



Leveraging Policy Tools to Improve Impact of Financial Instruments in Sustainable Agriculture, Forestry and Other Land Use (AFOLU)

Case Studies from the Lab
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CLIMATE
POLICY
INITIATIVE



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ABOUT CPI

CPI is an analysis and advisory organization with deep expertise in finance and policy. Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. CPI has six offices around the world in Brazil, India, Indonesia, Kenya, the United Kingdom, and the United States.

ABOUT THE LAB

[The Global Innovation Lab for Climate Finance](#) identifies, develops, and launches innovative finance instruments that can drive billions in private investment to action on climate change and sustainable development. The Lab is funded by the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU), GIZ, IFAD, the Netherlands Ministry for Foreign Affairs, The Rockefeller Foundation, The Swedish International Development Cooperation Agency (SIDA), and the UK Department for Business, Energy & Industrial Strategy. Climate Policy Initiative serves as Secretariat.

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FOREWORD

The Agriculture, Forestry and Land Use (AFOLU) sector plays a significant role in the economies, food and nutritional security, and climate change strategies of many countries. Today the sector faces a range of challenges-deforestation and forest degradation, land-use patterns and changes, anthropogenic fires, biodiversity loss and ecosystem fragmentation, which create adverse climate feedback loops.

There are solutions. Shifting to climate resilient and low emissions business models and technologies that sustainably use natural capital and forest assets can contribute to lower the impacts of climate change, reducing green-house gas emissions and increasing a region's and communities' resilience. But although this is a critical sector and more investment is clearly called for, current funding remains limited, particularly in developing countries. A broad range of both public and private financing types and sources are therefore essential for the AFOLU sector to build climate change resilience, and achieve sustainable national growth pathways and food systems, and deliver equitable and sustainable livelihoods for the most vulnerable people.

Small-scale farmers are at the centre of the AFOLU sector. This is their source of livelihoods and they are custodians of biodiversity and ecosystems. To enable small-scale farmers to fulfil their role, smarter and more sustainable investments in their activities are essential, including through multi-stakeholder partnerships that bring together investors, banks, insurance, project developers, producers and specialized advisory institutions to leverage mutually beneficial investments from the private sector. The financial sector can play a significant role, boosting processes such as incubation and accelerating businesses. It is also essential to promote comprehensive regulatory tools to adequately value the AFOLU sector.

This brief illustrates effective instruments that overcome barriers to investments and leverage existing policy tools and instruments to address sustainable financing in the AFOLU sector. The instruments demonstrate how national regulations can be leveraged for impact and capital investment stimulated through smart subsidies and sustainable rural projects.

IFAD investments in small-scale farming fully align with national AFOLU regulations and priority initiatives to demonstrate socio-economic impact. As a leader in rural investments and inclusive finance, IFAD supports innovation and catalytic efforts to help small-scale farmers, entrepreneurs and their households become more resilient to the challenges that they face. We have to invest in their farms and their communities, because these investments are vital to achieving climate resilience objectives and transition to "greener" livelihoods and economies and post COVID-19 recovery.



A handwritten signature in black ink, appearing to read 'G. Hougbo', written over a horizontal line.

GILBERT F. HOUNGBO

President of IFAD

EXECUTIVE SUMMARY

The Lab Definitions of Success

Three factors reflect what the Lab defines as essential for financial instruments to overcome barriers and achieve success:

Actionability: The instrument has identified a pipeline of bankable projects or a clear plan for that as well as implementing partners

Catalytic potential: The instrument has the potential to mobilize private climate capital within a sizeable market, be replicated in other contexts, and achieve socioeconomic, development, and environmental impacts

Financial sustainability: The instrument demonstrates the potential to be financially sustainable by phasing out public financial support, and thus achieving market viability

Since its launch in 2014, the Global Innovation Lab for Climate Finance (the Lab) has developed 49 financial instruments, 16 of which are designed to tackle the barriers that exist to financing sustainable agriculture, forestry, and other land use (AFOLU). Several of these are examples of how financial instruments can leverage existing tools used by governments to support the AFOLU sector, particularly national regulations and public finance levers.

The experiences of these Lab instruments shed light on how leveraging policy tools can lead to overcoming barriers to success. **This brief seeks to inform the development of new sustainable AFOLU financial instruments, as well as replication of existing ones in new geographies.** This is particularly important given the finance gap in this sector and the limited public finance available, which therefore has to play a catalytic role in attracting private capital.

By presenting the lessons of these Lab-endorsed instruments, as well as those found in relevant literature, the brief shares potential risks and design insights that can help to maximize chances of success.

The three instrument designs highlighted in this brief utilized policy tools in different ways:



Leveraging national regulations can overcome barriers related to identifying pipeline and demonstrating impact. The Lab's Responsible Commodities Facility, a credit facility that aligns lending conditions with national land use frameworks, uses such a model. Key design considerations to mitigate potential risks include:

- In contexts of weak regulations, setting realistic but ambitious lending conditions to strengthen climate and sustainability efforts;
- Implementing strong monitoring systems to avoid unintended impacts and aid in enforcement of regulations;
- Seek coherence with local, national, and internationally agreed climate objectives to mitigate the risk of political change; and
- Marketing the benefits of sustainable practices to stimulate demand.



Drawing on **government subsidies for insurance premiums** can stimulate demand for the product, generate socio-economic impact, and help in fundraising. The Blockchain Climate Risk Crop Insurance highlights when and how such subsidies should enter into the instrument. In designing such an instrument, considerations to keep in mind include:

- The temporary use of subsidies to avoid market distortions and politicization;
- Specific timing of subsidy uses to minimize market distortion and help commercial viability;
- Choosing an index-based design to mitigate the risk of reduced due diligence;
- Bundling insurance with inputs and services to reduce politicization risks.



Expanding the amount of **sustainable projects covered by subsidized rural credit** can lead to increased loan demand and repayments, and stimulate capital investments. The Conexsus Impact Fund, with a goal of greening Brazil's Pronaf credit line, is an example of such an instrument design. Key recommended design considerations include:

- Aligning with relevant subsidized credit lines to ensure complementarity;
- Partnerships with local financial institutions to encourage other market actors' participation;
- Provision of financial literacy assistance to help increase borrowers' credit worthiness and their future access to commercial finance.

Each case reveals ways that instruments can overcome barriers to investments that are frequently identified with the sector. The three designs have in common the ability to:

- Stimulate demand of climate-relevant financial products
- Identify project pipeline
- Generate and demonstrate measurable social and environmental impacts
- Attract public, philanthropic and private investments

The analysis also shows that leveraging existing policy tools is not only a promising approach to addressing common sustainable AFOLU barriers, but can also complement national climate policies, thus contributing to climate objectives. This potential is considerable given the high level of support that governments generally provide to the AFOLU sector.

1. INTRODUCTION

1.1 CONTEXT

Many barriers prevent climate finance from flowing into sustainable agriculture, forestry and other land uses (AFOLU), leaving a large gap between the actual finance provided and the needed finance for this sector. According to the updated 2019 Global Landscape of Climate Finance, out of the annual average of USD 574 billion of climate finance in 2017/2018, only USD 21 billion went to sustainable agriculture, forestry and other natural resource management (Macquarie et al., 2020; Buchner et al., 2019). This gap is particularly apparent for small-scale agriculture, where climate finance is approximately USD 10 billion per year, but where financing needs are estimated at USD 240 billion per year (Chiriac et al., 2020). Despite this, the opportunities for funding this sector remain clear: considering the vulnerability of the sector, climate finance for sustainable AFOLU has potential to drive mitigation and resilience actions, especially for the most vulnerable small-scale farmers (Chiriac et al., 2020; FAO, 2016; World Bank, 2016).

