approaches: the business models that make economic sense for present and future generations; processes that make sense for Africa's climatic and cultural contexts; and farming practices that restore soils, replenish ecosystems and nourish people.

The transition to regenerative is promising but complex and runs counter to many current approaches. As our conversations with farmers show, it touches on sensitive themes, ranging from the historic carving up of territories, ancestral land systems and successive ownership structures to the impacts of trade, treaties and tractors. In turn, regenerative solutions also have to be multi-faceted and responsive to their context.

Among other things, this report is an attempt to ensure that we understand the complexity in regenerative approaches, learn from stakeholders and make sure the voices of those most affected by current challenges are heard.

At Footprints Africa we believe our best way to contribute is to research and present tangible and compelling examples of regenerative agriculture in practice. In this report, we showcase ten success stories of regenerative agriculture. We selected a cross-section of models to illustrate what solutions can look like in different contexts and across different value chains. They include platforms connecting regenerative farmers with impact investors, businesses working on scalable (soil) restoration, and initiatives that are pioneering nature-based alternatives to synthetic inputs. From our work we have also summarised ten of our emerging insights and formulated five points of action for stakeholders.

Before taking you through our findings, we will explore what regenerative agriculture means in African contexts, and the benefits it can bring.

Regenerative agriculture: This century's opportunity for African farming

What do we mean by regenerative agriculture?

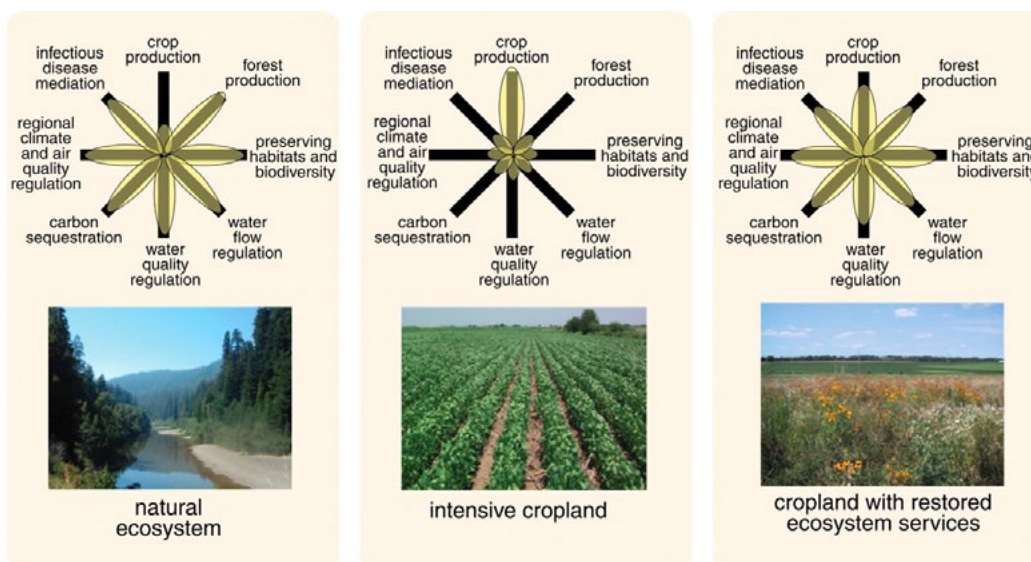
Definitions of regenerative agriculture (sometimes referred to as conservation agriculture) vary. We believe it is more helpful to think about regenerative agriculture in terms of a set of outcomes, or effects, rather than practices. One way of expressing it is as a way of thinking that “shifts from extractive, linear thinking that prioritises high yields above all else, to establishing cycles of regeneration”.³ We can talk about five main attributes of regenerative agriculture:

- **Improving soil health** by replenishing organic soil matter and improving the biome: the bacteria and fungi that provide food for invertebrates and microscopic organisms.
- **Increasing carbon capture of the soil** by storing it underground. The microorganisms that enrich the soil are made of carbon, and carbon is captured by maintenance of crop and root systems.⁴
- **Increasing biodiversity** by supporting beneficial insects, pollinators, songbirds, and other wildlife that improve farm biodiversity and resilience.

- **Promoting the better treatment of people** by prioritising farmers' extensive knowledge and practice, and by focusing on production of higher quality, more diverse foodstuffs and commodities.
- **Improving the larger ecosystem as a whole**, through farming activities that do not just make 'withdrawals' from this larger system, but also pay back into it.

What these attributes have in common is the way they prioritise the care of our ecosystem. They change our perspective so that we view farms not just as units of production but as complex systems, with interactions between crops, the water table, soil structure, micronutrients, soil health and the broader landscape. The diagram below illustrates how regenerative approaches maximise the balance of natural ecosystems, a balance which is skewed by intensive agriculture. Comparing the three approaches highlights that focusing on maximising just one goal - crop production - has a devastating effect on the others. Conversely, targeting an ecosystem where all eight goals are optimised achieves so much more.

Three agri-ecological system states⁵



How did we get here?

The causes are, of course, complex and interwoven, but many of the problems under discussion result from a “linear” approach applied to a living system that is all about improving efficiency of specific parts: yield, size, durability, growth rate, harvesting speed and so on. In the words of the environmental engineer Nick Jeffries speaking about conventional agriculture:

“This approach may be a viable way to optimise something mechanical and predictable, like an engine; the same approach does not apply to a complex, natural system like a farm. The system of a farm sits within and relies on interactions with the larger natural system. Crops need insects to pollinate, surface and groundwater to irrigate, microbes to cycle nutrients, and soil to provide a strong and fertile growth medium.”⁸



Kindia, Guinea. Photograph by Tim Oun

The role of regenerative agriculture in fixing African food systems

Whether we look at it from a human health, environmental, climate or financial perspective, food systems and agricultural production in Africa need urgent change.⁶ Much of the continent’s population is inadequately nourished. Environmental systems and processes are being pushed beyond safe boundaries by conventional methods of food production. And agriculture itself is a major driver of climate change,⁷ whose effects are already more profound in Africa than the rest of the world.

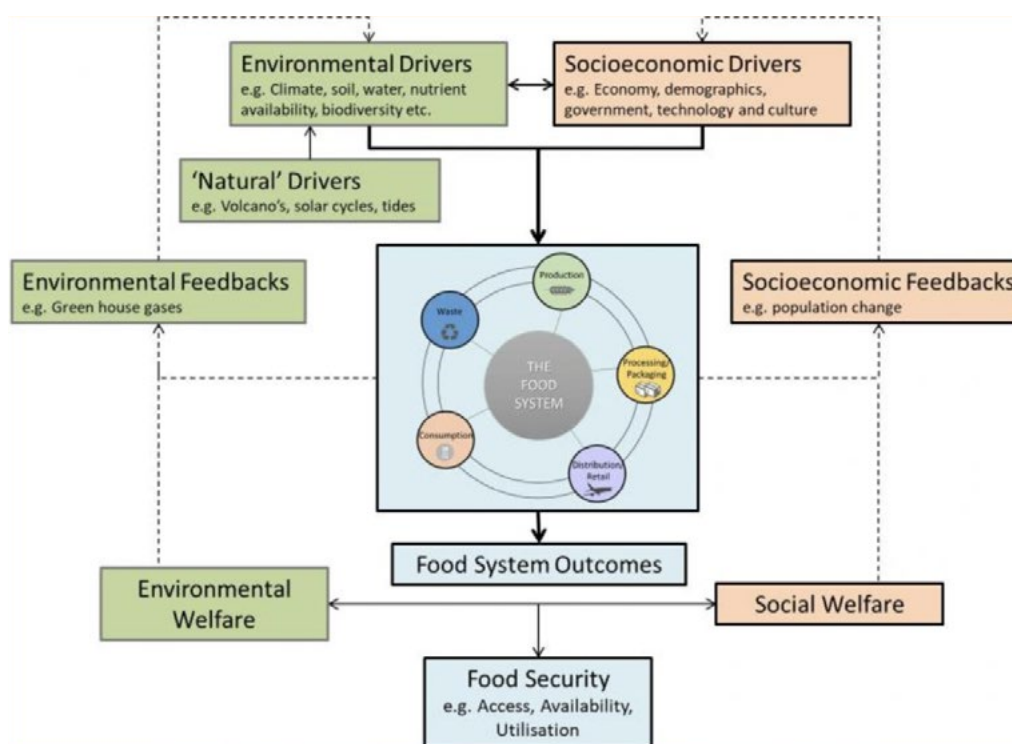
How we rise up to these challenges will be one of the defining questions for the remainder of this century. This means looking at food systems as a whole: not just the processes of growing, harvesting and processing, but also how we package, transport, market, consume and dispose of foods. It means revisiting how decisions about these processes are made and who is involved. This also means thinking of the inputs and outputs at each stage and how they interact with other systems: manufacturing, hard infrastructure, transport and storage, water and waste management, wholesale and retail, and of course communities, as well as others. And it means taking a fresh look at the intelligent ecosystems of which we often forget we form an integral part. This is why we believe regenerative agriculture is a fundamental part of the solution.



Professor Cheikh Mbow,
Director of Future Africa at
the University of Pretoria

With regenerative agriculture, the approach is not to reinvent something but to revalue it. It’s about redressing a mismatch between systems and culture, coming back to our roots and using innovation to support regenerative approaches. Imported solutions have never been effective in Africa.

