The Lab
The Global Innovation Lab for Climate Finance

Climate-smart Lending Platform

LAB INSTRUMENT ANALYSIS

June 27, 2016

The Lab is a global initiative that supports the identification and piloting of cutting edge climate finance instruments. It aims to drive billions of dollars of private investment into climate change mitigation and adaptation in developing countries.

AUTHORS AND ACKNOWLEDGEMENTS

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CLIMATE POLICY INITIATIVE

CONTEXT

Over two billion of the world's poorest people depend on agriculture for their livelihood. Many of these smallholder farmers' productivity and income levels could be improved with better access to finance, modern technologies, and improved farming practices.

Smallholder finance is growing in scale and substantial efforts are being made to reduce transaction costs, improve organizations and structures to aggregate smallholder investments, and improve credit-scoring approaches. However, a USD 150 billion financing gap remains (Dalberg 2016) and both smallholders and lenders with smallholder agriculture lending portfolios are highly vulnerable to climate change impacts.

Compounding their vulnerability, smallholders are typically conservative adopters of new farming technologies or practices, including climate-smart practices – their rate of adoption is often below 1% per year (Thornton and Herrero, 2010). Furthermore, lenders already engaged with agricultural supply chain actors rarely incorporate strategies to reduce climate risk in their portfolios or encourage their clients to increase uptake of climate-smart agriculture (CSA).

Developing new tools and approaches to measure risk and resilience, and to link access to finance with climate-smart practices, could help smallholder farmers improve their productivity, resilience, and food security while reducing their carbon foot print. It could also improve the risk profile of financial institutions' lending portfolios.

INSTRUMENT MECHANICS

A new lending platform will bring together the tools, actors, and finance necessary to enable traditional and non-traditional lenders to provide climate-smart loans to smallholders in developing countries and ultimately, reduce climate risk in loan portfolios.

OVERVIEW AND OBJECTIVES

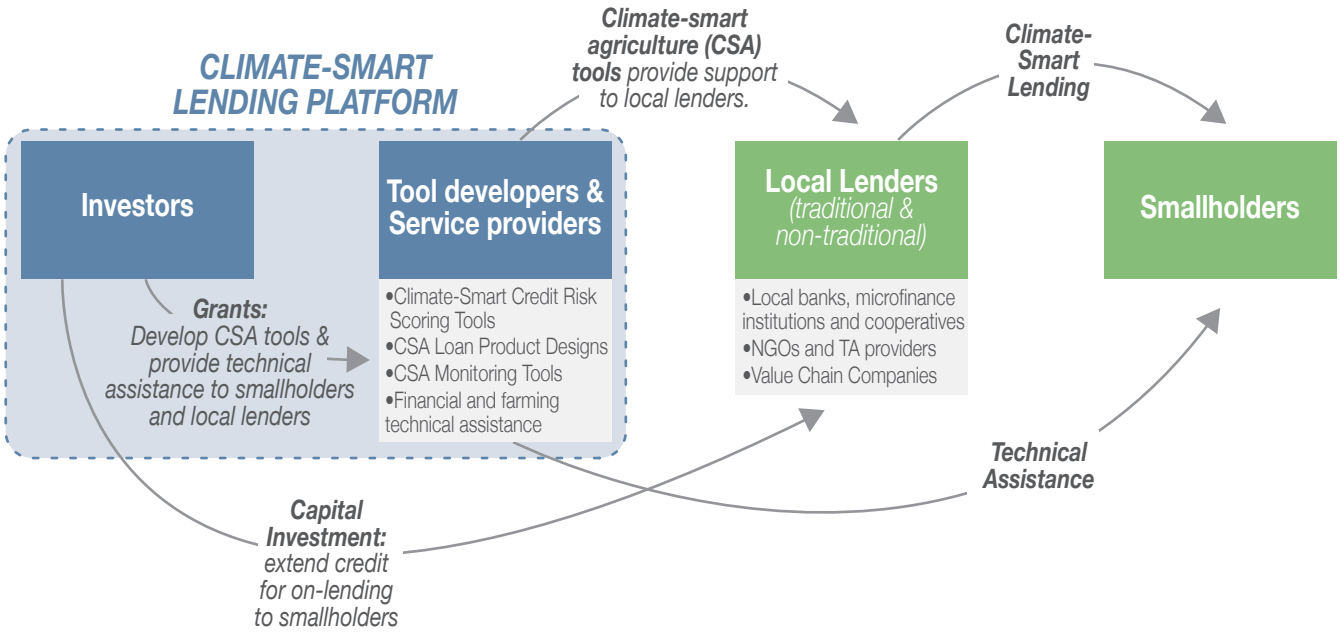
The Climate-smart Lending Platform (the Platform),[1] as shown in Figure 1, aims to bring together the approaches, tools, and actors necessary to reduce climate risk in lending portfolios and scale up climate-smart lending to smallholders across multiple geographies.