New and innovative financial instruments can effectively channel climate finance and drive investment into sustainable AFOLU (FAO, 2016; Limketkai et al., 2019; World Bank, 2016). As these new financing mechanisms are developed to mobilize more public and private climate finance, they can take advantage of existing measures governments use to support traditional AFOLU (ISF, 2020; Searchinger et al., 2020; World Bank, 2018).

Since 2014, the Global Innovation Lab for Climate Finance (the Lab) has developed 49 financial solutions for mobilizing finance into climate and sustainable development projects, 16 being sustainable AFOLU instruments (see Annex 1 for a full list). The Lab instruments offer diverse approaches and useful lessons-learned on effective climate finance mobilization into sustainable AFOLU. Within this portfolio, a few instruments provide design examples and lessons on leveraging existing policy tools, including regulatory measures and budgetary transfer measures (public finance levers). By linking financial instruments to policy tools such as national regulations and public financing, not only can these instruments address some of the existing barriers to their success, but they can also act as effective complements to achieving national climate objectives.

1.2 OBJECTIVE

The main objective of this brief is to understand how linkages with policy tools (specifically domestic regulations and financing) can contribute to sustainable AFOLU instruments' ability to overcome common barriers, and thus achieve success. The brief examines three Lab instruments as examples of how this can be done in different ways:

- Responsible Commodities Facility, a credit facility leveraging public regulations;
- Blockchain Climate Risk Crop Insurance, drawing on subsidies for insurance premiums;
- and

- Conexsus Impact Fund, expanding the amount of sustainable projects covered by subsidized rural credit.

This brief notes recurring risks and challenges related to linking with such policy tools, taken from literature, experts' feedback, as well as from the instruments' own experiences, and builds on these to provide a set of design considerations for future financial instruments.

It is important to note that this brief focuses on opportunities for agriculture financial instruments to use existing government tools. Although some barriers could be overcome by regulatory changes, examining those changes is beyond the scope of this brief. Furthermore, while some barriers can be surmounted by adopting a blended finance structure, a wide range of literature already exists on these approaches and thus are not the focus of this brief (IFC, 2011; Havemann, 2019; ISF, 2020; KOIS Invest, 2018; Louman et al., 2020).

2. THE LAB'S CRITERIA AND FACTORS FOR SUCCESS

The Global Innovation Lab for Climate Finance (the Lab) was funded with the mission of bridging the climate finance gap by identifying and developing financial instruments that have potential to mobilize financing for climate and sustainable development projects. Based on this mission, the Lab's work is centered around certain factors that reflect what is needed to succeed and which, for the purpose of this brief, will be used to define success: the ability of the instrument to be actionable, have catalytic potential, and be financially sustainable (See Box 1).

An instrument is actionable when it has identified a pipeline of bankable projects or a path to identifying a pipeline; identified implementing partners; and has identified off-takers or a market. In demonstrating catalytic potential, an instrument is able to mobilize private climate capital within a sizeable market; be replicated in other contexts; and achieve socioeconomic, development, and environmental impacts. Finally, financially sustainable instruments need to demonstrate the potential to phase out public financial support, and thus achieve market viability.

3. POLICY TOOLS

This brief examines policy measures used in AFOLU that fall under two categories: regulatory measures (public policies and regulations); and budgetary transfer measures (public finance and fiscal levers).

Domestic public policies and regulations span the land use and agriculture sector, and are becoming increasingly decoupled from production, with a focus rather on environmental outcomes (OECD, 2020a). It is these domestic policies with broader environment and climate change implications that are of relevance for this brief. They include, for example, land use codes, climate-smart agriculture policies, and laws limiting or prohibiting certain activities that emit GHGs (ISF, 2020). At the country strategic level, this may involve incorporating agriculture sector GHG emissions targets or adaptation goals into nationally determined contributions (NDCs) (ISF, 2020). For instance, more than 85% of developing countries refer to agriculture or land use in their NDC's mitigation contributions. (Ross and Agostini, 2016).

Public finance levers directed at the agriculture sector can take different forms: input subsidies, production payments, rural credit and guarantees, insurance subsidies, grant for technical assistance, as well as public good investments (i.e., rural infrastructure) (OECD, 2016; World Bank, 2018). Of the USD 570 billion per year spent on agricultural support in OECD and emerging economies, 34% went to agricultural government spending (as compared to market price support) (OECD, 2018). Public support can focus on particular actors, such as smallholder farmers or agricultural SMEs; on particular issues, such as technology transfer, climate change adaptation, or water efficiency; or on particular geographic areas (Ruate, 2015). While some types of public support have historically been associated with creating market distortions and incentivizing unsustainable land use, countries are increasingly imposing environmental conditions on this support to promote sustainable agricultural and land use (Searchinger et al., 2020; World Bank 2018). In addition, such government tools are also being structured in a way to catalyze private sector investment in agriculture (i.e., blended finance approaches¹) (Limketkai et al., 2019; Convergence, 2019).

As the Lab case studies show, not only can financial instruments use these policies as a tool to overcoming barriers, but they can also contribute to “greening” existing AFOLU support policies, which is highly needed for more sustainable food systems. Only 1% of support to agriculture is directly targeted at environmental outcomes such as conservation or restoration (World Bank, 2018). Financial instruments that leverage existing government policy to catalyze private finance can thus be effective complements to regulatory policy to achieve environmental and climate objectives (OECD, 2020b).

¹ As defined by Convergence, blended finance is the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development (Convergence, 2021).

Therefore, government intervention in AFOLU finance should be used as an enabling environment for financial services, and not as a substitute for private sector initiatives (IFC, 2011). This is important to avoid crowding out private investments in the sector and minimize market distortions.

4. CASE STUDIES

Several of the Lab's sustainable agriculture and land use instruments have components that leverage government support tools. By analyzing three such instruments, we highlight the opportunities and risks of leveraging public regulations and public finance, divided by their three primary tool types:



1. Leveraging public policies and regulations
Responsible Commodities Facility



2. Leveraging public finance: Government subsidies for crop insurance premiums
Blockchain Climate Risk Crop Insurance



3. Leveraging public finance: Dedicated rural credit lines
Conexus Impact Fund

The analysis and recommendations outlined below were compiled based on:

- a review of the Lab instrument analysis reports produced for each of the instruments as a part of the Lab process;
- a desk review of existing literature on financing of sustainable agriculture and other comparable instruments;
- conversations with the instruments' developers themselves;
- and information obtained from working group calls and interviews with experts in the field during the Lab development process.

Table 1. Lab Instruments' use of policy tools

Instrument	Pilot	Type of policy tool used	Specific tools
Responsible Commodities Facility	Brazil	Public policies and regulations	<ul style="list-style-type: none"> • Brazilian Forest Code • Land registration (Sicar/ Cadastro Ambiental Rural/ land designations)
Blockchain Climate Risk Crop Insurance	Kenya	Public finance levers	Insurance premium subsidies for crop insurance
Conexus Impact Fund	Brazil	Public finance levers	Subsidized line of credit (Pronaf)

Although there are many opportunities for alignment of financial instruments with national policies and regulations, there are some risks. In the sections below, we review some of these risks for each case study, followed by a set of risk mitigation recommendations for financial instruments developers to consider when designing a similar instrument. Both risks

and design considerations are based on a literature review, the Lab's own experiences, and interviews with experts in the field as well as the Lab instruments' proponents.

