



FINANCING THE AGRICULTURAL TRANSITION

# Driving institutional investment in regenerative agriculture at scale

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# Introduction



## **Climate change is posing an unprecedented and escalating worldwide challenge. July 2023 was the world's hottest month on record,<sup>1</sup> while flooding and droughts caused by El Niño are forecasted to cost South American economies US\$300 billion in the 2023-2024 period.<sup>2</sup>**

Thus, tackling and adapting to climate change by taking measures to reduce global CO<sub>2</sub> emissions has become an issue of utmost importance for the global economy.

One significant contributor to global CO<sub>2</sub> emissions is agriculture, which today accounts for a third of global CO<sub>2</sub> emissions and growing. Regenerative farming is one of a number of measures that could address the problem. According to the United Nations Environmental Programme, sustainable agriculture “uses up to 56 percent less energy per unit of crops produced, creates 64 percent fewer greenhouse gas emissions per hectare and supports a higher level of biodiversity than conventional farming.”<sup>3</sup> Yet effective implementation is fraught with challenges due to fragmented ownership, diverse regulations and misaligned incentives.

Transitioning to, and sustaining, regenerative agriculture practices must become a compelling business decision for farmers in order for regenerative agriculture to scale faster and help tackle rising emissions, meet an estimated 60 percent increase in food demand by 2050,<sup>4</sup> and preserve biodiversity.<sup>5</sup> A critical financing gap exists, however,

related to providing farmers with the capital needed to adopt regenerative practices, which can result in lower crop yields for several years.

The World Bank estimates that transforming the agriculture and food industry would cost approximately \$300-\$400 billion of additional investment each year.<sup>6</sup> However, there are currently no large-scale blended finance facilities designed specifically to accelerate the scaling of regenerative agriculture.

Addressing this financing gap is made even more difficult due to the fragmented and decentralized farming ecosystem, which is characterized by diverse environmental challenges, regulatory hurdles and government subsidies that often create incentives to continue current farming practices.

In this paper, we propose a financing structure intended to help mobilize institutional capital (i.e., asset managers and asset owners) to provide necessary large-scale financing to the diverse farmer community in conjunction with local government, banks, multilateral development banks (MDBs) and insurers.

### Scope of the problem

The agriculture sector accounts for about a third of global greenhouse gas (GHG) emissions, which comes from farming activities such as burning biomasses, fertilizers / pesticides manufacturing, food packaging and processing, and food waste disposal. Through these various activities, the sector is also responsible for 70 percent of freshwater withdrawals<sup>7</sup> and 80 percent of deforestation, which indirectly affect the Earth’s ability to remove GHG emissions from the atmosphere. Transitioning to more sustainable and environmentally friendly agricultural practices can help reduce global GHG emissions, both directly and indirectly.

### Rational approaches to an agricultural transition

Steps required for an agricultural transition can be organized into a six-pronged solution described in Figure 1.

Together, these activities help address the core sources of GHG emissions in the sector and provide other co-benefits such as soil conservation, reduced water pollution, decreased use of resources, prevention of biodiversity loss, better livelihoods of local communities, better jobs given the transition to knowledge-intensive management,<sup>8</sup> better food supply resilience, and, in general, global food security.

Figure 1

#### Rational approaches to an agricultural transition

Approaches	Description
<b>Regenerative agriculture</b>	Regenerative agriculture is an outcome-based farming approach that generates agricultural products while improving soil health, biodiversity, climate, water resources, and supporting farming livelihoods
<b>Low-carbon livestock</b>	Reducing emissions from livestock indirectly and directly through reducing meat consumption, improving feed quality, monitoring animal health, recycling nutrients, etc.
<b>Halting deforestation</b>	Efforts to conserve existing land resources and expand nature-based solutions
<b>Reducing food waste</b>	Actions to reduce food loss and food waste throughout the value chain

Source: State Street

An aerial photograph of a lush green rice paddy field. A prominent, winding irrigation canal or path cuts through the field, creating a series of curved, elongated plots. The water in the canal reflects the sky, and the surrounding rice plants are in various stages of growth, showing vibrant green and some yellowish-brown tones. The overall scene is a complex, organic pattern of agricultural land.