Visualising food systems



The food system is a complex web of activities involving production, processing, transport, consumption and waste. Through its interconnectedness, this illustrates the pitfall in focusing on just one element of the system at the expense of its other, interlinked parts.⁹

The business opportunity

Regenerative agriculture is a huge business opportunity, judging from worldwide trends. Globally, companies with significant footprints in Africa such as Cargill,¹⁰ Danone,¹¹ Nestlé,¹² Olam,¹³ Pepsi,¹⁴ Unilever¹⁵ and Walmart¹⁶ have all made public commitments toward regenerative agriculture in their value chains. The business case for doing so is significant. Some estimates suggest that \$1 invested in land restoration can create \$7 to \$30 in economic benefits, while protecting biodiversity and fighting climate change.¹⁷ It is also a form of risk mitigation, particularly when one considers that approximately half of the world's total GDP (some \$44 trillion) is dependent on nature and its services.¹⁸

De-risking the transition

At the same time, it is also hugely important that the regenerative agriculture transition (1) takes account of critical issues such as food security, and (2) is economically viable for farmers. This holds particularly true for smallholder farmers, who often have the best knowledge of techniques, of context and potential

solutions but may lack financial means or appropriate incentives to make the shift. They need to be supported at all levels, through financing to policies to technologies that create enabling conditions for regenerative agriculture. We touch on this consideration in more detail below and throughout the case studies.

Enabling technology

It is important that the transition be enabled by contextually appropriate technology, linking farmers to markets, reducing food loss, and monitoring the effects of regenerative approaches. These solutions can encompass:

- Inclusive, open-source knowledge management systems;¹⁹
- Equipment to manage farm 'waste' and by-products, providing soil enhancers;²⁰
- Solar technology geared towards smallholder farmer customers;²¹
- The use of sensors and smart devices;²²

- Mobile applications and systems, for example in localised weather forecasting;²³
- Platforms that promote access to rather than ownership of high-cost assets;²⁴
- Blockchain and distributed ledger technologies to link smallholder farmers to markets, process payments and give them access to credit.²⁵

The market for businesses focusing on these products and services across the continent is rapidly expanding. The potential for accessible, distributed technology applications in regenerative agriculture is huge.

At the same time we know that the application of technology alone is not a solution. At the heart of regenerative agriculture is a recognition that mobilising the complexity of natural systems is more important than adopting a tech-driven approach. But, critically, we do believe these technologies have the potential to increase the power of smallholder farmers. Technology will also have a fundamental role in making the job of regenerative farming less labour-intensive and more profitable, which are two of the major drivers of Africa's inter-generational decline in farmers.²⁶

Climate change could shorten growing seasons in much of sub-saharan Africa by more than 20 percent by 2100

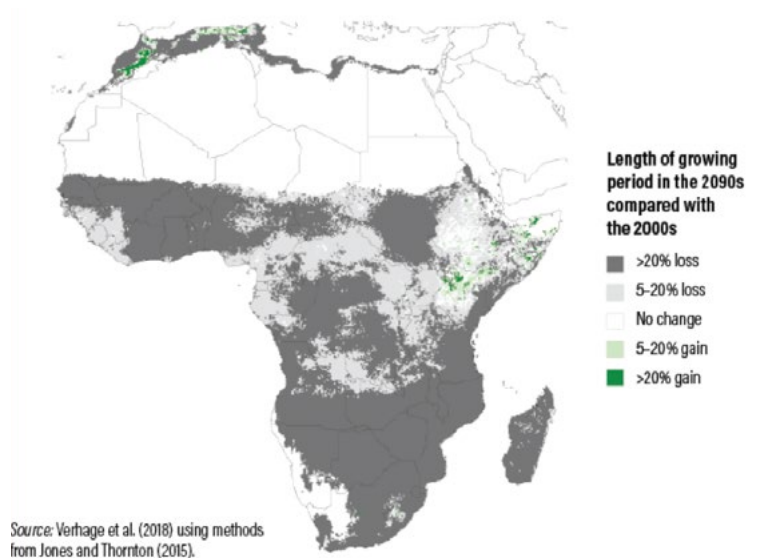


Diagram courtesy of the World Resources Institute

Talking about Africa

In our circular economy work we are aware of the risks and contradictions in talking in broad terms about the theme of regenerative agriculture in a continent of 54 countries, 1.2 billion people and over 1,500 languages. We are even more aware of doing so when talking about agriculture and food systems, which are inherently culture- and context-specific. But we do believe that there are twin challenges which many places share: a lack of good information on the ideas that underpin the circular economy, as well as compelling examples of business practice. Our approach in this report is both to address those information gaps, and to connect and create the networks that make change happen.



Gumbo Majubwa: Founder and Director, ambakofi, Tanzania

“ We see the harvests declining, partly because of climate change, and partly because of destruction of the soil. Most farmers still believe in using fertilisers and pesticides. But if you show them how agroforestry works, they can make the soil more productive without degrading it, all year round.

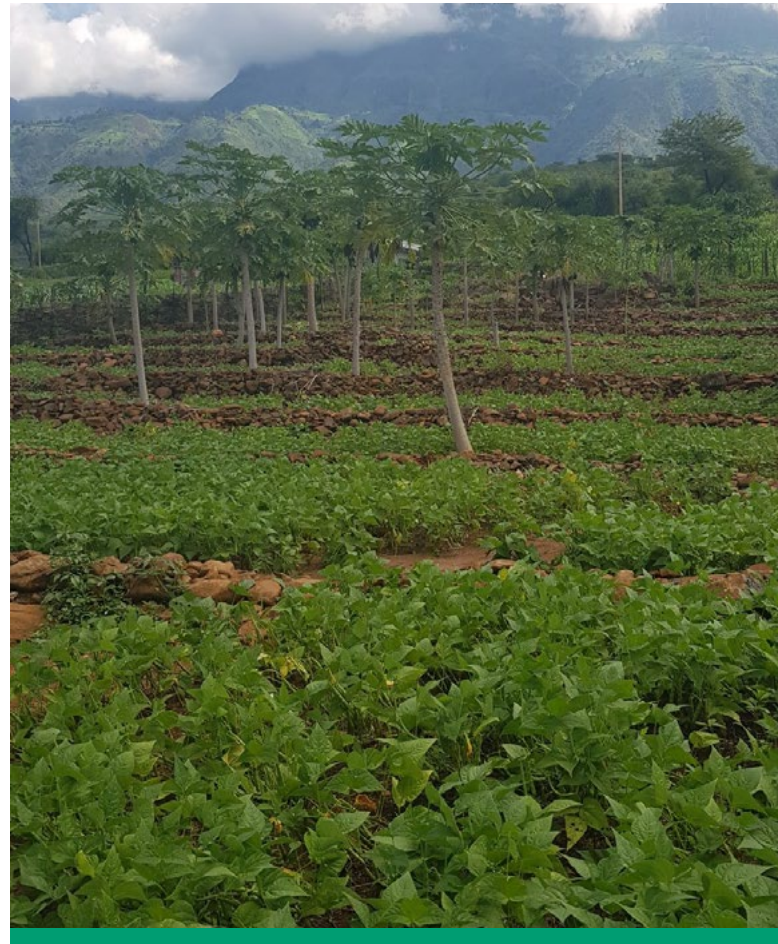
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This transformation of agricultural practices is at the same time radical, complex and straightforward. It's radical in that this is a rethinking of 'conventional' agricultural practices. It's more than just about making farming practices 'sustainable'. Sustainability is, we believe, a high-risk strategy which will simply sustain flawed and 'imported' practices with huge hidden future costs. It's complex since until now farmers and buyers have focused on building supply chains for single crops. They will need to develop farming practices and models that provide services and markets for multiple crops. But it's also 'straightforward' in that much of the strategy consists not in inventing but in reviving practices which already have long histories in African contexts.

There are six key - and intertwined - benefits that we believe regenerative agriculture can bring in African contexts:

1. **Improving food resilience:** Regenerative agriculture involves the design of a system in which farmers become as autonomous and resilient as possible. By this we mean three things:
 - Reducing dependency on agricultural inputs such as external amendments, nutrients or chemical inputs. High input farming - rarely within the economic reach of African farmers - has hidden future costs;
 - Expanding the variety of species that are grown on the land to improve nutrition, soil and reduce risk of monocrop dependency. This way harvests - often of different products - can take place continuously throughout the year;
 - Selecting species that are better adapted to local climates and need less intervention from farmers to thrive.
2. **Saving the continent \$6 billion a year in agricultural inputs:** Regenerative agriculture is about increasing productivity of land and variety in harvests, with fewer inputs. This is important, since - somewhat absurdly - Africa is a net food importer. To illustrate: Africa's exports of food and agricultural products are worth between \$35 billion and \$40 billion a year, and some \$8 billion a year flows through intra-regional trade in these products. However, the continent's food and agricultural imports amount to between \$45 billion and \$50 billion a year.²⁷

3. **Feeding future populations better:** The continent should be able to produce enough food, and most African diets can and should be richer and more diverse. Traditional diets in West Africa, for example, are healthier than those of countries such as Japan.²⁸ Regenerative farms are by their nature more biodiverse and provide better-balanced diets for the people who depend on them. This is an important point when one considers the tremendous projected population growth in Africa. Estimates are massively speculative, varying from between 2.2 - 2.5 billion by 2050. Whatever the figure turns out to be, high levels of population growth will increase the pressure to achieve sustainable intensification in production.²⁹



Green Planet Initiative 2050, Kenya. Image courtesy of reNature.