4.1 LEVERAGING PUBLIC POLICIES AND REGULATIONS

As countries increasingly implement national land use and agriculture regulations to achieve their NDCs and other sustainability targets, complementary measures and financing are needed to achieve them. Financial vehicles such as agricultural lending facilities have a role to play in providing the finance needed and incentivizing the uptake of sustainable agriculture practices by farmers. Incentives such as low interest rate loans, technical assistance, facilitation of market access, etc., can be an effective complementary measure to achieving national climate and sustainable development objectives (OECD, 2020b).

Agricultural financing facilities providing credit to farmers can align their credit eligibility requirements and lending conditions with local land use/agriculture frameworks and regulations, or in some cases, going beyond the ambitions of legal requirements in place. In doing so, they can increase their chances of overcoming specific barriers. The Lab case study below illustrates the possibilities of tying eligibility criteria to national regulations.

4.1.1 CASE STUDY: THE RESPONSIBLE COMMODITIES FACILITY (RCF)

The Responsible Commodities Facility (RCF) was developed by BVRio with support from the Lab's Brazil Program in 2018. The instrument leverages national legislation and information systems, in this case the Brazilian Forest Code and the related registry system, the Cadastro Ambiental Rural (CAR). The fund provides credit raised on international bond markets to farmers that produce soy (and eventually other commodities) in existing cleared and degraded lands in Brazil, to discourage the further expansion of agricultural land in the country. By encouraging agricultural production on previously cleared lands and abandoned pastures, RCF intends to support responsible soy in Brazil and meet the growing international demand for zero-deforestation supply chains (SIM, 2021). The pilot will take place in the Brazilian Cerrado, a region that accounts for about 50% of Brazil's soy production, and where approximately one-third of the future agricultural expansion is expected to take place on native vegetation, despite the fact that more than twice the area required for soy expansion exists in currently sparsely-used pasturelands (TNC, 2019).

Brazil's Native Vegetation Protection Law (No. 12,651/2012), also known as the Forest Code, works to limit agricultural area expansion in the country. It imposes mandatory limits on the proportion of native vegetation that can be legally cleared and requires all rural landowners to maintain "legal reserves" and riparian forests² in their lands to protect water streams and native vegetation. The surface required to be preserved varies between 20 to 80% of the total land area, depending on the biome: in the Cerrado, the percentage of land to be reserved for native vegetation is 35% (Presidência da República, 2012).

Lending conditions and eligibility criteria for RCF's products are linked to the Forest Code: farmland must be registered with the CAR and must have the legal forest reserves in

² Legal reserves are areas on the property set aside with native vegetation intact. Riparian forests are forested areas adjacent to bodies of water (Presidência da República, 2012)

accordance with the percentage required for the region.³ Yet RCF goes beyond the simple Forest Code legal requirements as it selects through its due diligence process producers that do not deforest at all after a certain cut-off date (to be defined)⁴, even if that would be considered as legal agricultural expansion by the Forest Code, Preference is given to producers on cropland restored from abandoned pasture land (SIM, 2021). Effectively, RCF is working to improve the outcome of the policy compared to what it would otherwise be.

4.1.2 OVERCOMING BARRIERS

RCF offers lessons for how connections with relevant agricultural/land use regulations and policies can contribute to overcoming barriers that instruments may encounter.

Identification of pipeline. Identifying a pipeline of projects is often a key barrier that sustainable agriculture instruments face. Although many factors are key to a strong pipeline of projects, one low-hanging fruit is to look for projects that already fulfill the sustainability conditions: in the case of RCF, producers that are already complying with the Forest Code. Moreover, instruments that are able to guarantee access to niche markets (or in the case of RCF, commodity-specific exchanges) based on land use conditions and compliance, may be able to attract more projects.

Buy-in from government. By driving private or concessional resources towards regulation implementation, such instruments can gain buy-in from the local government as well as support enforcement of the regulations. In situations where regulations face significant enforcement challenges (especially as a result of limited resources), incentives in the form of rural credit can act as drivers and a funding source for implementing the law (Souza et al, 2020). RCF's linkage with the Forest Code provides such an example.

Generate impact. Aligning credit eligibility criteria with regulatory compliances can act as a tool to enforce national policies, which can enhance the regulation's impact. RCF provides financial incentives for farmers to adopt sustainable agriculture practices (concretely avoid deforestation), encouraging them to abide by and surpass the requirements of the Forest Code. In cases where eligibility criteria are more ambitious than existing legal frameworks, as is the example of RCF, financial instruments can contribute to achieving sustainability on a larger scale, or in a shorter timeframe.

Demonstrate impact. Linking to national regulations and policies provides financial instruments an existing framework against which to assess the impact and thus demonstrate positive impact. Consistency and alignment with national land use and management laws (or going beyond existing regulatory requirements) offer an opportunity to show impact in terms of avoided deforestation, thus reduction of emissions and potential for carbon storage for land use and climate policies.

Promote opening of new markets. Demonstrable compliance with certain sustainability regulations and standards can allow producers access to new markets, increasing their revenue opportunity, improving loan repayment rates, and thus contributing to the financial

³ In case of "deficit native vegetation for legal reserve, the farmer must commit to prepare a land restoration plan in conformance with the legal requirements during the course of the loan" (SIM, 2021).

⁴ The cut-off date for conversion or deforestation will be informed by the Cerrado Manifesto Working Group's own decision on cut-off year (SIM, 2021)

viability of the instrument. The objective of RCF, for example, is to supply international markets with a different class of soy that is not linked to any deforestation or land conversion (including legal). Deforestation and conversion-free (CDF) soy is experiencing increasing demand, particularly in Europe and the UK (SIM, 2021).⁵

Stimulate fundraising. Compliance with local regulations is often compulsory for any due diligence and funding, and alignment with more ambitious conditions can be more attractive to investors focusing on impact. Even when eligibility criteria do not go beyond national standards, instruments can attract investors by acting as a tool to operationalize regulations, particularly if environmental governance is weak especially in complex value chains associated with unsustainable deforestation practices such as soy or palm oil.

4.1.3 POTENTIAL RISKS AND DESIGN CONSIDERATIONS

Change in policies and or political power shifts. Changes in policy regimes or political shifts (especially when this change is targeted at enforcement agencies) can cause instability and make it difficult to ensure compliance.

Weak regulations. Connecting eligibility and lending conditions to weak regulations can have reputational risks for the instrument, and may thus fail in attracting investors that are interested in impact.

Unintended impacts. Leakage and laundering are two unintended impacts that can occur as a result of regularizing land use or of conditioning loans based on land use practices. Leakage is when deforestation shifts to other areas after regularization occurs. Laundering occurs when products are produced in illegal areas, yet are sold as having been produced in regularized/legal areas) (Carvalho et al. 2019).

DESIGN CONSIDERATIONS

Institute realistic but ambitious conditions to complement weak regulations. To craft the most impactful eligibility criteria and lending conditions, a thorough understanding of national regulations is essential. It may be impactful to link conditions to specific regulations, while also incorporating elements that may be more ambitious than the regulations themselves. This is especially the case if existing land use or agricultural regulations are weak. Potential for leakage should also be considered in crafting these conditions, and mitigation measures implemented.

Strong monitoring systems to avoid unintended impacts. Monitoring systems are at the core of a strong and impactful agriculture instrument, which are necessary to track and demonstrate compliance and impact. Monitoring systems can also help identify if there are any unintended negative consequences (deforestation due to land use shifts, also called leakage, for example) and can aid in enforcement, particularly if enforcement by public entities is weak. One essential component of this monitoring is to have strong indicators to demonstrate this impact (particularly to impact investors).