SECTION 1

# Barriers to adopting an agricultural transition

**As noted earlier, transforming the agriculture and food industry would require significant additional investment each year. Over and above the high financial cost, making the industry-wide shift to sustainable agriculture is a complex problem that holds various barriers to adoption.**

### **The industry is fragmented and decentralized**

More than 80 percent of farmers are operating on fewer than two hectares of land each. These small farms account for about 30–34 percent of the world’s food supply.<sup>9</sup> As a result, many farmers today are focused on near-term financial performance and may not have adequate incentives to adopt sustainable practices and technologies.

### **Farmers are already experiencing financial stress**

According to the FAO World Food and Agriculture Statistical Pocketbook 2018, 26.7 percent of the world’s population derives its livelihood from agriculture, and much of that agricultural base comprises subsistence farmers. Even in developed economies, the profitability of farming is challenged, which makes investment in sustainable agricultural practices difficult to impossible.

Carlisle et al. (2019) notes that “the sobering reality is that fewer than half of farmers reported positive income from their operations in 2018, with median farm income averaging out to a negative \$1,553 (USDA ERS, 2019).”<sup>10</sup> The 2017 USDA agriculture census reports that only 43 percent of US farms were profitable.<sup>11</sup>

### **Regulations and policies vary across regions**

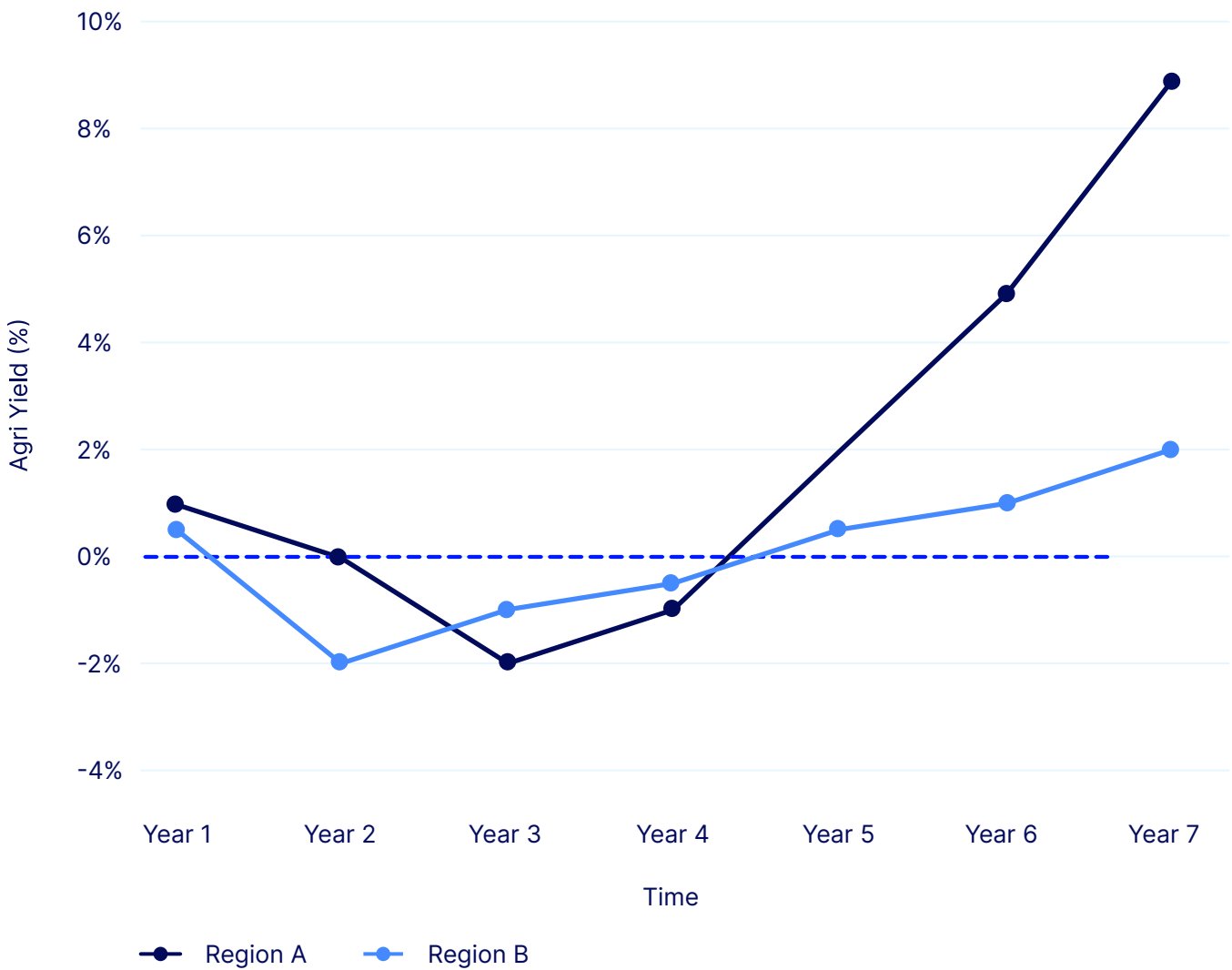
The complex ecosystem in which this sector operates is remarkably diverse, making it difficult to have uniform policies. Regulations, subsidies and taxes vary by region and country. Government priorities may change in terms of budget allocations each year, i.e., budget may be allocated to infrastructure and health campaigns instead of agriculture and health campaigns instead of agriculture transition. Local and regional policies on tariffs, research and development, and food security can limit options as well.