Image courtesy of ambakofi, Tanzania

4. **Reversing soil degradation:** Many of the examples in this report show how even land which is seemingly irreparably degraded can be restored. An estimated 20% of African soil - 6.6 million km² - is degraded as a result of soil erosion, salinisation, pollution and loss of vegetation or soil fertility.³⁰ That translates into declining agricultural productivity and reduced incomes, as well as a vicious cycle of collapsing ecosystems. This also pushes farmers to abandon underproductive land and cultivate more virgin land.
5. **Mitigating the effects of climate change:** Regenerative agricultural practices can help shift land to become a net carbon sink both through reducing the harmful effects of existing production systems and sequestering carbon.³¹ This is important for Africa since climate change is disproportionately affecting the continent's food production - and the lives that depend on it.³² The think tank Project Drawdown estimates that globally regenerative agriculture could remove 23.2 gigatons of CO₂ by 2050.³³
6. **Helping farmer and government budgets stretch further:** By storing carbon and recycling nutrients more effectively, regenerative agriculture needs fewer external inputs (depending on the practice and context). That means it can lower pressure on public finances. Right now, 10 countries alone in Sub-Saharan Africa spend over \$1 billion a year, or 14-26% of their annual public expenditures for agriculture on fertiliser subsidy programmes.³⁴ That is funding which could be redirected to supporting development of the enabling infrastructure for regenerative farming, which generally does not often feature in government expenditure. It would also create new business opportunities for local production of organic farming inputs.

We explore these benefits in more detail in the case studies below.

Here we have summarised some of the main practices of regenerative agriculture.³⁵ We have used these principles as an approximate guide for the case studies that we feature below, who use them in various combinations. This list is not exhaustive. There are a multiplicity of African farming practices that are context- and culture-specific. However, we hope that it is sufficient to show the contrast with conventional practices that are based on monocultures, extensive tillage, and use of pesticides and synthetic fertilisers.

- **Agroforestry:** The practice by which growers integrate trees and shrubs into crop and animal systems. This practice, which mimics forest systems, helps multiple species benefit from one another and makes better use of natural shade. One common example across Africa can be found in coffee production, where coffee bushes are cultivated in the forest understory. *OKO Forests and Tamalu Farms, both featured in this report, are examples of agroforestry from Ghana and Kenya respectively.*
- **Animal integration:** This practice involves integrating animals with their crop systems, usually in carefully managed grazing rotation, rather than producing plants and animals separately. Animals stimulate soil biology while trampling grasses and add organic matter back to the soil with animal manure.
- **Biochar:** Biochar is charcoal made from burning woody biomass, which can be applied as a soil amendment. It adds microscopic structure to soil, fostering essential micronutrients and retaining moisture. In Africa, traces of its ancient use have been found in Benin, Ghana, Liberia and South Africa, with suggestions that the practice of using biochar stretches back seven centuries in Ghana.³⁶ It is used as part of a medium called terra preta in the restoration of degraded land where rainforest has been cleared for cultivation. *Co-REGEN, featured as a case study in this report, is investigating the production of biochar at scale in Kenya.*



Agroforestry principles applied to a small plot at Tamalu Farm, Kenya. Image courtesy of Tamalu Farms



Application of biochar in maize and kale cultivation, Kenya. Photo credit: Geoffrey Kimutai. Image courtesy of Co-REGEN.



Dr Kofi Boa, Director and founder,
Howard G Buffett Centre for No-Till
Agriculture, Ghana

Conservation agriculture is not a single practice; it's a basket of options. Whenever you are in the world, you can choose the relevant technologies to improve and sustain the productivity of the soil.



- **Composting:** The natural process of turning waste (from manure or food) into fertiliser or soil enhancer.
- **Contour planting:** This involves planting crops in a pattern around a hill, instead of up and down the hill. Following the natural contours of a landscape helps slow water flow during a rain event while reducing erosion. There are signs of this practice being adopted in contexts such as Uganda as a response to deleterious landslides.³⁷
- **Cover cropping:** The practice of planting cover crops to cover soil in order to reduce soil erosion, increase water retention, improve soil health, increase biodiversity and more. Cover crops can be planted around the time of harvesting cash crops or in between rows of permanent crops.

- **Diversified crops, or intercropping:** Growing a variety of crops protects against pests and diseases, provides a diversified income stream, creates habitats for more pollinators, and improves soil health. This is a common practice already in many parts of the continent.



Intercropping of maize and beans in Hambisa, Ethiopia. Image courtesy of Nuru International.

- **Ecological aquaculture:** This practice can include the integration of shellfish (such as mussels, which live off organic matter and lock up carbon in their shells for the longer-term) and seaweeds (known to take up high amounts of nitrogen and other nutrients) in a vertical, closed loop system with zero inputs. Another example, specific to Africa, includes the integration of ducks in tilapia fish farming.
- **Halophytic agriculture:** Halophytic crops are plants that are tolerant to salty conditions - even seawater irrigation. This allows for agriculture to take place in regions where freshwater is scarce and famines are frequent, such as degraded mangroves.
- **No-till:** A technique that leaves the soil intact when planting rather than disturbing the soil through traditional ploughing. The build-up of mulch over time protects microbial ecosystems in soil, which in turn provide important functions for crop health and nutrition. *Warc Group and the Centre for No-Till Agriculture, both featured in this report, are demonstrating the effects of no-till in Ghana and Sierra Leone*



Demonstration of crimping, a mechanised approach to no-till farming that leaves ground cover intact. Image courtesy of the Centre for No-Till Agriculture, Ghana.

- **Pasture cropping:** This refers to planting annual species into perennial grasslands to keep soil covered as the perennial species enters its dormant phase of production.
- **Perennial plants:** Perennials are plants that do not need to be replanted every year. Perennials also exhibit long root systems that can retain water, improve soil's porosity, store more carbon, and improve soil health.
- **Planting native species:** Native plants are beneficial in restoring wildlife habitats and improving biodiversity. They tend to need fewer inputs because they are better suited to the local climate. They can be planted as the main cash crop, incorporated in conservation buffers, or used as cover crops. This is a critical point in African contexts, where native plants have huge potential as food- and cash-crops but in many instances have been ignored by commercial farmers, scientists and policymakers.³⁸
- **Reduced or no pesticides or fossil fuel-produced inputs:** Building soil health and leveraging other natural systems to manage pests instead of relying on pesticides or other products with potentially harmful effects. When we talk about 'fossil fuel-produced inputs' we mean fertilisers which often depend on fossil fuels for their synthesis, transport and so on.
- **Silvopasture:** A form of agroforestry, silvopasture integrates trees into pastures for grazing animals.



Ngitili silvopastoral system in Tanzania. Image by Lalisa A Duguma/ICRAF, courtesy of World Agroforestry Centre

- **Solar energy:** This refers to the use of solar energy from panels on farms to reduce dependence on fossil fuel and overall energy costs.

In compiling this list, we are mindful that most of the definitions we use come from outside Africa, and we believe that there is still a lot of work to be done to bring African regenerative practices to the fore.

Based on the hard-earned wisdom and experience of the people we spoke to, we have summarised some of the insights that have been shared and the patterns we have observed. Throughout our discussions we have noted the refrain that building a compelling alternative to the dominant 'agribusiness' model is a challenge. The dominant school of thought is that cash, technology, external inputs, larger farms, and infrastructure are what is needed for agriculture to succeed. A mix of strategies will be critical for regenerative approaches to be more widespread.

1. **Regenerative agriculture means valuing empirical wisdom:** We often heard the word 'remind' when referring to engaging farmers in regenerative practices. One initiative makes a practice of interviewing community elders to learn about the appearance of the landscape when they were growing up. Consistent with principles of permaculture, this gives them a better understanding of native species, water flows and the potential for the landscape. In our interviews we detected a growing sense of urgency that this knowledge will be lost as this generation passes on.
2. **Encouraging young people to engage in regenerative agriculture needs smarter approaches:** Africa's farming population is ageing. Young people are dissuaded from agriculture because of its arduous nature, lack of quick returns and a perception that it is old-fashioned), or even a poverty trap. People who are still interested in farming more often believe that the 'conventional', high-input form of agriculture is more lucrative. A more mechanised approach may feel more 'modern'. and we heard proposals that young people can be engaged with contextually-appropriate technology and intelligent commodity choices which give both short- and long-term returns.
3. **Better data is needed to make the case for regenerative agriculture:** There is pressure to collect as much data as possible to demonstrate benefits: how it affects yields, what techniques work best, and what inputs are needed. However, the time inherent in natural cycles makes building evidence and trialling methods a longer process. Nonetheless, this information is vital to give farmers - already often struggling to make ends meet and taking the greatest risks - confidence that investments in regenerative agriculture are going to benefit them.