⁵ Complying with more rigorous standards can also avoid the potential risk of losing access to a market, for instance, as we see deforestation in the Brazilian Amazon that put the EU-Mercosur Free Trade Agreement at risk (Souza et al., 2020)

Seek coherence with local, national, and international objectives to ensure coherence and to mitigate impact of political change. Depending on target markets, instruments should also consult local level policies to ensure coherence, and craft conditions accordingly. If local land use regulations also exist, the more ambitious should be adopted. On a national and global level, the instrument should seek alignment with NDCs, the Paris Agreement, and net-zero objectives (Louman, 2020).

Marketing benefits of sustainable practices to increase demand. To ensure demand for financial products that favor sustainable agriculture and land use, an “enabling context” on the ground for local producers and cooperatives is just as important as enabling conditions for private investment at the national level. If producers or cooperatives are well aware of the benefits of producing sustainable or deforestation-free products (i.e., access to markets, increased income), they will be more likely to comply with eligibility criteria regardless of whether or not these criteria are part of regulatory frameworks or are enforced by public authorities. This is important particularly in face of the risk of political change, where weak enforcement of regulatory measures could mean less incentives to comply with them.

4.2 GOVERNMENT SUBSIDIES FOR CROP INSURANCE PREMIUMS

In developing countries, only 20% of smallholder farmers have access to agricultural insurance coverage where limited demand and supply, cost, and lack of trust between insurer and farmer act as the key barriers to insurance uptake (McCord et al., 2015; ISF Advisors, 2018). Subsidies can be used as a means of scaling up demand for agricultural insurance, and thus reducing risk exposure for farmers against natural disasters (e.g., drought, floods) and normal agricultural production risks (Hazell et al., 2017). Governments in developed as well as emerging economies spend billions of dollars per year on premium subsidies and other forms of financial support for agricultural insurance (Mahul & Stutley, 2010); a 2007 World Bank study estimated that the total global cost to governments was about USD 20 billion per year (Mahul and Stutley, 2010). This figure is likely much higher today given that three countries – China, India, and the U.S. – together spend about USD 17.7 billion each year on subsidies (Hazell et al., 2017). The rationale for government support of agricultural insurance generally falls into two categories: (1) subsidies to correct failures and externalities in insurance markets, and (2) subsidies to achieve broader social and political goals (Hazell et al., 2017).

Financial instruments can incorporate government subsidies into their projections to partially finance the insurance premiums to farmers. Globally, most agricultural insurance relies on public subsidies: premium subsidies constitute a large part of these, covering 44% of the total premiums collected (Hazell et al., 2017). Additionally, governmental spending was directed towards subsidizing administrative and operational costs of insurance programs or direct payments for insurers to settle claims (Mahul & Stutley, 2010; Hazell et al., 2017).

4.2.1 CASE STUDY: BLOCKCHAIN CLIMATE RISK CROP INSURANCE

Developed by the Lab in 2019, the Blockchain Climate Risk Crop Insurance instrument offers a weather index (crop) insurance product that relies on blockchain for the management of

policy contracts, including automatically triggering payouts based on weather indexes, thus improving transparency, speed of payments to users and decreasing premium prices in the long term. For insurers, the instrument reduces transaction costs during the processing of claims. The instrument was brought to the Lab by Acre Africa, Etherisc and Sprout. It will be piloted in Kenya, targeting over one million farmers, offering an insurance product that covers droughts in four stages of the crop growth cycle (from plantation to pre-harvest), at a 10% premium rate per season (Micale & Van Caenegem, 2019).

Governmental subsidies for insurance premiums are an option for this financial instrument. While the initiators have not yet incorporated subsidies into the instrument, premium subsidies can be important in the medium term, when there is a shift towards a more integrated business model. This will help encourage uptake by contributing to a lower price for smallholders to pay for the insurance product, or to increase their insurance coverage for the same amount. Kenya already offers a subsidy scheme to support the agricultural insurance sector, with a 50% subsidy on the premium through the Kenya Agriculture Insurance Programme for Area Yield Index Insurance (One Acre Fund, 2018). Moreover, the country is seeking to begin supporting crop insurance through a government program to provide cover for climate risk (Ombok, 2021).

4.2.2 OVERCOMING BARRIERS

The Blockchain Climate Risk Crop Insurance can shed light on opportunities for overcoming barriers by using subsidies to cover insurance premiums.

Stimulate demand. Smallholder farmers in developing countries are generally reluctant to subscribe to crop insurance products, as suggested by low insurance rates (Micale & Van Caenegem, 2019; ISF Advisors, 2018). One of the main reasons is related to the cost of the insurance premium which is viewed by farmers as high in comparison to the limited coverage provided and long waiting time for payouts (ISF Advisors, 2018).

Sufficient demand for the product is necessary for the pilot phase to test the concept, including the financial model, the risk model, integration with the technology platform and all the related processes. The integration of insurance subsidies in the pilot phase would help decrease the price for farmers, thus encouraging uptake. While experiencing the product, farmers become aware of its benefits (Hazell et al., 2017) and are able to make an informed decision on a potential investment in a future full price insurance premium (if subsidies are phased out in next phases) or on extending their initial coverage (if subsidies are maintained) (Micale & Van Caenegem, 2019).

Increase socio-economic impact. At the farmer level, subsidies enabling farmers to subscribe to index insurance reduce their risk exposure to weather extreme events (Hazell et al., 2017), thus increasing their resilience to climate change by reducing recovery time after disasters (Micale & Van Caenegem, 2019; IPCC, 2014). Better weather risk management can also help poor farmers avoiding poverty traps, resulting at times from a combination of bad weather years, price volatility and health issues (Searchinger et al., 2020)

If subsidies are included in the pilot phase: early adopters/farmers increase the returns on their agricultural investment (such as investment in inputs e.g., seeds) compared with uninsured farmers. (Micale & Van Caenegem, 2019).

If subsidies are included after the pilot phase: for early adopters participating in the pilot phase, introducing the subsidies in the medium-term phase, enables them to extend the insurance coverage/policy limit while paying the same premium. (Micale & Van Caenegem, 2019).

Stimulate fundraising. In the medium-term, public subsidies help to ensure that the number of new insurance subscriptions in addition to extended insurance coverage for existing subscribers is at a level that allows the insurance product to break even (Micale & Van Caenegem, 2019). Maintaining the subsidies allows the insurance instrument to continue growing their customer base while graduating to a new phase in the business model whereby costs increase (the insurance product is fully integrated into the blockchain platform) (Micale & Van Caenegem, 2019). In turn, this helps to demonstrate the instrument's commercial viability and attract more investments, particularly commercial capital allowing the instrument to scale up. Ultimately, the objective is that scarce public resources are progressively phased out to leave space for market-driven dynamics to govern the viability of the insurance product.

While the opportunities for insurance instruments to leverage premium subsidies are important, insurance companies, product developers and potential investors should be aware of several risks. In the sections below, we review some of these risks followed by a set of suggested mitigation measures to be considered at the design stage. Both risks and design considerations are based on our literature review, the Lab's own experiences, and interviews with experts in the field as well as the proponents of the Blockchain Climate Risk Crop Insurance.

4.2.3 POTENTIAL RISKS AND DESIGN CONSIDERATIONS

Distorting market and climate signals. Agricultural subsidies are known for their potential to distort local markets and thus free trade. Subsidized crop insurance is particularly susceptible to cancelling or delaying market signals by incentivizing farmers to maintain production of crops that are subsidized by the government rather than switching to more profitable or more climate adapted ones (Searchinger et al., 2020; Hazell et al., 2017).