**A transition will likely entail short-term reduction in crop yields (see Figure 2)**

A critical financing gap exists in providing farmers with the capital to adopt regenerative practices, which can result in lower crop yields for several years.

**Figure 2**

**Illustrative example of sustainable agriculture productivity curve**



Source: State Street



## **Productivity and adoption speed can be inherently different across regions**

Practices and solutions are unlikely to be adopted at scale until costs decrease, especially in less-developed regions and on smaller farms. A significant knowledge gap in how to implement solutions such as regenerative farming also hinders the adoption. Moreover, incentives today do not yet exist to acquire such knowledge.

## **Misaligned incentives**

Lastly, drivers in the value chain are not aligned to encourage agricultural transition due to trade-offs and lack of incentives. For example, why would a buyer prioritize crops grown regeneratively if they're told to only consider price? Or why would a farmer adopt a system that has a five-year payback when they only have a one-year lease on their farmland?

To address these issues, we first lay out goals, incentives and constraints of key players in the agricultural transition (see [Figure 3](#)).

**26.7%**

**of the world's population derives its livelihood from agriculture, and much of that agricultural base comprises subsistence farmers.**

- FAO World Food and Agriculture Statistical Pocketbook 2018

Figure 3

Key players: Goals, incentives and constraints

	Goals	Incentives	Constraints
<b>Governments</b>	Introduce legislations and policies to support sustainable agriculture and protect forests	Productive and sustainable use of resources  Improved agriculture yields	Limited fiscal space
<b>MDBs/NGOs</b>	Support agricultural transition via investment and education	Further progress in global climate transition  Productive and sustainable use of resources	Limited capital
<b>Companies</b>	Support agricultural transition through developing and providing solutions	Limit costs longer term  Contribute to healthier agriculture ecosystem	Limited capital  Hence, need partnerships with governments and financial institutions
<b>Farmers</b>	Adopt sustainable agriculture practices for healthier land	Improve yield from regenerative practices	No capital during transition period
<b>Financial Institutions</b>	Be a meaningful partner in agricultural transition	Protect loans to agriculture sector  Provide diversified investment to current portfolios	Need to meet risk premia parameter  Limited capital (hence, need to have partners)

Source: State Street

An aerial photograph of a lush green forest with a winding river. The river is a vibrant blue-green color, cutting through the dense canopy of trees. The trees are a deep, vibrant green, and the overall scene is a natural, undisturbed landscape.

SECTION 2

# Driving institutional investment in agricultural transition at scale

## **Agricultural transition at scale cannot happen without collaboration and aligned vision across key participants, including governments, companies, farmers and financial institutions.**

As seen in **Figure 3**, all these stakeholders have a distinct part to play during the transition:

- Governments must introduce legislation and policies to support sustainable agriculture, including regenerative farming.
- MDBs and Non-Governmental Organizations (NGOs) need to provide not only financial investment but also research into sustainable agricultural practices and training of farmers in these practices.
- Companies can help expedite and support transition through developing and providing innovative solutions.
- Financial institutions can help channeling the capital among different players.
- Farmers can adopt sustainable agriculture practices as a result.

Through these efforts, all players can benefit from agricultural transition vis-à-vis more productive use of resources, long-term cost reduction, improved yields and protection of investments.