Practical session with farmers at the Centre for No-Till Agriculture in Ghana, which features in this report

4. **Smallholder farmers 'get it':** Most (although not all) initiatives we interviewed had little issue convincing farmers of the benefits of 'traditional' practices and were surprised at the speed at which nature rebounded once farmers started working alongside nature rather than fighting it. Where they have had significant challenges is persuading large businesses or local governments to see the benefits and often identified vested interests, for example in the procurement of inputs.
5. **Context-specific agricultural solutions need to be prioritised:** Imported solutions are rarely appropriate: high-input, highly mechanised approaches that favour monocropping vast tracts of land do not work in Sub-Saharan tropical contexts. They typically have far smaller plots of land, and many are dependent on rainwater for irrigation. Rainfall is inconsistent and can be dramatic when it comes, damaging crops and washing away soil and any inputs. Farming practices should not be determined from the outside. The same also goes for alternative, regenerative approaches.
6. **Reducing or eliminating synthetic inputs means a major mindset change:** Synthetic inputs are highly subsidised and well-marketed as the miracle solution to low yields. There are long-established attitudes that regard them as superior to older, 'backward' practices. This is not to say that regenerative models reject chemical inputs entirely; some initiatives we interviewed have found their limited use essential in some cases (such as herbicides in the first year of no-till). However, this mindset prioritises short-term higher yields at the expense of long-term ability to sustain production and planetary health.
7. **Regenerative agriculture needs more dedicated policy:** A key metric for measuring farming success is yield per acre. But if high yields are achieved with high levels of costly inputs, profitability is typically lower than a low input, moderate yield with a diverse crop mix. One respondent happily quoted yield figures which they described as "underwhelming". However, their focus is on the profit margins for the farmers they collaborate with. This will also inform choice of crops to avoid those which have highly fluctuating prices dictated by markets
8. **Regulatory institutions need to adapt faster:** One interviewee stated that it can take two years to have seed varieties approved. Farmers are limited by seeds that are not suited to the end use of the crop. Another was facing a barrier that their fertiliser was too unconventional to meet the regulator specifications, who in turn wasn't able to approve it. Large seed companies often have

disproportionate power and their profit-drive can conflict with farmers' needs. An example of this is the provision of hybrid varieties that produce infertile crops so that farmers cannot collect seed for future seasons.

9. **Durable land tenure arrangements are critical:** In Africa traditional landholding has been broken down by new processes - formalising title on land, cadastral systems, and so on. This is important insofar as formalising title can offer safeguard against appropriation. However this does not always lead to systems where farmers have appropriate tenure. Regenerative agriculture involves permanent practices and lifelong investments. Guarantees for farmers - and their successors - to be able to work the land for the long term are therefore hugely important.
10. **The value of ecosystem services need greater recognition:** Carbon has an established market which has the potential to create revenue streams for regenerative agriculture businesses, particularly as a short term solution. Water, however, has less recognised value for now. And what about soil? Let alone the latent cost of the crisis averted from a more resilient ecosystem, such as flood prevention. Then there are other ecosystem services which regenerative agriculture provides - biodiversity restoration, for example - that have been theoretically valued but whose markets have yet to evolve.



Cattle and manure in Sumbe, Angola. Photo by Eryxson Fonseca

We asked the people we interviewed to tell us what action they wanted to see from stakeholders in food systems: multinationals, programme funders and governments. We received strong opinions and some fascinating insights. Here we have summarised them in five areas for action to drive regenerative agriculture in Africa at scale. The action points we share here are based on initial findings and, we believe, warrant much deeper exploration.

As we have said, this is a critical decade for action, and the task in relation to regenerative agriculture is urgent and complex. There are important high level commitments that have been made to restore degraded farmland, forests and other ecosystems, such as the AFR100³⁹ and the Great Green Wall⁴⁰ initiatives. To make them work, however, we need more practical pathways, even 'how to' guides for regenerative agriculture.⁴¹ We have also received repeated feedback that regenerative agriculture approaches need to be farmer-centric, prioritising their creativity, resourcefulness, and long-term interests in the health of the systems they work.⁴²

1. Rethink the big picture

As with the circular economy, regenerative agriculture involves thinking in systems. Regenerative agriculture is an ambitious transition from systems that reward short-term financial gain, focus on economies of scale to maximise yield and efficiency, and externalise environmental and social costs. This means making a bold mindset shift and joining up functions which may have traditionally been separate: agriculture, forestry,

climate change, waste management, energy and so on. A business can only be as circular as its ecosystem and value chain so the approach of considering individual businesses from an investment or 'technical support' perspective no longer makes sense. We suggest three action points:

- Governments can set up a task force to catalyse regenerative agriculture initiatives, bringing together different functions: agriculture, environment, finance, sanitation, education, trade and industrialisation and so on - with clear, long-term targets and appropriate - and patient - financing;
- Investors should adopt a different approach where they invest in the whole value chain and even set aside specific funding to address ecosystem challenges that prevent or reduce profitability in a circular value chain. This includes supporting community governance, research or stakeholder coordination;
- Development practitioners need to stop importing expertise and develop the tools to listen to existing wisdom and conditions, and support the development of community leaders.

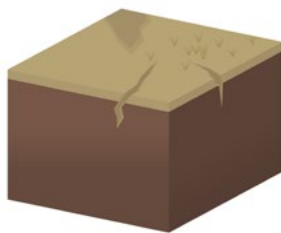
2. Build (and share) evidence and standards

There is a wealth of evidence on regenerative agriculture, but it's not translating to policy or action. By its nature, much of the wisdom on regenerative approaches is not codified, and it is highly context-specific. This is a disincentive to experimentation and investment, leading to three specific actions:

Biodiversity and species restoration is a multi-year process

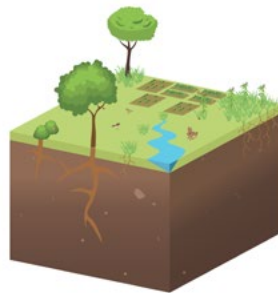
BASELINE

Degraded land with little biodiversity



AFTER 1-3 YEARS

With the implementation of regenerating practices, above and below ground biodiversity is starting to develop



AFTER 3 YEARS

The land is regenerating, and biodiversity is thriving



Image courtesy of Metabolic



- All stakeholders should accelerate the development of measurement indicators for agriculture that look at a broader set of impacts rather than just yields, and common standards. These can include measuring nutrient content per hectare, total biomass, ecosystem services, and livelihood resilience;
- Multinationals and funders should sponsor more pilots for regenerative farming techniques on demonstration farms, to test and improve these techniques to improve food security and agricultural productivity, and pest and disease control;
- All stakeholders can promote standards and marketing of organic and regenerative food products in both domestic and international markets, with recognised certification.⁴³ The demand side could pay for documentation, monitoring and verification.

3. Shift policy and budget allocations to change incentives

Government budgets are always scarce, but we suggest they need to work in creative ways in order to prioritise the uptake of regenerative approaches. Three options for action are as follows:

- Develop pilots to reshape markets, for example by increasing taxation on synthetic inputs alongside introducing subsidies for locally-produced, organic fertilizers and other organic farming inputs that help to improve soil health and biodiversity;

- Set specific budget targets on clearly-defined regenerative agriculture spending, with year-on-year increases;
- Take a broader view of what falls within a given subsidy regime, for example including non-productive species which have been planted alongside commodities and promoting native species.

4. Think long term

Regenerative agriculture is a strategy for both the near and the deep future. It depends on creating conditions for long-term investments which will take years to deliver benefits. One crucial consideration is in land tenure, where governments have a number of options to create more security in order to promote regenerative practices. We have also talked about the challenge of inter-generational decline in farming in African contexts. Three action points:

- Governments could consider facilitating access to land for regenerative farming through regulating large-scale land acquisitions from international agribusinesses that adopt industrial modes of production;
- All stakeholders should look at how agricultural investments could also be costed for the longer term, including calculating and publishing cleanup costs resulting from long term degradation of land, as well as factoring in obligations for rehabilitation in any land leases;



Cassava and turmeric field from the Centre for No-Till Agriculture, Ghana, which features in this report

- Governments should take concrete measures to invest in the next generations of regenerative farmers: focusing on university programmes, for example, or providing incentives to agribusinesses who are switching to regenerative approaches to bring young people into their value chains.

5. Promote intelligent (and patient) financing for regenerative approaches

Regenerative agriculture needs different financing models. In many cases a venture capital-type model will be inappropriate, since regenerative farming won't offer the rapid growth that it seeks. It needs funders with broader and longer horizons. Yields from a regenerative farm might first decline and then recover to (or exceed) previous levels over a three- to ten-year period as the soil recovers. That initial drop in production is a cost for farmers that needs to be met. To the extent that government finances cannot cover these investments or where multinational buyers do not support the transition, they can work with financing institutions to:

- Design financial products that match the reality-timeframes, cash flow fluctuations, and ownership models for customers;
- Promote crop insurance policies that protect farmers and share risk more equitably between farmers and buyers;
- Encourage incorporation of natural assets on a farm's balance sheet, when they deliver financial benefit in the form of ecosystem services;
- Incentivise collaboration across value chains to distribute both risks and returns, rather than the conventional single company focus.

These are some options for giving farmers more confidence in the risks of the regenerative transition rather than being wary of failure and financial setback.

Further reading

In this report we have prioritised looking at the practice over the theory and scientific underpinnings. These are several current publications looking at those aspects of regenerative agriculture in Africa in more depth:

A call to action for placing African farmers at the centre of new regenerative agricultural systems: *Farmer Led Regenerative Agriculture for Africa*, University College London, Institute for Global Prosperity (2020).

[Click to read more](#)

A discussion on how to achieve nature-positive food production in Africa at required scale: *Re-Imagining Africa's Food Future at the Intersection of Agriculture and Conservation*, WWF (2020).

[Click to read more](#)

The circular economy opportunity in food systems: *Five Big Bets for the Circular Economy in Africa*, African Circular Economy Alliance (2021).

[Click to read more](#)

Why governments should reinvest underperforming public agricultural subsidies in land restoration: *A Multi-Billion-Dollar Opportunity: Repurposing Agricultural Subsidies to Restore Degraded Farmland and Grow Rural Prosperity*, World Resources Institute (2021).

[Click to read more](#)

A reconsideration of 'Green Revolution' approaches: *"Africa at the Crossroads:" Time to Abandon Failing Green Revolution*, Regeneration International (2020).

[Click to read more](#)

The circular economy as part of a system-level solutions framework for agriculture: *Circular Economy in Africa, Food and agriculture*, publication by the Ellen Macarthur Foundation (2021).