Discouraging sustainable practices. Generally, insurance subsidies are tied to specific crops and therefore could incentivize farmers to focus on monocropping which requires the use of fertilizers and pesticides rather than employing crop rotations, which are more complex but are able to break weed and insect cycles and improving soil quality by fixing nitrogen (Searchinger et al., 2020; Nemecek et al., 2015).

Unintended inequality. Proportional premium subsidies can stimulate larger farmers to increase their coverage, thus widening the economic and climate resilience gap between them and smallholders, typically poorer farmers who can afford only limited insurance (Hazell et al., 2017). For the insurance instrument, this has the potential to limit its impact in terms of number of farmers with improved resilience.

Politicization. Due to the immediate and concrete benefits provided to beneficiaries, as opposed to other types of governmental investments in infrastructure, research or extension services which take longer and have more indirect individual benefits), subsidies run the risk of being instrumentalized by politicians to serve their own electoral agenda (Glauber, 2012; Hill et al., 2014; Hazell et al., 2017; World Bank, 2020a). This opens any insurance instrument

using subsidies to risks of sudden changes and dependency on electoral dynamics (Hazell et al., 2017) or political power transfers.

Reduced due diligence. In many instances, insurance subsidies are provided in order to facilitate access to credit for smallholder farmers. When insurance is bundled with credit, it might determine lending banks/financial institutions to be lenient on the performance of proper due diligence (Hazell et al., 2017) as they rely on insurance payouts for farmer defaults. This can affect the financial viability of the insurance product.

DESIGN CONSIDERATIONS

Temporary use of subsidies to avoid market distortion and politicization. Financial instruments should incorporate insurance subsidies temporarily: either to test a new insurance product's actual risks and benefits (Hazell et al., 2017), to encourage initial uptake and allow farmers to experiment or potentially to help with scale-up. The instrument business plan and financial model should embed subsidies whenever applicable, together with a clear exit strategy and its timing (Hazell et al., 2017; World Bank, 2020). The ultimate objective is to have a commercially viable insurance product. This will also help mitigate many of the risks identified above, including market distortion, discouraging the adoption of sustainable practices, unintended inequality and politicization.

Specific timing for subsidy use to minimize market distortion risk and help commercial viability. Depending on the specific insurance product's background and development process, integrating subsidies might be beneficial in the pilot or early stages of the market testing for insurers that are completely new to the market. Insurers already operating on the market or relying on an existing insurance product to develop a new one, might prefer to access subsidies after the pilot and after having tested a minimum viable product. Since premium subsidies are directed towards the users, at the insurer's end, their management can add operational costs which are difficult to sustain in the early stage when the priority is launching the product. It is, therefore, preferable to integrate subsidies at a stage when insurance subscriptions reach scale.

Net cost to farmers should be higher than risk to minimize market and climate distortion. The price of the insurance premium that is to be paid by farmers (after subsidy deduction) should be equal or higher than the actuarial pure risk premium (Hazell et al., 2017). This will help reduce the disincentive problem which appears when farmers take on too high risks, therefore reducing the distortive effects of subsidies. Concretely in this scenario, subsidies cover the administrative and development costs, which are typically high in the inception phase of an insurance product.

Index-based insurance products help to avoid the risk of reduced due diligence since claims are made against verifiable risk metrics (Hazell et al., 2017).

Bundling insurance products with agricultural inputs and services mitigates politicization risks and ensures commercial viability. Crop insurance is considered to be an effective tool for the reduction of residual risks, meaning that they can only cover risks remaining after other risks have been addressed (Hazell et al., 2017; World Bank, 2020a). Farmers' capacities to manage risks should be prioritized (OECD, 2020a) with wider agricultural measures included in risk mitigation strategies: access to improved seeds, fertilizers, infrastructure and access to markets. This goes along with building the trust of users in a new

insurance product. If farmers place high expectations on the new insurance product, they risk being disappointed, which affects product uptake in the medium and long term. Additionally, bundling insurance with other types of services (such as access to credit), can stimulate demand in the longer term, as it holistically addresses agricultural market issues and can create a meaningful impact for poor farmers.

4.3 DEDICATED RURAL CREDIT LINES

Rural credit lines are used by governments to support the agriculture sector, promote economic growth, and contribute to reducing poverty. Credit for smallholder farmers specifically leads to greater increases in agricultural productivity, more efficient land use, and even reduced deforestation (Souza et al., 2021; Assunção & Souza, 2020). However, smallholder access to rural credit (especially for sustainable agriculture) remains limited in many countries for a variety of reasons (Chiriach et al., 2020; Van Asseldonk et al., 2012; AFD, 2015; Assunção & Souza, 2020; IFAD, 2015; IFAD, 2016).⁶ In this section, we look at how a Lab instrument turned to public credit lines in an attempt to alleviate pressures to deforest, facilitate smallholders' access to credit, and ultimately contribute to greening public rural credit.

4.3.1 CASE STUDY: CONEXSUS IMPACT FUND

The volume of national rural credit in Brazil corresponds to nearly 40% of the country's total agricultural production value (Assunção and Souza, 2020). As such, rural credit offers much potential to act as a mechanism for aligning Brazil's agricultural policy with its sustainability goals. Recognizing this potential, the Conexsus Impact Fund (CX Impact Fund), a 2020 Lab instrument, is designed to redirect Pronaf,⁷ a Brazilian federal subsidized credit for smallholders, to sustainable production systems that keep forests standing. Pronaf credit lines' bureaucratic processes, asymmetric information, and transaction costs make accessing the credit complex (Souza et al., 2020). This is particularly true for small producers that do not participate in well-known (but often unsustainable) value chains like soy and livestock: only 2 to 3% of the annual USD 5 billion Pronaf credit lines go to sustainable production systems and forest-based value chains (BACEN, 2020). Moreover, between 2013 and 2015, 85% of the total amount of Pronaf resources in Amazonian states went to livestock (IPAM, 2017).

As such, CX Impact Fund works to direct more of Pronaf's working capital loans to sustainable production systems, especially forest-based activities, in effect "greening" the subsidized credit line (Alves & Byrd, 2020). By offering simple financial products to cooperatives that engage in sustainable production systems, as well as financial management assistance, the fund helps to build credit history and financial capacity. In doing so, the fund serves as an intermediary step for these cooperatives and SMEs to eventually access Pronaf. CX Impact Fund's long-term goal is to help these cooperatives and SMEs graduate from using public finance (i.e., Pronaf), and at some point, to longer-term debt, equity, or joint ventures, helping in the transition from public to private financing of sustainable agriculture.

⁶ For instance, high transaction costs and asymmetric information; lack of familiarity that financial institutions face in reaching remote and under-developed areas; informal legal status; lack of collateral and banking/credit history

⁷ The National Plan for Family Farming (Programa Nacional de Fortalecimento da Agricultura Familiar or PRONAF)

The fund also connects local financial institutions that are on-lenders of Pronaf to a pipeline of forestry and sustainable agricultural practices, ultimately helping the local financial institutions (LFIs) become more familiar with sustainable value chains. This, in turn, strengthens these value chains, contributing to achieving national climate and sustainability objectives.

4.3.2 OVERCOMING BARRIERS

Stimulate demand. Services and products that facilitate access to subsidized credit lines can be attractive to certain potential borrowers. This is the case particularly for smallholders that have difficulty in accessing these lines of credit. Offering these types of products can help the instrument in generating demand and identifying a pipeline of projects. As CX Impact Fund demonstrates, cooperatives in forestry-based value chains in Brazil are largely not serviced by the national rural credit line due to their own unfamiliarity with the financial products, as well as the LFI's unfamiliarity with these value chains. As a part of the fund's COVID-19 emergency credit line, CX Impact Fund, with a wide network on the ground, was able to connect to these potential borrowers: from May-August 2020, the fund identified 226 organizations in forestry-based value chains all over Brazil looking for credit, amounting to a demand of financing of USD 5 million (Conexsus, 2021). Of these 226 organizations, 178 were eligible for the emergency credit line (Conexsus, 2021).