While each stakeholder group has a distinct role in the transition, they all need to work in harmony to enable provision of large-scale financing to the fragmented farming sector. Clear constraints exist today, however, that are hindering a productive collaboration. Most of these constraints come from the fact that capital allocated toward agriculture transition is limited for the following reasons:

- Farmers do not have adequate capital to explore new practices during the years of low yield that will result from adoption of regenerative practices. Many farmers will also require training and support as they incorporate new techniques and crops.
- Financial institutions have been reluctant to commit capital in large scale due to: 1) inability to assess risk and 2) the fragmented nature of farming and diverse nature of successful transition that makes scaling complex.
- Governments, while allocating substantial amounts of capital to the agriculture sector in the form of subsidies, have yet to repurpose some of that capital into agricultural transition.

These constraints are part of the reason why capital provision by financial institutions through instruments such as green bonds, impact investment, supply chain finance, carbon credits and blended finance have not yet achieved scale.<sup>12</sup> Stimulating institutional investment through innovative approaches for agricultural transition at scale is therefore of paramount importance.

To achieve such scale, key players need to realign their actions to aforementioned goals and incentives. For example, governments can repurpose agricultural subsidies for regenerative farming assistance.

Companies in the food supply chain can help agricultural transition by sourcing supplies from those engaged in regenerative farming, thereby improving the resiliency of their supply chain.

Lastly, financial institutions can create innovative financial products that can tie all these efforts and incentives together. We next examine one such approach.

## Agriculture transition structured product

The provision of large-scale finance to regenerative agriculture requires an innovative structure wherein incentives and rewards of the different players are aligned. One approach is to implement a structure similar to collateralized loan obligations (CLOs), widely used in the world of fixed income.

There are a few distinct steps to this structure. The key concept would be for a manager (typically an investment bank) to set up a special purpose vehicle (SPV) that raises capital from investors for funding regenerative agriculture. The funds are provided to farmers in the form of loans to support regenerative farming practices.

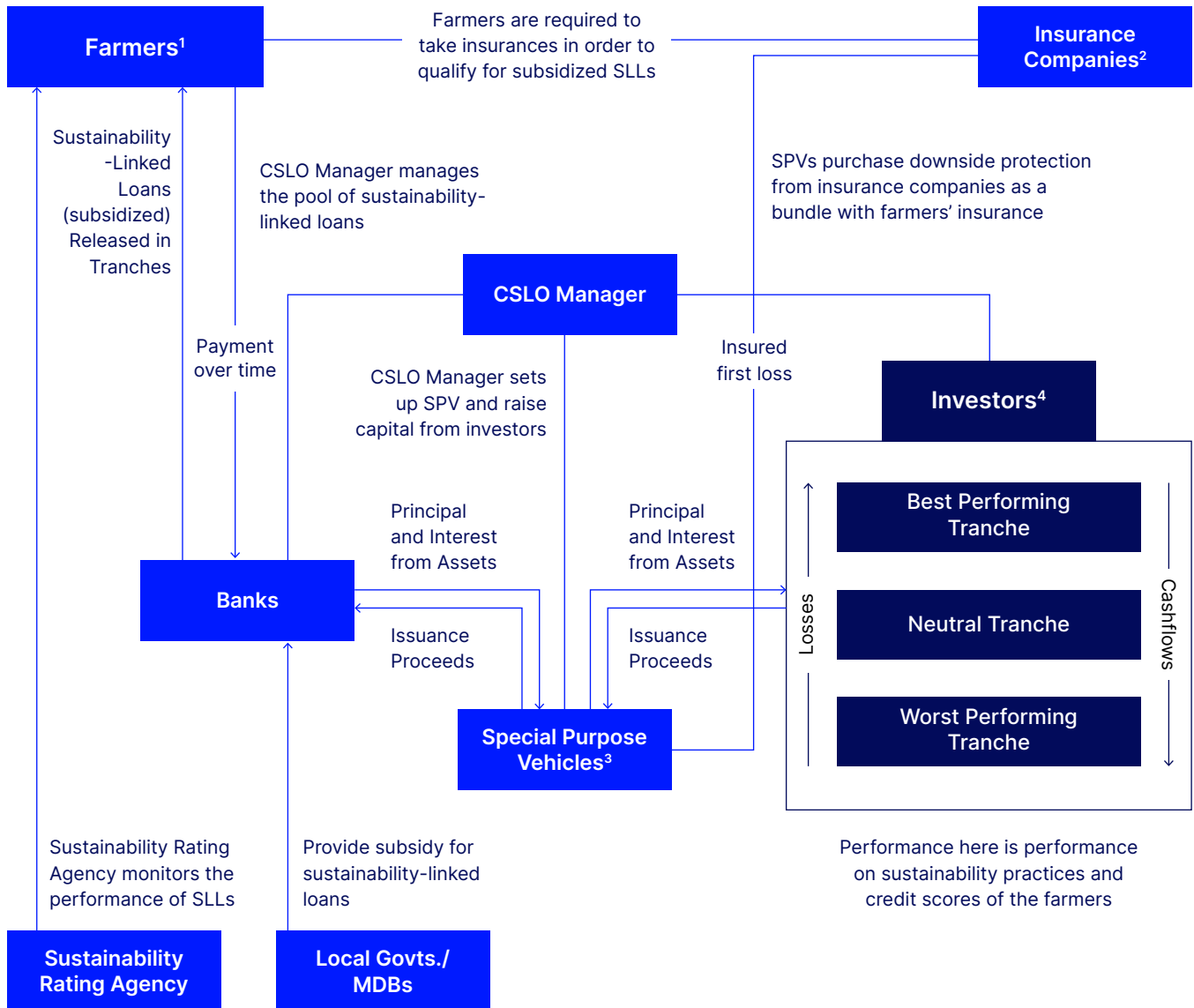
The steps involved are the following:

1. The collateralized sustainability-linked loan obligations (CSLO) manager sets up an SPV and raises capital from investors.
2. The manager then remits the capital to banks, which underwrite sustainability-linked loans (SLLs) to farmers in need of capital. These SLLs have preferential terms due to subsidies provided by local governments or multinational development banks (MDBs). This step is necessary as farmers currently do not have the ability to pay market rates for loans to finance regenerative agriculture, which reduces yields in the first few years.
3. To qualify for these loans, farmers are required to take farm insurance with insurance companies. The SPV also purchases downside protection from insurance companies as a bundle with farmers' insurances.
4. These insurance contracts are structured so that insurance companies take first losses on loans to farmers supported by premiums.
5. The absorption of first loss by insurance companies encourages the financing of these loans by end investors.
6. Farmers get preferential terms for their loans (zero-interest or low-interest) from MDBs. These can be financed by MDBs working closely with the local government.

7. To minimize and diversify risk for investors, the CSLO manager pools SLLs from different farming regions, as the slope of the yield curve varies by location. In some areas, the yield pick can be nearly 50 percent; in others, 10 percent. In some areas the time period for under-yielding is two years; in others it can be nearly four. The pooling structure is meant to minimize the risks of farmers walking away from their obligations or abandoning regenerative practices.
  8. The loans are transferred in tranches depending on the potential for regenerative farming to add value, i.e. steepness of the J-curve, as well as the credit scores of the farmers.
  9. Investors have options to purchase different tranches of pools that are based on sustainability performance and the credit scores of farmers. The best-performing tranche has the highest solvency but lowest cashflows as the yield on the best-performing tranche is the lowest by the design of SLLs.
  10. Once established, interest and principal payments from the pool are transferred backed to investors.
  11. Sustainability rating agency performs ongoing monitoring of the performance of SLLs.
- This process is illustrated in [Figure 4](#).

**Figure 4**

**Loan-based blended finance strategy**



1. Pool of sustainability-linked loans (SLLs) forms Collateralized sustainability-linked loans (CSLO)
2. Insurance companies take first losses that are partly absorbed by upfront premiums
3. SLLs can be pooled from different areas of J-Curve to reduce the risk of
  - farmers walking away and
  - sustainability transition not working as expected
4. Structure of sustainability-linked loans make the best performing tranche the least risky as those get the most preferential rates  
**Tranche is based on solvency**

Source: State Street



In summary, the proposed agricultural transition structured product is designed to achieve needed scale by bringing together key players in this ecosystem and providing proper incentives. The risks of first loss to investors is minimized through the insurance protection, and auditing by a third party puts another layer of scrutiny on the proper working of the structure.

While we fully acknowledge the fact that more details need to be planned out for actual implementation, we believe that novel financial instruments like this will help key players engaging in this topic.