[Click to read more](#)

How you can be part of driving the circular economy transition in Africa

We would love to hear from you if you:

- Would like to collaborate on helping businesses measure their circularity and impact;
- Are looking for training partners for circular businesses
- Have further case studies that you think should be included;
- Would like to be part of the community that builds out and curates our database of cases and the [Knowledge Hub collection](#), our [geolocated map](#), or our new collaboration with [HappyPorch](#) on an interactive case study platform.

If so, contact us at: changemakers@footprintsafrica.co putting “Circular economy” in the subject line.

If you would like your business initiative to be included in the database, please complete our [questionnaire](#).



Project Laikipia, Kenya. Image courtesy of reNature, which features in this report.

In this section we profile ten regenerative agriculture initiatives:

- OKO Forests - Ghana;
- Howard G Buffett Centre for No-Till Agriculture - Ghana;
- reNature - Global, with current projects in Côte d'Ivoire, Kenya, Tanzania, Uganda and Zambia;
- Co-REGEN - Kenya;
- ambakofi - Tanzania;
- Global BIOTEK - Togo and Benin ;
- Tamalu Farms - Kenya;
- One Billion Trees - Cameroon and Nigeria;
- Regenerative Resources Co - Global, with current project in Ghana, Mozambique, Namibia and Somaliland;
- Warc Group - Ghana and Sierra Leone.

To each case study we have added key information on the regenerative strategies that each initiative has

adopted, their key commodities (where applicable), and the Sustainable Development Goals to which they contribute.

In this report we are specifically looking at regenerative agriculture; therefore, we have not included certain other practices – such as aquaponics, hydroponics, vertical farming, or the transformation of food waste to compost – although they are hugely important in food systems. In our previous [report](#) on the circular economy we looked at two of these food-system-adjacent practices: bio-waste to compost, and bio-waste to produce feed and soil improvers through black soldier fly technology.

For reasons of space and readability, we have chosen a selection of case studies rather than set them out exhaustively. But you will find a fast-growing, open-access dataset of circular economy and regenerative models in our collection on [Circle Economy's Knowledge Hub](#), and mapped out by GRID-Arendal on the [Footprints Africa](#) website. The list below gives a flavour of what we are mapping across the continent.

Name	Country/ies	Focus	Web
Amelia Agro	Uganda	Diversified carbon-neutral regenerative farm	www.ameliaagro.com
Biophyto	Bénin	Organic fertilizers and pesticides from neem and other aromatic plants	www.biophyto-benin.com
Ecookim	Côte d'Ivoire	Reforestation and agroforestry	www.ecookim.com
Farm Africa - Kenya pilot	Kenya	Forest and rangeland management	www.farmafrica.org/kenya/kenya
Farmer Max	Kenya	Regenerative poultry farming through intensive grazing methods	www.farmermax.co.ke
Green Heart of Kenya	Kenya	Regenerative master-planned town and agricultural landscape	www.greenheartofkenya.com
Green Planet Initiative 2050	Kenya	Degraded landscape restoration	www.gpi2050.org
Grounded	South Africa	Regenerative farming cooperative for tea and spice production	www.grounded.co.za
Kaydara Agroecology School Farm	Senegal	Agroecology practice and training school	www.unescogreencitizens.org/projects/the-kaydara-agroecology-school-farm

Name	Country/ies	Focus	Web
Komaza	Kenya	Building a 'virtual plantation' across thousands of smallholder farms	https://www.komaza.com
Mama-Itohan RegenSoil Ltd	Nigeria	Diversified regenerative agriculture consulting and implementation services	www.mama-itohanregensoil.com
Ndanifor Permaculture Ecovillage	Cameroon	Permaculture demonstration village	www.betterworld-cameroon.com/ndanifor-permaculture-ecovillage
Pride Farms	Rwanda	Regenerative consulting and farm management services	www.pridefarmsltd.com
Réseau Associatif de Développement Durable des Oasis (Raddo)	Algeria, Chad, Mauritania, Morocco, Niger and Tunisia	Oasis ecosystem restoration	www.raddo.org
SEKEM	Egypt	Biodynamic agriculture	www.sekem.com/en/ecology/sekem-agriculture
Shumei International	Madagascar	Propagation of natural agriculture techniques	shumei-international.org/case-study/madagascar
Sustainable Agriculture Tanzania	Tanzania	Agroecology upskilling services	www.kilimo.org
Tamounte	Burkina Faso	Moringa-based agroforestry	www.tamounteburkina.wixsite.com/tamounte/moringa
Transforming Rural Economies and Youth Livelihoods project	Kenya	Market systems project focused on regenerative agriculture	www.practicalaction.org/pmsd-toolkit/treyl-case-study

Given the breadth of the theme and the context this list is naturally far from complete. If you would like your regenerative agriculture initiative added to Footprints Africa's open-source database, please [complete our survey](#).



Image courtesy of Tamalu Farm, Kenya; which features in this report.

OKO Forests

Location

Ghana

Year founded

2015

Key commodities



Cassava



Maize



Shea



“Right now it’s cheaper for farmers to destroy the environment – through use of chemicals and reliance on cash crops – than it is to restore it”

Kofi Debrah

Founder

Link

okoforests.com



Oko Forests farmers

Ghana-based OKO Forests develops agroforestry systems, linking a network of smallholder farmers to both international and domestic markets.

What’s the opportunity?

Farmers are more likely to adopt regenerative agriculture methods if they are tied to income security. As current cash crops become increasingly vulnerable to the effects of climate change, the kinds of resources that will allow farmers to better adapt to this reality need to be more accessible. This means giving farmers better rights over their land, providing access to value-added inputs, and creating the space for community discussions about the land they work.

projects in cassava production and operations in both energy production (OKO Energy) and sustainable timber production (in collaboration with the Eco Innovation foundation). The company is shortly to be registered for carbon credits.

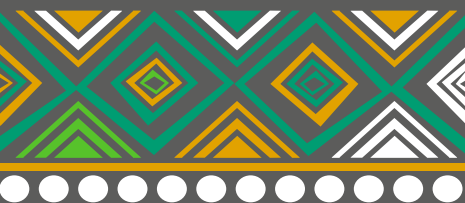
Their approach

OKO Forests creates a step-by-step programme that enables their smallholder farmers to adopt agroforestry techniques. At present, they hold a 50-year lease of 85 acres divided up between 22 farmers. As part of this arrangement they have concluded agreements to allow the farmers to pass plots to their children, giving them the ability to invest for the long term.

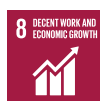
Once farmers are trained on how to farm the land, they are provided with high quality inputs and purchase agreements. Crops are chosen based on market demand and value-addition potential. OKO Forests harvests the crops, transports them, warehouses them and processes them. In the next five years OKO Forests hopes to set up a network of warehouses that focus on three to four main commodities, incorporating OKO Energy biomass fuel and biochar into the production process, as well as producing timber for the Eco-Innovation Foundation branch.

Kofi Debrah’s story

OKO Forests’ founder, Kofi Debrah, has fond memories of escaping London to visit his grandfather’s cocoa farm in Ghana. His visits brought out a love of nature but also made him conscious of the growing connections between farming and climate change. Motivated by the need to mitigate landscape degradation through farming, Kofi began developing value-added regenerative agroforestry systems that could be replicated across the country. OKO Forests, which began as a landscape management company in 2015, has expanded, with large scale experimental



SDGs



The Howard G Buffett
Foundation Centre for
No-Till Agriculture

Location

Ghana

Year founded

2012

Key commodities



Maize



Legumes



Tree crops



Cover crops



“With no-till, we
create healthy
soil, to produce
healthy plants,
for healthy
people.”

Dr Kofi Boa

Director and founder

Link

centrefornotill.org



Aerial view of the Centre in Kumasi

The Howard G Buffett Foundation-supported Centre for No-Till Agriculture is a Ghana-based leader in demonstrating the value of and supporting the adoption of conservation agriculture.

What is the opportunity?

Conservation agriculture, through no-till, is a practice that retains the soil's healthy balance of nutrients, resulting in consistent levels of production and the ability to grow a wide range of produce which keeps farming families healthy and provides them with a sustainable source of income.

Farming methods such as slash and burn, pesticides, and tilling threaten food security in Ghana. Farmers using these 'traditional' farming methods typically see decreases in the productivity of their land after just two years. By leaving cut-down vegetation on fields rather than burning it, for example, a healthy layer of mulch builds up and the soil becomes richer and less dependent on artificial inputs. No-till also promotes natural processes of weed and pest control.

Kofi Boa's story

The Centre's founder, Dr Kofi Boa, was inspired to spread the take-up of conservation agriculture by his personal experiences with traditional slash and burn practices. When he was young, his family's farm burned to the ground after a neighbouring farm lost control of its fire.

Before founding the centre, Dr Boa used to work in the Ghanaian crop

research institute. During his time there he maintained small plots of farms which he used to teach farmers. In 2012 he asked himself: why not scale up and establish a bigger teaching centre? From there the Centre for No-Till Agriculture was born.

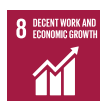
The Centre's approach

The HGBF | CNTA gives Ghanaian farmers who are interested in alternative farming methods a strong grounding on the benefits, evidence and methods of conservation agriculture.

Farmers take part in short term courses at the Centre, itself a model farm which grows diverse crops using only conservative agriculture techniques. The Centre emphasises hands-on field demonstrations and community-based training events alongside classroom based-learning. By attending these courses, farmers can establish an important network of other farmers who are making the change from traditional farming to conservation agriculture.

The Centre reports impressive results: a 35% yield increase, a 45% decrease in labour inputs, and a 25% increase in farmers' disposable income after two years.