The tools and approaches promoted and supported under the Platform include:

- Climate-smart credit products and process designs, which embed diverse climate-smart agricultural or land management practices in loan terms and conditions
- A climate-smart credit-scoring tool, which comprehensively assesses the credit worthiness of individual farmers and their portfolios in the context of climate change risk, including compliance with climate-smart agricultural and land management practices
- An environmental compliance monitoring tool to monitor adoption of climate-smart farming in compliance with loan agreement requirements, thus informing the credit-scoring tool

1 The 'climate-smart smallholder financing' concept was proposed to The Lab by F3 Life, an organization that has been developing climate-smart lending tools and a demonstration project in Central Kenya. After analysis and expert consultation facilitated by The Lab, we proposed the establishment of a Climate-smart Lending Platform (the Platform), based on the F3 life concept.

Figure 1: Proposed Climate-smart Lending Platform



In Phase 1, a series of projects will be developed in collaboration with different types of financial institutions and implementing partners in three different geographies and crop contexts (nine projects in total). These projects will produce valuable results to prove the climate-smart lending case, to replicate and build upon the first projects with subsequent larger loan programs. Under each project, grants and concessional loans will be raised according to local needs to fund the development of bespoke climate-smart loan products and monitoring tools that would feed in to credit risk scoring tools. Many of the projects will be developed in collaboration with pre-existing lending, climate, and agriculture programs and funds, thus making use of existing implementing structures to get off the ground running.

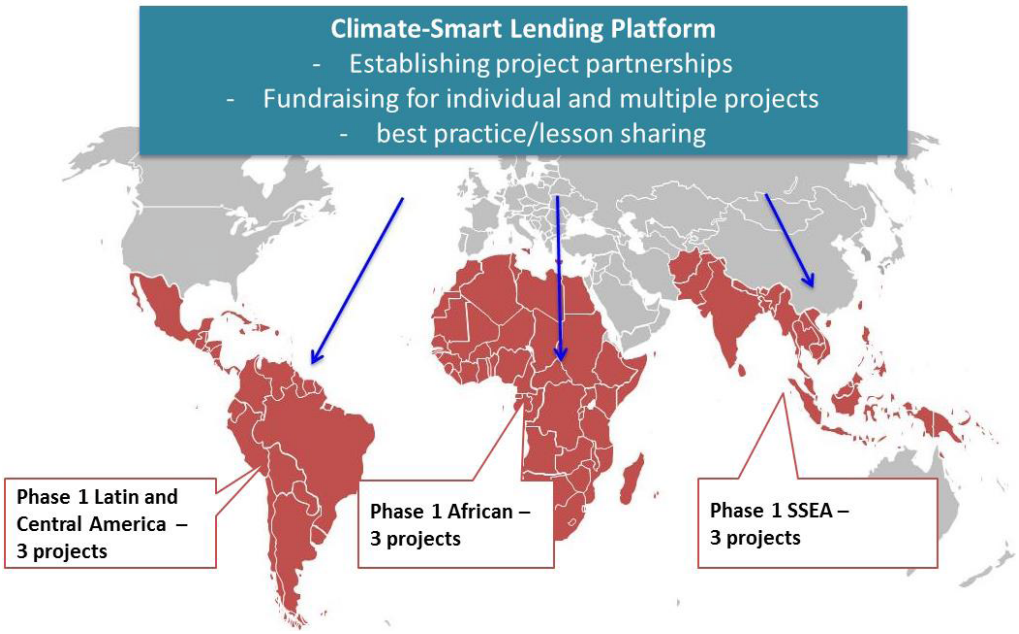
The long term goal of the Platform is to mainstream CSA metrics into the loan terms and credit scoring systems of financial institutions without concessional backing to improve agricultural lending portfolio resilience to climate change, and to create a strong incentive for farmers to adopt CSA practices by using the CSA lending tools. As such, in the second and third phases, no concessional financing is envisaged but some first loss guarantee backing for commercial finance providers is included in the proposed financing structure for Phase 2 as commercial finance is phased in.