Build local financial institutions' capacity. Connecting public (and private) on-lenders of rural credit lines to sustainable agriculture and land use projects can support their capacity for deal origination in these value chains. The more familiar LFIs become with these value chains and production systems, the more likely they are to lend to agricultural practices outside of the most dominant (but often most unsustainable) practices. This has catalytic potential for transformation of land use, considering increases in capital can relieve pressures that drive deforestation (Assunção & Souza, 2019; Souza et al., 2021).⁸

Strengthen value chains. Leveraging national subsidized credit lines to finance production activities that get limited financing can also help strengthen weak value chains. This in turn guarantees both pipeline and supply for offtake, facilitates access to markets for farmers, and increases the longer-term sustainability of the public support.

Support loan repayments. With a main objective being to increase access to Pronaf resources, CX Impact Fund provides an example of how linking to subsidized credit can contribute to an instrument's financial sustainability and act as a de-risking mechanism. By providing simple loans to SMEs and cooperatives in an attempt to build their credit history, CX Impact Fund increases the likelihood that these enterprises can access Pronaf. In creating an opening for them to access the subsidized credit line, CX Impact Fund also improves the chances that borrowers will have the resources to repay the fund's own loans.

Stimulate fundraising. Being connected with subsidized credit lines can act as a de-risking mechanism, increasing the likelihood of loan repayment. As a result, leveraging rural credit lines can improve an instrument's commercial viability and attractiveness. During the six

⁸ In the Brazilian Amazon and Cerrado, for example, expansion of rural credit has been seen to boost agricultural activity while reducing pressures driving deforestation (Souza et al., 2021). Rural producers in Brazil also were shown to shift their land use from less to more productive alternatives – specifically, pastures to croplands –, and also result in an increase in forest areas (Assunção & Souza, 2019).

months under development with the Lab, CX Impact Fund was able to secure USD 2 million for its COVID-19 emergency credit line (Alves & Byrd, 2020).

4.3.3 POTENTIAL RISKS AND DESIGN CONSIDERATIONS

Changes in public financing and similar policies. Changes in fiscal policies can result in reduced amounts of public credit offered. For instance, between 2014 and 2019, the volume of rural credit funds in Brazil fell by 14% in real terms (Assunção et al., 2020). Similarly, changes in credit programs' rules and eligibility criteria, creates the risk of uncertainties and confusion for entities structured to facilitate credit access (Souza et al., 2020). The stability of the government subsidization policy is often decisive for its impact.

Crowding out market or private finance. Subsidized credit lines can be a risk to the overall sustainability of agricultural financing: the availability of inexpensive lines of credit may make it difficult for private banks or microfinance institutions to develop competitive lending operations (Meyer, 2014).

Lack of mature enough credit lines. If the public credit lines are not reliable or mature enough to ensure access by producers/SMEs, challenges can arise relating to an instrument's actionability, catalytic potential, and financial sustainability.

DESIGN CONSIDERATIONS

Identify countries in relevant stages of financial development in order to ensure uptake.

The countries targeted should have a rural credit line that is mature enough to be tapped into reliably. Ideally, the country should be in the "government-entry" stage, where rural credit is expanding and agricultural support comes from public resources (as shown in the figure below from ISF, 2020). This stage can allow for the instrument to adequately leverage these public resources, while also being in a stage to allow for private financing to move in.

Figure 1. Timeline of agricultural finance development

STAGE	The informally-served stage	The government-entry stage	Bank-based stage	Market-based stage
GOVERNMENT ROLE	Little to no involvement	Expanding available credit, working through farm-level organizations; enhancing agricultural productivity more broadly	Oversight and regulation	Deregulation
SOURCES OF FARM DEBT	Non-institutional moneylenders	Government-supported community lenders	Commercial lenders' share of agricultural debt is greater than or equal to government-sponsored institutions; informal lenders a minority	Banks, securities, and "merchant creditors"
FARM STRUCTURE	Smallholders and tenant farmers	Decrease in smallholders as land consolidation increases	Land consolidation intensifies	Split between large commercial and smallholder with links to merchant creditors
FARM PRODUCTIVITY	Low	Increased input use drives rising productivity	Profitability increases	High

Source: ISF, 2020

Align with relevant subsidized credit lines to ensure complementarity. Considering in some cases various credit lines might exist (i.e., working capital vs. investment), financial instruments must be aligned with those that are in most demand by their target borrowers. If the objective of the fund is to facilitate access to subsidized loans, but if there is no certainty of the real demand for specific lines of credit, the fund will have more trouble guaranteeing that its borrowers will actually seek out these subsidized loans upon “graduating” from the fund.

Due diligence to ensure demand and up-take. A very good understanding of the eligibility criteria to access the subsidized credit lines is vital. Navigating such credit lines can be complex and bureaucratic. Thus, if a financial mechanism has as objective facilitating access to these credit lines, they must be familiar with what it takes to access them to be able to maximize the chances that their own borrowers are able to obtain access to such loans.

Implement strong monitoring systems to demonstrate impact. Similarly, to instruments leveraging regulatory policies, those intending to take advantage of existing credit lines should have strong monitoring systems in place to measure, track, and demonstrate compliance and impact. Particularly when the instrument intends to discourage deforestation, land use monitoring is essential, and mitigation measures in case of leakage should also be put in place.

Partner with local financial institutions and /or cooperatives to encourage market actors' participation. Partnering with institutions that act as intermediaries for public credit lines can strengthen their capacity and familiarity with deal origination in sustainable value chains. Cooperatives are also effective institutions to distribute credit among smallholders (Souza et al., 2020).

Provide financial literacy assistance to help increase borrowers' creditworthiness and their future access to commercial finance. In addition to building technical capacity related to sustainable practices, building financial literacy and management capacity for borrowers at the project level should also be considered (FAO, 2018; Pinzon, 2019). Given the significant role that financial literacy can play in accessing public credit lines, as well as other investment opportunities in general, this could help increase the chances that farmers, cooperatives, and SMEs are able to tap directly into other rural credit lines at some point (both subsidized and commercial).

5. CONCLUSION

Many barriers exist in getting investments to flow into sustainable AFOLU, leaving a large gap between the actual finance provided and the needs for this sector. New financing mechanisms that are developed to mobilize more public and private climate finance into this sector can take advantage of existing policy measures to support AFOLU focused initiatives. This is particularly relevant given the government support that has historically gone to the sector in both developed as well as emerging economies. According to the OECD, annual domestic support provided to agriculture through government policy is equal to 28% of the total value added by agricultural production in the countries that make up two-thirds of the world's agriculture (OECD, 2018).

In addition, considering that only 1% of total governmental support to agriculture is directly targeted at environmental outcomes, these financial instruments can also contribute to achieving climate objectives and to help transition to "greener" AFOLU public policies and support (World Bank, 2018).

In the Lab's portfolio of sustainable agriculture ideas, three instruments provide examples of the opportunities, risks, and considerations that potential financial instrument developers and entrepreneurs in the AFOLU space can learn from in designing similar mechanisms.



Leveraging national regulations can overcome barriers related to identifying pipeline and demonstrating impact. The Lab's Responsible Commodities Facility supports the compliance of national land use regulations, while also incentivizing more ambitious sustainable land practices. Key design considerations to mitigate potential risks include:

- Setting realistic but ambitious lending conditions to complement weak regulations;
- Implementing strong monitoring systems to avoid unintended impacts;
- Seeking coherence with local, national, and internationally agreed climate objectives to mitigate the risk of political change; and
- Marketing the benefits of sustainable practices to stimulate demand.