SDGs



reNature

Location

Headquartered in Amsterdam with projects in Latin America, Southeast Asia and Africa: Côte d'Ivoire, Kenya, Tanzania, Uganda and Zambia

Year founded

2016



“ We cannot and will not stop consuming, so we need to create a system that brings these two perceived opposites to collaborate: a strategy that supports the economy and strengthens the ecosystem.”

Felipe Villela

Founder & Chief Commercial Officer

Link

www.renature.co



Project Anauá - Brazil

reNature supports farmers and corporates in the transition towards regenerative agriculture.

What is the opportunity?

reNature's ambitious objectives are, by 2030, to:

- Feed 10 million farmers and community members sustainably;
- Sequester 200 million tonnes of CO₂;
- Regenerate one million hectares of land, including 'conventional' farmland.

Above all, reNature wants to make regenerative practices mainstream. They want to see landscapes that are diversified and where the benefits of their commodities are shared.

reNature recognises that farmers need an alternative that will both bring nutrients back to their soils and food into their family's mouths. Implementing agroforestry on land that has been stripped of its arable qualities can restore the area's biodiversity and increase crop success rates which means immediate and long-term advantages for the climate and economy.

Felipe's story

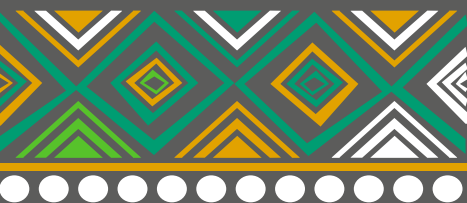
In 2017 sustainable agriculture enthusiast, Felipe Villela, and marketing and communications expert, Marco de Boer, founded reNature. After witnessing the effects that mass deforestation of the Amazon rainforest has on the ecosystem and people in his home

country of Brazil, Villela felt compelled to change the way farming is done. Villela spent time learning from swiss agroforestry expert, Ernst Götsch, on his cocoa farm in Brazil. Villela observed how the thriving ecosystem of Götsch's farm compared to that of neighbouring farmers who did not use agroforestry. This revelation led to the founding of reNature.

reNature's approach

reNature has built a platform between the people who want to make the shift to regenerative agriculture and people who can help.

They start with a strategic selection of projects, asking, for example: What are current practices? What does 'regenerative' mean in a specific context? Then they set up a demonstration plot, which allows them to think about farm design, to give a proof of concept and create a basis for comparison. Next, they create model farms - small plots with intertwined species-focused on growing one or two main cash crops. They provide a 'transition package' which helps farmers put their learning into practice and establish links with prospective buyers, financial institutions and research institutions. They promote the idea that farmers learn best from other farmers, and are used as a hands-on learning opportunity as well as a chance for farmers to work together and discuss what works and what doesn't.



SDGs



Co-REGEN

Location

Kenya

Year founded

2016



Tea bushes next to plant residue from pruning

Co-REGEN is a consortium providing advisory services closed loop gasification energy and biochar farming with renewable biomass in sub-Saharan Africa.

The opportunity

Biomass gasification turns solid feedstocks into combustible gases and biochar. Biochar is a soil amendment which enhances fertiliser uptake, water retention and crop production. It can lock away large amounts of carbon without additional costs. It can also use low-grade agricultural 'waste' instead of wood and gives a higher energy efficiency than incineration. For example, using the available residue from just five of Uganda's main crops for gasification would displace the wood fuel consumption of 6 million people.

energy sources, the partners have been building and refining a closed-loop model, engaging agribusinesses, gasification systems and ICT providers, policymakers and investors.

Their business model

Co-REGEN designs and delivers holistic models for generating reliable energy and biochar. This creates a new income stream for farmers who can sell residues such as nut shells, tea prunings, husks, and tree litter that are either burnt or left in the fields. Biochar reduces fertiliser use and increases productivity so farmers earn more from the same parcel of land.

Gasifiers obtain more energy from biomass and release less carbon to the atmosphere than incinerators. 150 tonnes of biomass generates enough electricity for 50 low-income families for a year, and enough heat to boil 2.5 million litres of water. The same amount gives 10 tonnes of biochar which removes 33 tonnes of CO₂ from the atmosphere - equivalent to 12,000 litres of petrol.

Co-REGEN is now focused on industrial applications. For example, in Kenya's tea sector, gasification could satisfy power needs for local processing and enable new on-site value addition. It could also generate revenue from carbon credits.

Co-REGEN's story

After a chance meeting at Nairobi airport in 2016, the scientists at the [International Institute of Tropical Agriculture \(IITA\)](#) joined forces with [The Cobalt Partners](#) to commercialise biochar research. IITA and its partners achieved impressive results working with 150 Kenyan farmers who saw gains of 22-38% in their harvest over three consecutive seasons. Knowing that community engagement was critical for success, they brought on [The Grass Company](#), a base of the pyramid consumer collaboration agency.

In order to move away from extractive food production and expensive, unreliable



"Humans must draw technology towards them. If humans aren't bought in, technology will fail"

Aarti Shah

Director, The Cobalt Partners

Link

<https://rb.gy/jyndkt>

SDGs



ambakofi

Location

Tanzania

Year founded

2018

Key commodities



Green vegetables



Turmeric



Yams



Castro beans



“Nature pays back wellbeing and fortune to whoever invests in the natural environment and forest restoration. We believe small-scale farmers are best-placed to conserve the land, the soil and water sources.”

Gumbo Majubwa

ambakofi's founder

Link

www.ambakofi.org



ambakofi's operations in Tanzania

ambakofi is an organisation that promotes agroforestry, cost effective clean energy solutions, and environmental education to generate community passion for forests and the natural environment.

What is the opportunity?

Deforestation and land degradation in Tanzania's coastal regions have been driven by a combination of drought, shifting cultivation, overgrazing and demand for firewood and timber. The effects of climate change are starting to become more and more palpable, as is the need to adapt to resilient and drought-resistant agricultural practices. The land needs to be restored in order to support food security, while creating new economic opportunities for farmers and their communities.

Gumbo's story

When Gumbo was 24 he was horrified to see the forest being cleared in his childhood home of Bagamoyo District, on the east coast of Tanzania. This drove him to focus on conserving nature, first through his study at the Institute of Rural Development Planning in Dodoma, and then his work on a series of conservation initiatives. In 2017 he joined the Kanthari International Institute for Social Change in Kerala, India, to study leadership for social change. It was this experience that led him to found ambakofi.

ambakofi's approach

ambakofi implements ambitious agroforestry projects in two villages, Mkanga and Mihuga, which are both in Bagamoyo District, on Tanzania's coast. ambakofi has also undertaken mangrove restoration in Pangani District. Each of the villages has 50 acres of land under restoration. The organisation's purpose is to invest in nature by restoring deforested land, improving soil fertility, and replenishing the water table and river channels. As it does so it will increase food production, produce sustainable timber, repair the ecosystem and progressively reduce the deleterious effects of climate change.

Typically farmers are limited to seasonal cropping but ambakofi's approach enables them to generate income year round.

To date, more than 5000 trees have been planted, both for timber and fruit. The project has 246 direct beneficiaries and more than 3000 indirect beneficiaries. Ambakofi's ambition is to scale up significantly through the creation of an agribusiness network – a business entity that organises and unites small scale farmers. The network will take care of marketing and connecting farmers with domestic and international value chains.

Reduced use of synthetic inputs

Global Biotek (Biotri-ABC Grower)

Location

Benin and Togo

Year founded

2012



Global Biotek at work in the laboratory

Global Biotek produces precision organic fertilisers and microbe-based bio-pesticides to promote sustainable livelihoods.

What's the opportunity?

Long term use of synthetic fertilisers and insecticides on farms has created both plant-level resistance as well as a degradation at soil, farm and ecosystem levels. Viable organic alternatives have been developed which are specific to both the crops and the ecosystems in which they are to be deployed. If the price point is accessible, African farmers have the opportunity to replace these non-sustainable chemicals products with more effective, crop-specific organic products.

tested several BIOTRI-ABC grower products in 'conventional' agriculture and in no-soil agricultural contexts and are now trialling them on three demonstration farms across Togo and Benin. Their plan is to be incorporated into government-sponsored promotion and supply of agricultural inputs.

Global Biotek's approach

Global Biotek uses their products on three demonstration farms, where participants receive training to run their own farms using their skills and knowledge in biofertilisers and biopesticides. Their farm in Aneho, Togo, will employ 100 women by the end of 2021. The organic inputs used on demonstration farms are a combination of Chabi's fertilisers, using minerals extracted from weeds, and Urbain's biopesticide liquide formula, made up of microbes which increase nutrient absorption and prevent pests and disease. To date they have created 19 types of fertiliser, and their products are exceptionally economical: it only takes 10 to 15 litres of Global Biotek's products for a hectare of cultivation from seed to harvest.

Their story

Young entrepreneurs Urbain Amoussou, a Togolais micro- biologist and Global Biotek founder, joined forces with Beninois sustainable agriculture specialist and ABC Grower creator, Chabi Bienvenu Adje, to launch the Biotri-ABC Grower project. Biotri-ABC Grower combines the production of organic fertiliser and biopesticide to boost crop yields and soil health while creating more sustainable livelihoods for women farmers. They



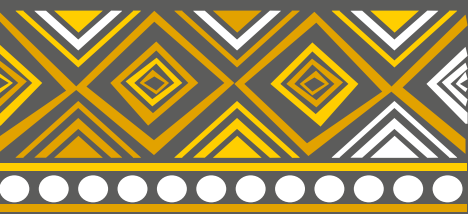
"Feeding our populations through strong agriculture and appropriately adapted biotechnologies, while protecting the land and environment: this is our mission."