The Platform itself will have a relatively small amount of grant funding to facilitate coordination and cooperation across projects (see Figure 2), to reduce costs and enhance the effectiveness of individual projects and to help build a strong project pipeline. As such it will help to get projects off the ground, establish project partnerships and raise funding for new CSLP projects. It will also help to share best practices and lessons across projects, acting as a repository of expert knowledge, approaches, loan products, and tools related to CSA lending, supporting investors, local lenders and implementing partners.

CLIMATE-SMART LOAN PRODUCTS

The Platform projects will work with traditional and non-traditional lenders to develop climate-smart loan products. These lenders could be

Figure 2: Phase 1 step-by-step project development approach and Platform role



local banks and microfinance institutions, value chain companies e.g. input suppliers, producer associations, traders, processors, and potentially NGOs and technical assistance providers.[2] Local lenders will make finance available to aggregated groups of smallholders such as established and well-functioning cooperatives, farmer producer groups, or farmers who supply the same processor.

Loan terms, including credit limits and interest rates, will be set to incentivize farmers' uptake of climate-smart agricultural and land-management practices. Furthermore, it may be appropriate to include preferential loan terms, larger loans or targets for number of women farmers, given women's unequal access to productive resources in the agriculture sector (DfID 2015).

Financing will be provided for fixed assets or for working capital and social needs, with requirements for climate-smart agricultural and land management investments or practices built into the loan conditions. A variety of CSA practices could be incentivized depending on particular contexts as determined through analysis, farmer surveys and participatory approaches to understand projected climate impacts, farmer demand and needs. Examples of CSA practices and investments include water and soil management techniques and infrastructure, switching to more resilient crops or crop varieties, protecting crops and produce from heat exposure and pests and cropping calendar adjustments (see also Annex 1). Loan products may also be developed to address the climate-resilience and GHG impact of landscapes at a larger scale beyond the farm level e.g. on farm agroforestry by dairy farmers or off-farm maintenance of forest areas bordering the farm.