Drawing on **government subsidies for insurance premiums** can stimulate demand for the product, generate socio-economic impact, and help in fundraising. The Blockchain Climate Risk Crop Insurance highlights when and how such subsidies should enter into the instrument. In designing such an instrument, considerations to keep in mind include:

- The temporary use of subsidies to avoid market distortions and politicization;
- Specific timing for the use of subsidies to minimize market distortion and help commercial viability;
- Choosing an index-based design to mitigate the risk of reduced due diligence;
- Bundling insurance with inputs and services to reduce politicization risks.



Expanding the amount of **sustainable projects covered by subsidized rural credit** can lead to increased loan demand and repayments, and stimulate capital investments. The Conexsus Impact Fund, with a goal of greening Brazil's Pronaf credit line, is an example of such an instrument design. Key Recommended design considerations include:

- Alignment with relevant subsidized credit lines to ensure complementarity;
- Partnerships with local financial institutions to encourage other market actors' participation; and
- Provision of financial literacy assistance to help increase borrowers' credit worthiness and their future access to commercial finance.

The risks and design considerations identified can be used by various stakeholders that are active in climate finance innovation for the AFOLU sector.

- Financial instruments developers and entrepreneurs initiating new financial ideas can draw on these recommendations at the design stage as well as when planning implementation, partnerships, and fundraising strategies.
- Potential donors and investors can integrate these findings in their assessment of fundraising requests, particularly timing, risks and funding conditions that they can impose to developers.
- Lab advisors can take these into account during the selection process, when assessing progress of instruments through the Lab process and when providing feedback as part of the working groups.

Lab analysts can utilize these elements to refine future instruments as well as to support replication of existing ones to new countries. These considerations can also provide elements to guide the Lab's support on fundraising, helping to determine relevant donors and funders.

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7. ANNEX

Table A1: Frequently identified challenges to financial instruments promoting sustainable agriculture, based on three Lab criteria

Actionability	Catalytic Potential	Financial Sustainability
-Low user uptake and/or demand from farmers and /or LFI	-Achieving, monitoring and demonstrating impact, particularly climate related (and possible unintended impacts if not monitored)	-Long pay back periods and low returns for investors
-Inability to generate adequate deal flow / difficulty in identifying pipeline	-Small ticket sizes	-High upfront and transaction costs
-Poor infrastructure / difficult access to markets	-Insufficient transparency from buyers	-Small ticket sizes
-Low capacity and insufficient knowledge of LFIs/ lenders of sustainable agriculture practices	-Lack of information on origin & criteria used for tracing / screening sustainable commodities	-Loan default or non-performance risk
-Limited financial management and literacy of borrowers	-Lack of consistent compliance with conditions of credit (i.e., sustainability conditions or CSA)	-Limited management capacity of vehicles
-Difficulty in identifying partners / off-takers / implementing entities	-Low incentives for adoption of CSA or sustainable agriculture	-Fundraising and lack of capital deployment due to lack of investor appetite to take on significant risk for unproven / early stage business models, as well as due to lack of information on viable investment opportunities
-Legal and administrative ambiguities		-COVID-19 & other emergencies

Sources: Chiriac et al., 2020 ; FOLU, 2019; Kois Invest, 2018; Limketkai et al., 2019; Louman et al., 2020; Mazza et al., 2018

Table A2. Examples of government tools for enabling finance in the agriculture sector

Public policies and regulations	Public finance levers
<ul style="list-style-type: none"> • GHG emission reduction targets in agriculture (including National Determined Contributions) • Land use regulations • Lending minimum requirements for agriculture • Disclosure requirements 	<ul style="list-style-type: none"> • Subsidized lines of credit • Credit guarantees • Insurance subsidies • Input subsidies • Market price support • Results-based finance • Conservation payments • Technical assistance

Adapted from: Whitley et al., 2018; Searchinger et al., 2020; World Bank, 2018; Climate Transparency, 2017; ISF, 2020.

Table A3: Lab Sustainable Land Use and Agricultural Instruments

Name	Proponents	Geography	Description
Agricultural Supply Chain Adaptation Facility	Inter-American Development Bank / Calvert Investments	Central / South America	A facility to provide farmers with know-how and finance for climate-resilient investments, by enabling development banks to partner with agribusiness corporations who empower farmers within their supply chains
Amazonia Sustainable Supply Chains	Natura and Mauá Capital	Brazil	A mechanism to provide upfront finance for input providers in the Brazilian Amazon based on offtake agreements, conditioned on fostering sustainable supply chains that contribute to forestry preservation
Blockchain Climate Risk Crop Insurance	ACRE Africa, Sprout Insure, Etherisc	Africa (pilot in Kenya)	A standardized, digital index crop insurance platform for smallholder farmers that addresses the impacts of climate change on crop production by making insurance more transparent, efficient, and scalable
Caaporã / Socio – Climate Benefits Fund	Kaeté Investimentos	Brazil	A fund to increase forest restoration in the Amazon by investing and providing technical assistance to restore degraded lands in smallholders' farms with agroforestry systems and, at the same time, developing and facilitating sales of their products
Cloud Forest Blue Energy Mechanism	Conservation International / The Nature Conservancy	Central / South America	A mechanism for restoration and conservation of cloud forests in Latin America, which can improve the productivity of hydroelectric plants
Conexsus Impact Fund	Instituto Conexsus	Brazil	The fund creates a business platform that can develop a variety of financial products tailored to specific communities and enterprises, addressing the gap in the way small-scale farms and forest-dwellers in Brazil access available financing
Ecopec / Climate Smart Cattle Ranching	The Nature Conservancy	Brazil	A business model to provide resources and technical assistance to intensify and increase cattle production in Brazil, while also restoring degraded pastures and forests, and decreasing deforestation
Greenfi / Climate-smart Lending Platform	F3 Life / Greenfi	Africa	A platform to bring together the tools, actors, and finance necessary to help lenders incorporate climate risk in their loan portfolios while incentivizing the adoption of climate-smart farming methods by smallholders
GROVE: Forestry Smart Ledger (FSL)	Global Mangrove Trust	India / Southeast Asia	The instrument combines satellite computer vision and remote sensing of biomass with blockchain verification of sustainable land-use impacts and restoration agreements to create performance rewards for Indian communities engaged in regenerative forestry
Monetizing Water Savings	World Resources Institute / FEMSA Foundation	Mexico	The idea leverages a "pay-for-success" model to monetize water conservation, efficiency, and nature-based solutions, creating incentives and revenue streams in areas where users often lack the necessary financial resources
Responsible Commodities Facility (RCF)	BVRio	Brazil	A vehicle to promote the responsible production of commodities, particularly soy, in the Brazilian Cerrado biome, through incentives to plant in already cleared and degraded lands
Rural Prosperity Bond	World Resources Institute	Africa	The bonds allow SMEs who sell products and services that support sustainable agriculture to offer their products to smallholders on financially reliable credit, helping tens of thousands of farmers to adopt regenerative practices currently beyond their reach
Smallholder Forestry Vehicle	Komaza	Africa (pilot in Kenya)	A mechanism to scale up sustainable forestry in Africa through which investors buy portfolios of trees that have been planted by smallholders on degraded land, and recoup their investment once the trees are harvested and sold
Smallholder Resilience Fund	One Acre Fund	Africa	Simultaneous sustainable agriculture investments across an entire food system value chain to reduce the risk of failure at any one part of the supply chain and manage larger volumes
Sustainable Agriculture Finance Facility (SAFF)	Rede ILPF (ICLF Network) and the Brazilian Institute of Development and Sustainability (IABS)	Brazil	The Sustainable Agriculture Finance Facility provides customized bundled loans that match the farmers' needs and takes into account specific ICLF parameters
West African Initiative for Climate-Smart Agriculture	Economic Community of West African States (ECOWAS)	West Africa	A dedicated blended finance fund providing financial and technical support to smallholder farmer organizations and agribusinesses to adopt climate-smart agriculture practices in West Africa