Urbain Amoussou

CEO and Co-founder, Global Biotek

Link

[facebook.com/
GlobalBiotek](https://facebook.com/GlobalBiotek)



SDGs



Tamalu Farm

Location

Kenya

Year founded

2018

Key commodities



Green vegetables



Tomatoes



Blueberries



“Don't try to change the whole system at once. You have to be patient for the first two to three years. You plant plot by plot, and see your income grow.”

Fredrick Kipchumba

Farm manager

Link

www.tamalufarm.com



Tamalu Farm's one-acre agroforestry site

Tamalu Farm is an agroforestry and market gardening project in Kenya, the aim of which is to lead the region's transition towards better land stewardship for small to medium scale farms.

The story behind Tamalu Farm

Tamalu Farm is the first of a planned series of demonstration sites that progressive agricultural services provider [L.E.A.F Africa](#) is developing in Kenya. L.E.A.F. started work in 2018 to build Kenya's first open-source demonstration farm for a range of profitable regenerative agriculture enterprises including agroforestry, market gardening, and pasture-raised poultry. The site, situated on the slopes of Mount Kenya, was brought back to life after over a decade of neglect when L.E.A.F. started production in January 2019, serving customers of its own brand, ForestFoods.

The farm manager's story

Fredrick Kipchumba, an agronomist by training, speaks of how he gradually became aware of the problems of long-term degradation of Kenya's soils. He first heard about Tamalu Farm's work in 2018. Having already decided that he wanted to work in regenerative agriculture, he knew he wanted to get directly involved in its more sustainable production methods and demonstrate their benefits to a wider audience.

Their approach

Tamalu Farm's approach is grounded in syntropic agroforestry, a dynamic system that integrates all seven layers of a forest in an agricultural landscape. This fosters increased social, economic, and environmental benefits for its users. Syntropic agroforestry mimics and accelerates natural succession processes to capture carbon, water, nutrients and biodiversity in degraded and undeveloped land.

Tamalu Farm's one-acre market garden consists of a growing space with over 80 varieties of integrated fruit, vegetable, herb, native and timber tree species. They sell directly to customers through a subscription model, and they offer educational farm visits so that they can see how their food is grown and understand the different ways of managing land.

The farm plans to expand by setting up ForestFoods farms across the country and a logistics and distribution hub in Nairobi with an integrated supply chain. To help them advance towards these goals, L.E.A.F. Africa recently joined the [Kenya Climate Innovation Centre](#) in 2020 through the Commercial Forestry programme, in partnership with the economic development foundation [Gatsby Africa](#).

Agroforestry



GreenAid - One Billion Trees for Africa

Location

Cameroon and Nigeria

Year founded

2010

Key commodities



Maize



Millet



Sorghum



Beans



Paprika



Avocado



"We need ethical and morally conscious activities that meet today and tomorrow's needs in a more balanced approach."

Tabi Joda

Founder

Link

onebilliontreesforafrica.org



Tabi Joda and collaborators

One Billion Trees for Africa is a frontline response to climate degradation focusing on planting and growing indigenous trees to restore lands, and create jobs and income for local communities in 11 countries in Africa, mostly in the Sahel within the Great Green Wall.

What is the opportunity?

One Billion Trees for Africa is a response to the large-scale degradation of land in Africa, where the effects of climate change, droughts and extreme weather events are most severe. Tree planting is critical to Africa's farming future; it offers a cost-effective way for rural households not just to take carbon dioxide out of the atmosphere, but to transform rural areas into profit centres that are also beneficial to the ecosystem as a whole. It's for this reason that agroforestry is a central component of the 2021-2030 **UN Decade of Ecosystem Restoration**, a global effort to accelerate efforts to reverse centuries of damage to forests, wetlands and other ecosystems.

Tabi Joda's story

One Billion Trees' founder Tabi grew up in the forest, spending hours playing among the trees in the Mambila Plateau between Cameroon and Nigeria. But as he got older, deforestation meant there were fewer trees to climb. The environmental toll also carried a human one, with more and more of his childhood friends making the dangerous trip to Libya in search of employment and opportunity in Europe. Some came back, but many did

not. It was then that Tabi decided he had a responsibility not only to the memory of his friends but also to their community and the planet.

How One Billion Trees for Africa works

One Billion Trees for Africa's approach is to work directly with the people who depend on land-based natural resources to promote forest products and services for income, employment, food and well-being. By planting a combination of trees, including primarily native species, people benefit from the food, medicine, animal feed, and other ecosystem services that the forest provides. By providing green economic opportunities, members of the community are now returning and earning income from these resources. The revitalised forest has also improved the community's capacity to adapt to the impacts of climate change.

To date the initiative has planted over three million trees, restored over 80 hectares of land and created 89 jobs in agroecology and forest restoration. In doing so the initiative has brought back would-be climate migrants from Liberia to Cameroon, Chad and Nigeria.

SDGs



Regenerative Resources Co

Location

Worldwide with
current projects
in Ghana,
Mozambique,
Namibia and
Somaliland

Year founded
2019



“Reducing our footprint’ means destroying the earth less quickly. We do not have to settle on being less bad for the earth. We can actually be good for the earth.”

Neal Spackman
Founder and CEO

Link
regenerativeresources.co



Regenerative Resources Co (RRC) transforms degraded landscapes into productive ecosystems.

What is the opportunity?

Coastal and rural communities all over the world often survive on unsustainable practices that meet short-term needs but compromise long-term ecological health and economic stability. Land degradation is a result of these practices in the form of coastal erosion, fishery depletion, deforestation, soil loss, and fresh-water scarcity. These in turn exacerbate poverty - as resources are degraded poverty worsens, which makes short-term needs more acute - which leads to greater degradation. This is a vicious cycle in which ecological destruction and poverty reinforce each other.

RRC reverses this destructive cycle by combining economic development with ecological restoration, creating livelihoods that reinforce ecological health through transformation of degraded landscapes into productive ecosystems.

Neal's story

RRC's CEO, Neal Spackman, spent 10 years living and working in a community in Saudi Arabia to restore life and livelihoods to degraded and desertified land. In early 2019, having met his future partners at the Sustainability Centre in Stanford, he founded RRC.

RRC's approach

RRC designs and creates land restoration models in areas where natural resources have been seriously depleted.

Their approach is driven by the climate, location, and needs of the context. Their projects require a substantial investment of resources and time—sometimes years—to understand the needs and cultural practices of the communities they work with, and their native flora and fauna. Often the people in the community have figured out the best answers to local environmental issues; what they lack are the resources and technical expertise to turn them into a reality. Current RRC projects around the globe include the restoration of mangrove wetlands, dryland agroforestry, seawater agriculture, and aquacultures.

In Songor, Ghana, RRC has leased a 2,500 hectare site for 90 years as part of a \$50 million investment, where dryland agroforestry will be introduced. Dryland agroforestry is ideal for low rainfall areas, being able to survive up to two years without rain. It can also transform watersheds using nearby seawater systems. The project will generate some 3-3.5million tonnes in carbon credits, making the project carbon neutral.

Warc Group

Location

Ghana and
Sierra Leone

Year founded

2011

Key commodities



Maize



Rice



Sorghum



Soy



"The core of our business is about the support of smallholder farmers. Our philosophy is based on the idea that subsistence farmers are not poor by choice or design, and that they deserve the best technology."

Christopher Zaw

Partner

Link

warcgroup.com



Warc group employees and collaborators

Warc Group designs and bundles farming inputs-as-a-service in Sierra Leone and Ghana. Its mission is to raise subsistence farmers out of poverty and regenerate soils.

What's the opportunity?

Warc's experience over the last decade demonstrates the opportunity to increase yields by switching to technologically-appropriate, no-till farming which minimises synthetic inputs, eliminates slash and burn and focuses on soil management. With the right setup and value chain access, rural subsistence farmers have the potential and community influence that is needed to lead Africa's farming practices towards a more regenerative future.

Their story

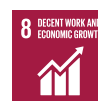
In 2011, Warc's Argentinian founders, Emiliano Mroue and Jorge Lopez Menendez, already specialised in no-till techniques prevalent in their home country, relocated to Sierra Leone. They were motivated both by a vision of the wealth that could be created in West African farming communities and sustainability potential of the region's agriculture. There, they set about developing a farming service model to move subsistence farming communities out of poverty, and go beyond sustainability to being truly regenerative.

Warc's approach

Warc manages three farms spread across Ghana and Sierra Leone, working with over 10,000 smallholder farmers cultivating rice, maize, sorghum and soy. Their main focuses are improving technology transfer, food security, and income generation for local farmers. Farmers are provided with a bundle of regenerative agriculture inputs and mechanization, then paid for their produce. The produce of the smallholder farmers is aggregated with Warc's own production for sale to large grain off-takers. With Warc as a secure buyer, these smallholder farmers gain access to an economic market at guaranteed, predictable selling prices for their produce.

Over the last decade Warc has helped 1,000 farmers move beyond subsistence farming, created 300 new rural jobs, Warc empowered 400 women, and converted 5,000 acres of land to regenerative agriculture. The farmers they have worked with have seen their yields almost double and incomes multiplied by a factor of five as a result of increased productivity. This income increase is driven by increasing the number of crops produced in a year, the amount of available land farmed, increase of yields and better selling prices through a guaranteed market. Warc's goal is to reach 30,000 farmers in the next three years.