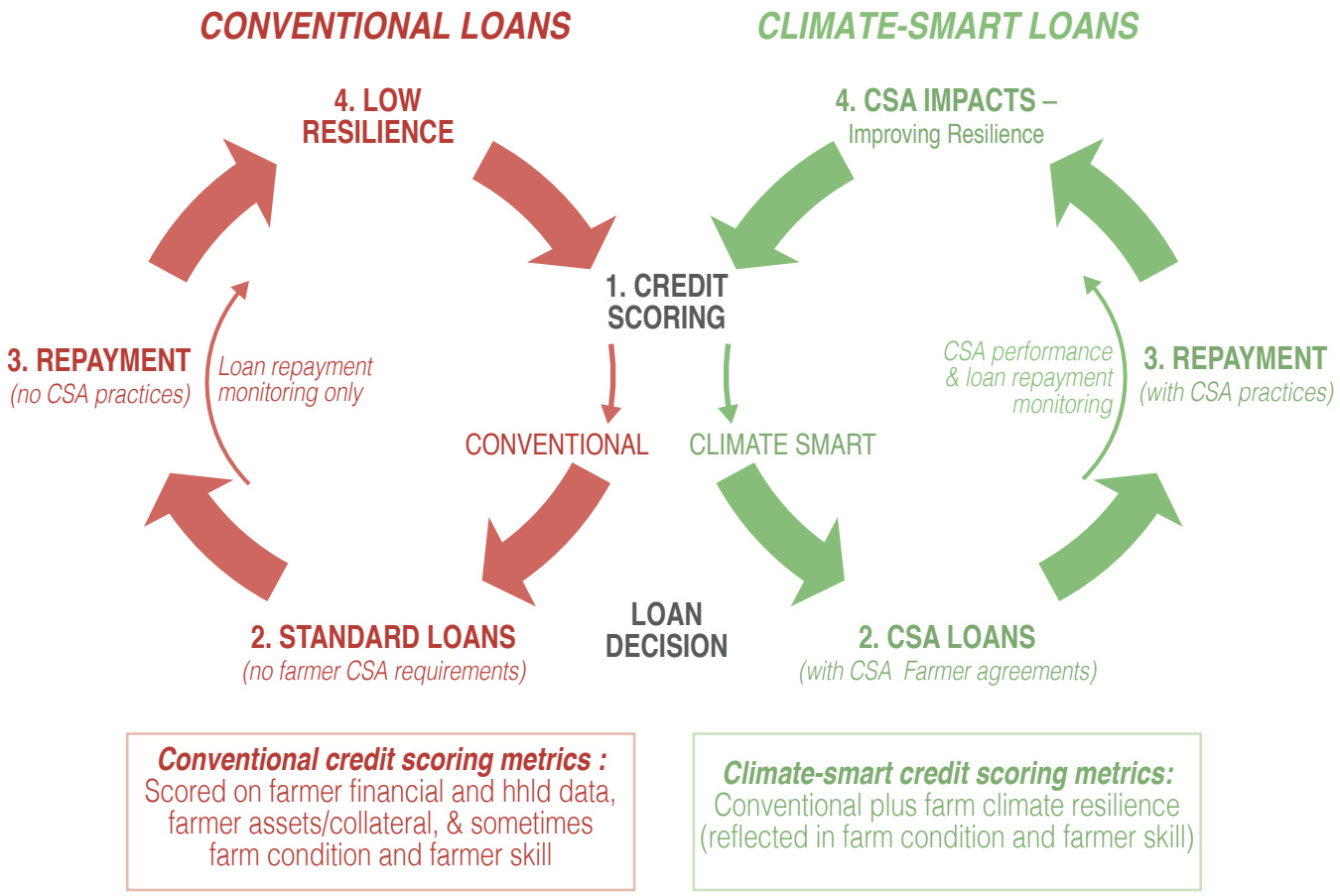
MONITORING AND CREDIT SCORING TOOLS

While lending and technical assistance are the foundation of the Platform, its key value-add is the development of credit risk scoring tools, which improve the climate resilience of agricultural lending portfolios.

Credit providers typically base their lending decisions on farmers' financial and household data including farm assets, collateral, cash flow estimates and income projections. Climate

2 Subject to national banking regulations.

Figure 3: The reinforcing cycle of climate-smart lending, as pioneered by F3 Life



smart credit-scoring combines detailed cash flow estimates with climate risk assessments, including of loan agreement requirements for climate-smart agricultural and land management practices, to more comprehensively calculate the credit worthiness of individual farmers and their portfolios (see Figure 3) in the context of climate change risk. Necessary data includes:

- expected impacts of climate change on crop yields and quality
- information on current farm conditions, practices, crop cycles and quality and quantity of inputs, including compliance with climate-smart loan agreements and adoption of climate-smart agricultural and land management practices e.g. adoption of appropriate soil and water conservation measures
- financial information including detailed cost and price data and estimates of household expenditures and savings.

The climate-smart credit scoring system would bring all of this data together and enable lenders to make more informed decisions on their lending portfolio to reduce default and climate risk, selecting groups of farmers which balance risk. This, alongside provision of climate-smart loans should help incentivize lenders to increase their lending portfolios to smallholder farmers.

Unlocking a supply of increased finance for smallholders from lenders adopting the Climate-smart Credit Scoring System requires:

- An initially subsidized lending program which helps farmers access initial financing to improve their productivity and CSA practices.

Table 1: Summary of key elements and lessons from comparative initiatives

Comparative initiative	Key elements and Lessons
Local lender programmes e.g. Financial Access, Mercy Corps, MIF Ecomicro, FS-UNEP MEBA	Cash flow based credit assessments, taking account of farmer skill and farm condition. MIF Ecomicro and MEBA are grant funds supporting the greening of MFI portfolios in LAC. None of the initiatives include (i) CSA in loan conditions, or (ii) CSA monitoring tools, which lie at the heart of the Climate Smart Lending Platform's approach.
National commercial bank initiatives e.g. Equity Bank Kenya/AGRA/IFAD, HDFC India	HDFC 'correspondent banking' via value chain actors who act as loan providers, to reduce transaction costs and increase exposure. Working in remote areas, competition from state banks with subsidized loans and costly standard accounting practices persist as key challenges.
Agribusiness channeled finance e.g. NWK Agri-Services and Cargill, Zambia, Pepsico, ICICI and WRL, weather insurance for contract farming, India.	Success and strong repayment record due to tight relationship between growers and the company, mutually beneficial commercial incentives, technical assistance, careful farmer selection, prompt payment systems and individual farmer monitoring.
Environmental funds e.g. Moringay, Althelia Ecosphere Fund, Terra Bella, Eco-Enterprises Fund, Livelihoods Fund.	Strong environmental outcome focus. Many are venture equity funds. Mostly project based.
Impact investing and blended capital, public-private partnership funds e.g. AgDevCo, Deutsche Bank AATIF, IFAD ASAP, LAFCo, Root Capital.	Funding agri-SMEs and cooperative.

- A comprehensive program of data collection to feed the lenders' climate-smart credit scoring systems: Data would be collected regularly from borrowing smallholders, to monitor implementation of climate-resilient practices.