Table A4: Frequently Identified Challenges, by Lab Criteria (as identified in Lab instruments' analysis)

ACTIONABILITY	
Frequently identified challenges	Description
Low user uptake or low adoption / demand	<ul style="list-style-type: none"> - Limited interest of demand from farmers/ producers / agribusinesses for the financial products being offered - Limited uptake or adoption of sustainable land practices or climate-smart agriculture being incentivized or encouraged
Low capacity (users level)/ inability to generate adequate deal flow/Pipeline identification of projects	<ul style="list-style-type: none"> - Low capacity of LFIs or financial intermediaries (in the case of conditional credit lines): lack of adequate skills to integrate & monitor CSA conditions into loan products and non-adequacy of loan products (WAICSA) - Difficulty generating a pipeline of high-quality projects. For GROVE, difficulty to generate high quality mangrove projects to attract peer-to-peer investments for a new platform.
Poor agricultural markets	- Lack of or weak market linkages restrict the flow of products from farms to consumers, thus reducing income benefits and the ability of farmers/producers to repay the loans.
Lack of consistent compliance with conditions of credit	<ul style="list-style-type: none"> - Sustainability conditions/CSA: despite contracts signatures/other formal commitments, farmers continue to the same extent or lower extent to use unsustainable practices (such flood irrigation or pumping water beyond their concession limits) (MWS). This can cause failure to achieve the planned environmental impacts and, especially for NBS/PES projects jeopardize the financial sustainability of the instrument. - Offtaking conditions/side-selling: can be due to parallel monetary incentives to sell to other buyers. Side selling increases the loan default risk for value chain actors who entered into purchasing agreements with farmers.
COVID-19 & other emergencies	<p>Limited activities on the ground</p> <ul style="list-style-type: none"> - Higher cash flow volatility and lower customer spending due to the pandemic as well as tighter export-import restrictions for agricultural inputs and products - Delay of on-the-ground feasibility studies for the financial instruments, due to the inability to interact with farmers and test their interest in the instrument. - Delay in securing partnerships (RPB)
Legal and administrative ambiguities	<ul style="list-style-type: none"> - Ambiguity around the relevant level of administration (federal, state, local) and the body responsible for management of natural resources such as water, including investments, monitoring of use, transfer of use rights and enforcement of regulations. This can result in challenges to coordinate with the different entities involved and can cause delays for approvals, thus in implementation (MWS) - Unclear official stance/legislation on or administrative procedures for the adoption of new technologies such as blockchain can affect the timing and the feasibility of implementation for financial instruments that rely on them (Blockchain insurance)
Political / regulatory changes	<ul style="list-style-type: none"> - Unfavorable changes in policy and regulations, especially those related to interest rates (RCF), land-use, land titles, agricultural import/export duties can negatively alter investment risk-return profiles and private actors' incentives to invest (ASCAF) - Changes in the governmental programmes of subsidies or other public support tools addressing the agricultural sector. This can be a game changer for instruments that leverage these public support mechanisms (Conexus). For financial instruments that provide alternatives to governmental programmes, political changes can increase competition.
Partnerships	<ul style="list-style-type: none"> - Reputational risks due to links between the financial instrument and unvetted agricultural inputs/ seed distribution systems. Building partnerships with input distribution companies or associating the financial product (in this instance insurance) with certain brands of seeds can be risky if the respective companies are involved/previously been involved in controversies. - Difficulty in identifying interested and suitable partners requires alignment between the instrument's priorities and corporations strategies (ASCAF). Their involvement in financial instruments, sometimes by providing credit to farmers can be difficult as corporations may not have existing internal credit operations or, as highlighted by Coon et al. (2010), could see financing as a distraction from their core business.

CATALYTIC POTENTIAL	
Impact and M&E systems	<ul style="list-style-type: none"> - Challenges in demonstrating/obtaining impact: Most agricultural, land use or nature based solution financial instruments requires robust M&E systems and attribution methodologies for measuring environmental benefits, such as for water savings, trees growth. In the absence of such tools or if they fail to accurately capture the adoption/implementation of environmental conditionality, the instrument concept will not be able to demonstrate impact, thus limiting funding. - Failed impact due to non-performance of forestry projects, agroforestry systems or agricultural crops. These can be due to limited growth, extreme weather events, fire or diseases and can constitute a major threat to the success of the instrument. - Unintended impact: through relocation of unsustainable practices from beneficiaries to other farmers. For instance total water savings (MWS) may be jeopardized by increased consumption from other farmers and industrial players extracting from the same water source, thus threatening the ability of the instrument to demonstrate impact and monetize environmental benefits (for PES based instruments) or deforestation could move from the targeted area to other areas where there was previously no deforestation (Ecopec, RCF)

FINANCIAL SUSTAINABILITY	
High operating costs	<ul style="list-style-type: none"> - Financial instruments dealing with small size loans are confronted with high operating costs (RPB, WAICSA). These can affect the financial viability of instruments. - Additional operating costs can be incurred for set-up and registration of the legal structure of the instrument (fund or bond) depending on regulations in the country of domicile.
Loan default or non-performance risk	<p>It refers to instruments extending loans to LFI/financial intermediaries, agri-SMEs/value chain actors, farmer associations, individual farmers or combinations of those. In many cases, LFIs and value chain actors extend similar loans to farmers or farmer associations.</p> <p>Loan defaults and delays in repayment can cause the instrument to perform poorly and reduce the returns to investors. Furthermore, they can prevent the instrument from attracting private investments at scale.</p> <p>Many factors can contribute:</p> <ul style="list-style-type: none"> - price and demand fluctuations for agricultural/forestry products - unreliable agricultural supply chains or side-selling by farmers - currency volatility - extreme weather and diseases affecting agricultural production/forestry growth, that can result in crops failing or obtaining variable yields (especially for newly introduced crops, ag practices, technologies, seeds). - tree growth risks (SFV) do not reach targeted growth due to, e.g., fire, disease => risk that the company is not able to buy back the trees at a fair price.
Management capability (instrument level)	<ul style="list-style-type: none"> - For instruments dealing with high number of small size transactions, proper management can get challenging. This can affect investors' trust, fundraising and thus financial viability of the instrument.
COVID-19 & other emergencies	<ul style="list-style-type: none"> - Delays in fundraising or unsuccess as donors, funders and investors, both public and private, allocate their financing towards immediate health-related projects or other humanitarian crises to the detriment of climate projects - Corporations/individuals less willing to invest in voluntary carbon markets.
Fundraising	<ul style="list-style-type: none"> - Capital raising from concessional and commercial investors proves to be difficult (Conexus) - Low interest from private investors due to poor profitability and perceived and actual risk associated with the sector, specifically agricultural production, contractual agreements in this sector (especially smallholder agriculture) (WAICSA, Ecopec, Conexus)
Revenue streams	<ul style="list-style-type: none"> - Price and demand fluctuations for carbon credits which provide revenue streams to fin instruments can affect the financial viability of the instrument. - Delays in cashing in revenue from carbon credits due to certification challenges

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