SDGs



- ¹ According to the African Development Bank (AfDB), the continent holds 65% of the uncultivated arable land left to feed 9 billion people by 2050. Remarks by the Director of the AfDB, Dr Akinwumi Adesina, in Unlocking Africa's Agricultural Potential to Create Wealth, available at: <https://www.afdb.org/en/news-and-events/unlocking-africas-agricultural-potential-to-create-wealth-18437>
- ² It is estimated that more than 60% of the population of sub-Saharan Africa is smallholder farmers, and about 23 % of sub-Saharan Africa's GDP comes from agriculture. See McKinsey's Winning in Africa's agricultural market (2019), available at: <https://www.mckinsey.com/industries/agriculture/our-insights/winning-in-africas-agricultural-market>
- ³ Regenerative agriculture: how it works on the ground, Nick Jeffries, Circulate (2019). (Emphasis by Footprints Africa.)
- ⁴ It is even possible that the carbon sequestration potential in Africa is much higher than in temperate climates. Most regions are not prone to extreme cold conditions, so they can support the growing cash or cover crops all year. Greater levels of heat and sunlight could also allow soil biomass to grow more quickly.
- ⁵ Global Consequences of Land Use, Science, 22 July 2005, Jonathan A Foley et al, available at <https://www.science.org/lookup/doi/10.1126/science.1111772>
- ⁶ We recognise that agriculture encompasses production of non-food commodities, such as cotton, palm oil or tobacco. However, given the nature of the case studies in this report we focus primarily on farming for food, and food systems.
- ⁷ See the Intergovernmental Panel on Climate Change's Special Report on Climate Change and Land (2019), which estimates that agriculture is directly responsible for up to 8.5% of all greenhouse gas emissions with a further 14.5% coming from land use change (mainly deforestation in the developing world to clear land for food production)
- ⁸ Regenerative agriculture: how it works on the ground, Nick Jeffries, Circulate (2019), available at: <https://medium.com/circulateneeds/regenerative-agriculture-how-to-grow-food-for-a-healthy-planet-9a5f637c0f3e>
- ⁹ This diagram features in the Oxford Martin Programme on the Future of Food and is adapted from Polly J Ericksen's work, 'Conceptualizing food systems for global environmental change research', published in Global Environmental Change, 18, 234–245 (2008), P J Ericksen, available at: <https://www.futureoffood.ox.ac.uk/what-food-system>
- ¹⁰ <https://www.cargill.com/2020/cargill-to-advance-regenerative-agriculture-practices-across-10>
- ¹¹ <https://www.danone.com/impact/planet/regenerative-agriculture.html>
- ¹² <https://www.nestle.com/media/pressreleases/allpressreleases/nestle-efforts-combat-climate-change>
- ¹³ <https://www.olamgroup.com/news/all-news/press-release/5-priorities-for-regenerating-the-living-world-on-world-environm.html>
- ¹⁴ <https://www.pepsico.com/news/press-release/pepsico-announces-2030-goal-to-scale-regenerative-farming-practices-across-7-mil04202021>
- ¹⁵ <https://www.unilever.com/planet-and-society/protect-and-regenerate-nature/regenerating-nature>
- ¹⁶ <https://corporate.walmart.com/newsroom/2020/09/21/walmart-sets-goal-to-become-a-regenerative-company>
- ¹⁷ See 'Roots of Prosperity: The Economics and Finance of Restoring Land', World Resources Institute, 2017, available at: <https://www.wri.org/research/roots-prosperity-economics-and-finance-restoring-land>
- ¹⁸ Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy' by the World Economic Forum and PwC, 2020, available at: https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf
- ¹⁹ One example is WeFarm, a social enterprise operating in Kenya and Uganda that lets small-scale farmers connect with one another to solve problems, share ideas, and spread innovation (<https://wefarm.com/>)

²⁰ See, for example, some of the businesses we profile in our first report on the circular economy in Africa, 'The Circular Economy in Africa: Our Journey so Far', available at: https://irp-cdn.multiscreensite.com/40a0e554/files/uploaded/CEcasereport_Footprints.pdf

²¹ See, for example, Kenya-based SunCulture which specialises in off-grid solar technology to provide our customers with reliable access to water, irrigation, lighting, and mobile charging (<https://sunculture.com>)

²² See 'How Can Sensor Technologies and Precision Farming Improve Agriculture?', ICTWorks, 7 September 2016, available at: <https://www.ictworks.org/how-can-sensor-technologies-and-precision-farming-improve-agriculture>

²³ See, for example, Ignitia's SMS subscription-based weather forecasting tailored to tropical conditions (<https://www.ignitia.se>)

²⁴ See, for example, Hello Tractor's tractor-as-a-service platform: <https://hellotractor.com>

²⁵ See, for example, two initiatives focusing on agriculture specific applications of blockchain: Shamba Records (<https://www.shambarerecords.com/>) and Bext360 (<https://www.bext360.com>)

²⁶ For an excellent overview of both low-tech solutions and high-tech holistic tools involving satellites, sensors and big data analytics (including across Africa), see the GSMA's Digital Agriculture Maps 2020: State of the Sector in Low and Middle-Income Countries, available at: <https://www.gsma.com/r/wp-content/uploads/2020/10/GSMA-Agritech-Digital-Agriculture-Maps-2020-1.pdf>

²⁷ Safeguarding Africa's food systems through and beyond the crisis', McKinsey and Company, available at: <https://www.mckinsey.com/-/media/McKinsey/Featured%20Insights/Middle%20East%20and%20Africa/Safeguarding%20Africas%20food%20systems%20through%20and%20beyond%20the%20crisis/Safeguarding-Africas-food-systems-through-and-beyond-the-crisis-vF.pdf>

²⁸ West Africans have some of the healthiest diets in the world', Quartz Africa, 2015, available at: <https://qz.com/africa/473598/west-africans-have-some-of-the-healthiest-diets-in-the-world>

²⁹ We recognise that this also means looking at urban and peri-urban food systems (vertical farming, hydroponics and so on), which, although hugely important, are outside of the scope of this report. For a recent publication on this theme, see Resilient Cities Through Sustainable Urban and Peri-Urban Agrifood Systems, CGIAR (2021), available at: <https://www.cgiar.org/initiative/16-resilient-cities-through-sustainable-urban-and-peri-urban-agrifood-systems>

³⁰ Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2018

³¹ Although the precise causes remain to be determined, land-use change including deforestation and fires associated with agriculture appear to be a driver of CO2 emissions. See 'Africa's tropical land emitted more CO2 than the US in 2016, satellite data shows', Carbon Brief, 13 August 2019, available at: <https://www.carbonbrief.org/africas-tropical-land-emitted-more-co2-than-the-us-in-2016-satellite-data-shows>

³² For example, the 2014 Intergovernmental Panel on Climate Change report projected that without adaptation, growing seasons in much of sub-Saharan Africa are projected to be more than 20% shorter by the end of this century.

³³ <https://www.drawdown.org>

³⁴ Review: Taking stock of Africa's second-generation agricultural input subsidy programs, Food Policy, Volume 75, February 2018, available at <https://www.sciencedirect.com/science/article/pii/S0306919217308618>

³⁵ This description is adapted from the US-based Natural Resources Defense Council's summary of regenerative agriculture practices, which is available at: <https://www.nrdc.org/experts/arohi-sharma/regenerative-agriculture-part-3-practices>

³⁶ A 700-year-old West African farming practice could be an answer to climate change', Quartz Africa, 22 June 2016, available at: <https://qz.com/africa/713512/a-700-year-old-west-african-farming-practice-could-be-an-answer-to-climate-change>

³⁷ For a contemporary example, see 'Bududa locals change to contour farming to control soil erosion', Uganda Daily Monitor, 31 March 2021, available at: <https://www.monitor.co.ug/uganda/news/national/bududa-locals-change-to-contour-farming-to-control-soil-erosion-3342710>

³⁸ See, for example, the results of the two-decade long project published by the US National Research Council of the National Academies, 'Lost Crops of Africa' available at <https://www.nationalacademies.org/our-work/lost-crops-of-africa>

³⁹ AFR100 is an international partnership between African nations, financial interests both donor and business, technical organizations, and local interests which aims to restore more than 100 million hectares of land in Africa by 2030. Read more at: www.afr100.org

⁴⁰ The Great Green Wall is an African-led movement with the significant ambition to grow an 8,000km natural wonder of the world across the entire width of Africa. Read more at: <https://www.greatgreenwall.org/about-great-green-wall>

⁴¹ For an interesting early example, see the Unilever Regenerative Agriculture Principles with implementing guides (2021), available at: <https://assets.unilever.com/files/92ui5egz/production-v2/489410442380812907bc3d97be02ccda1a44ab4b.pdf/Regenerative-Agriculture-Principles-and-Implementation-Guide-April-2021.pdf>

⁴² We suggest these action points should be read in the context of the recommendations made by the Institute for Global Prosperity, University College London, in its report 'Farmer Led Regenerative Agriculture for Africa', available at: https://www.ucl.ac.uk/bartlett/igp/sites/bartlett/files/igp_ra_for_africa_report_2020.pdf

⁴³ One relevant (non Africa-specific) example is the Regenerative Organic Certification system developed by the Rodale Institute, available at: <https://rodaleinstitute.org/regenerative-organic-certification>

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All opinions expressed in this report are those of Footprints Africa.

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The front cover features Gifty, a farmer at OKO Forests, one of the case studies featured in this report.

See www.footprintsafrica.co for more information on the programmes Footprints Africa runs to support businesses to develop purpose-driven cultures and so empower their employees to improve their social and environmental impact.