**Companies in the food supply chain can help agricultural transition by sourcing supplies from those engaged in regenerative farming, thereby improving the resiliency of their supply chain.**

SECTION 3

# Risks to agricultural transition structured products

## Successful implementation of the proposed structure faces several hurdles and risks including those outlined below.

### Attracting institutional investment

Key to success is unlocking investment capital from institutional investors for the proposed SPVs. While the structure is set up to minimize risk through insurance and phased release of capital, the yield may not be big enough to compensate investors for underlying risks of crop failure and/or default by the farmer or the local financial institution providing the loan.

Other deterrents, including exchange rates and geopolitical risk, are often cited as holding back institutional investment in emerging and developing economies, and would be present here as well if the SPV was set up to provide funding in EM/DM markets.

Finally, there is no clear guidance on where this investment would sit within the asset allocation framework and effort would need to be made by investors and consultants to determine the appropriate treatment and understand the return and risk correlation with other assets in their portfolio.

As research has shown, investment in farmland is uncorrelated with the major asset classes and can therefore prove to be an opportunity for institutional investors.<sup>13</sup>

### Government support

Governments would need to enact policies that work in tandem with the sustainability-linked loans issued to farmers and unwind those that create unaligned incentives (e.g., subsidizing pesticides and herbicides). While working through MDBs can ensure compliance, there are known risks due to lack of policy stability in different parts of the world.

There is also an opportunity for governments to provision tax incentives or carbon credits to further incentivize investment.

### Pricing the risk

Insurance companies might find it hard to price the risks of regenerative practices and might, in a risk-averse posture, keep the premiums too high. This is an important consideration as first-loss insurance coverage is an important incentive in attracting capital. MDBs might also be a collaborator in this area given their history of working with insurers in the context of infrastructure development.

### **Performance measurement**

There is no universally accepted methodology that can be deployed to measure the sustainability performance of the different tranches, as sustainability rating agencies differ in their approaches and methodologies. As a result, financial institutions might have to undertake the task of defining their internal guidelines regarding sustainability performance measurement. Thus, it is of paramount importance that detailed design and implementation of these products fully reflect both economic and impact incentives of key players.

### **Cost and provision of skills development**

Transitioning from chemical intensive monocrop farming to sustainable farming requires adoption of proven sustainable practices such as: implementing crop

rotation; using cover crops to build nutrients, prevent erosion, and reduce the need for herbicides and pesticides; reducing or eliminating tillage; adopting integrated pest management, integrating livestock, and agroforestry; and managing wild systems and landscapes.

Adoption requires skills not generally used in conventional farming today and time to implement and optimize for local conditions. Implementation of training and mentoring programs alongside the SPV investments will be critical for a successful transition and to maximize the return of these investments.

The cost of providing these programs is a hurdle but there is an important benefit as well — the agriculture transition will be a move from industrial farm work to more knowledge-based work that leads to more meaningful and fulfilling jobs in the farming industry.

**There is no universally accepted methodology that can be deployed to measure the sustainability performance of the different tranches, as sustainability rating agencies differ in their approaches and methodologies.**

SECTION 4

# Incentives and rewards for different players



## **Despite the risks, the proposed structured products provide various rewards and incentives to stakeholders other than farmers. These products provide banks, insurers and investors an opportunity to meet their net-zero commitments.**

Additionally, these products are an opportunity for banking institutions to diversify their basket of offerings, not to mention the reputational gain and goodwill that comes with reducing their financed emissions. Similar to CLOs, investors stand to gain from wider yield spreads, portfolio diversification and attractive performance. Given that the loans are insured, it is reasonable to say that default rates would be very low.

Set up appropriately, all parties can be incentivized to participate meaningfully in the mission to provide large-scale finance to regenerative farming.

Aside from fulfilling their nationally determined contributions (NDCs) and meeting SDG goals, sustainable agriculture can protect countries from food inflation and price fluctuations, and lessen the dependence on imports, especially in times of reduced production within the country owing to droughts and extreme weather.

Part of a country's agriculture-allocated subsidies can be redirected toward subsidizing the SLLs, because governments can earn additional taxes from profits that are a direct outcome of sustainable agricultural practices.

# Conclusion

Agriculture and the food system accounts for about a third of world's CO<sub>2</sub> emissions and is responsible for much of the freshwater withdrawals and deforestation that is hampering Earth's regenerating ability. Yet, transitioning the agriculture sector is a daunting task due to unique characteristics of the sector, including decentralization and a misaligned value chain. Efforts by financial institutions to bring in transition capital to the sector are already underway, but the necessary scale has not yet been achieved.

As a potential solution, we propose a novel structured product design using pools of sustainability-linked loans or impact investments as collateral. Involving both local governments / MDBs and insurance companies in the structure would help provide further incentives to farmers and minimize risks to investors.

The details of our proposal need to be formalized, but we believe this strategy provides an important step forward to achieve transition capital at scale for this important sector.

# Appendix A

## What is being done today by asset managers and owners?

Instrument Type	Notable Cases
<b>Green Bonds / Loans</b>	<ul style="list-style-type: none"><li>• COFCO International signed an agreement for a \$1.6B sustainability-linked loan with a consortium of 19 banks tied to the traceability and socio-environmental screening of its Brazil soy supplies and Sustainalytics' ESG Management Score<sup>14</sup></li><li>• The Group BPCE issued 750mn EUR worth of green bonds aimed at refinancing sustainable agriculture linked assets<sup>15</sup></li></ul>
<b>Impact Investment</b>	<ul style="list-style-type: none"><li>• Nuveen Natural Capital and Manulife Investment Management invests across global farmlands with focus on sustainability<sup>16</sup></li><li>• SLM Partners, whose aim is to implement regenerative agriculture practices and sustainable forestry systems, raised over A\$105 mn for its first fund to acquire 480,000 hectare of grazing land in Australia for sustainable beef production<sup>17</sup></li><li>• AXA, Unilever, and Tikehau Capital signed a MoU on creating \$1bn impact fund focused on regenerative farming<sup>18</sup></li></ul>
<b>Sustainability-Linked Supply Chain Finance</b>	<ul style="list-style-type: none"><li>• Citi has launched its first MENA sustainability-linked supply chain finance program in Algeria targeted at suppliers who demonstrate strong or improving sustainability performance<sup>19</sup></li><li>• ING, HSBC, and Deutsche Bank also have Sustainable Supply Chain Finance solution that allows its clients to strengthen their supplier base and offers financial incentives in order for their suppliers to become more sustainable<sup>20</sup></li></ul>



## Instrument Type

## Notable Cases

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### Blended Finance

- IFACC — Innovative Finance for the Amazon, Cerrado, and Chaco — was launched by the Nature Conservancy and Tropical Forest Alliance. The IFACC announced a commitment worth of \$3bn with more than \$200mn in disbursements by 2022 and to scale that to \$10bn in commitments and \$1bn in disbursements by 2025<sup>21</sup>
  - The World Bank has developed more than 10 Climate-Smart Agriculture Investment Plans for countries like Bangladesh, Zimbabwe, Zambia, Lesotho, Mali, Burkina Faso, Ghana, Cote D'Ivoire, Morocco, and the Republic of Congo. The investments total over \$2.5bn with potentially over 80 million people benefiting from it<sup>22</sup>
- 

### Carbon Credits

- Rabobank has set up the Rabo Carbon Bank to enable farmers to unlock new revenue streams by providing access to the carbon credit market<sup>23</sup>
  - Other companies such as Indigo and Agora Carbon Alliance have also started offering similar services<sup>24</sup>
- 

### FinTech

- FarMart is an agro-tech platform in India that helps farmers receive digital credit and farm inputs<sup>25</sup>
- Farmcrowdy is a platform in Nigeria that connects smallholder farmers with financing, insurance, technical assistance and direct access to customers<sup>26</sup>

Source: State Street

# Endnotes

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4. FAO: Sustainable Development Goals: Sustainable Agriculture
5. According to the UNEP agriculture is a threat to 86% of species at risk of extinction
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8. See [Frontiers | Transitioning to Sustainable Agriculture Requires Growing and Sustaining an Ecologically Skilled Workforce \(frontiersin.org\)](#)
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11. <https://qz.com/1714519/in-the-age-of-farm-to-table-farmers-are-barely-profitable>
12. Please refer to Appendix A for notable cases of each instrument type
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14. Source of information: <https://www.cofcointernational.com/newsroom/cofco-international-completes-new-sustainability-linked-loan-deal/>
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