Collected over time, this data has the potential to demonstrate a material link between a sustainably-managed farm and the farmers' credit worthiness, whereby CSA practices, combined with Good Agricultural Practice, enhance both productivity and resilience against climate shocks, and thus reduce loan default risk. A recent analysis of the implementation of Rabobank's sustainability policy in Brazil shows that there is a correlation between the financial health and environmental performance of farmers (Bini et al. 2016).

The cost of farm monitoring and data collection is typically high, dependent on field officer visits to remote and scattered farms. These costs can be reduced by using mobile technologies to enable remote monitoring. Examples already in use include F3 Life's mobile-device based, georeferenced environmental monitoring and credit-scoring tool, as well as EchoMobile and Akvo FLOW platforms and emerging use of drones and satellite technology where applicable. Meanwhile, financial technology (FinTech) also has the potential to significantly reduce transaction costs of serving farmer clients, a challenge to financial institutions serving smallholder farmers. FinTech can also support efficient banking relations through, for example, Mobile Money and automated loan tracking tools.

FINANCING STRUCTURE AND RELATIONSHIP WITH OTHER FUNDS

In Phase 1, a series of projects will be developed in collaboration with different types of financial institutions in three different geographies and crop contexts (nine projects in total). We present possible financing structures in Section 4.3. We assume that the sources of capital in the short to

medium term will be flexible. In some contexts it will need to be largely concessional to incentivize lenders and farmers to adopt climate-smart loans, enable lending at reasonable rates. In this first phase and in other contexts, this finance will be provided entirely from the balance sheet of the lender. However, with time, commercial finance will be blended in with appropriate credit enhancements. Concessional lending is expected to be required in the case of potential local lenders in certain circumstances, to incentivize lenders to adopt the new systems, but a certain contribution would also be expected from the local lender to avoid moral hazard. We assume 30% in our proposed financing structure but this may vary. For instance in Latin and Central America, it has been reported that liquidity is high and micro-finance institutions (MFIs) will not require concessional capital for on-lending. Hence the platform in Latin and Central America may be solely grant-based. This is not, however, the experience of the Proponents in Africa so far. The Platform is flexible to adopting different financing structures under individual projects depending on local contexts and partners.

Contractual and financial relationships between external service providers and service users in the Platform will be defined on a case by case basis and may include co-lending and joint venture agreements to merge funding or fees for use of climate-smart lending tools and services. Aligning with existing funds may take time but this will bring the benefits of existing operational structure and processes. A dedicated fund may also be considered in the medium term as an incentive to scale up and speed up roll-out.

INNOVATION AND RISK MITIGATION

INNOVATION: THE PLATFORM MAINSTREAMS CLIMATE-SMART METRICS INTO SMALLHOLDER LENDING

While there are several funds and initiatives that provide lending or technical assistance to smallholders, the key innovation of this instrument is a 'first time ever' incorporation of climate-smart metrics into credit assessments and embedding climate resilience improvements into loan terms and conditions. This reduces climate risk exposure for both farmers and lenders as reflected in lending decisions (see Figure 2).

A handful of organizations are working to build credit scores of smallholder farmers and bespoke credit assessment tools – most notably Financial Access and FS-UNEP's Microfinance for Ecosystem Based Adaptation project. However, most existing smallholder lending initiatives are focused on improving farm productivity and farmer livelihoods, and do not integrate objectives to reduce climate risk outside of weather variability despite expected compatibility with adoption of CSA (see Table 1).

RISK ALLOCATION: CLIMATE-SMART LENDING REDUCES RISKS FOR FARMERS AND LOCAL LENDERS IN PARTICULAR BUT ALSO UPSTREAM BUSINESSES AND INVESTORS

Currently, most smallholder farmers have little or no access to formal and efficient financing due to lenders' high (perceived) risks, particularly related to repayment in the case of insufficient farmer returns, low productivity, low quality, fluctuating prices, or weather shocks. These are expected to become more common as climate change impacts become more prominent.

This lack of capital is exacerbated by a lack of collateral, savings, or insurance, as well as the high transaction costs of working in, monitoring and evaluating agricultural project outcomes in

remote areas with dispersed actors. Financing available to smallholders therefore tends to be prohibitively expensive, largely available from informal sources such as traders and local money lenders, rather than financial institutions.

Smallholders therefore often lack access to capital that would allow growth and enhanced resilience to climate change, while financial institutions lack appropriate tools to address climate risks in their portfolios e.g. credit-scoring systems, loan product designs and monitoring systems.

While the Platform reduces some risks associated with smallholder lending by increasing productivity and building up farmer resilience, price and foreign exchange risks remain and must be mitigated where possible. Additional context-specific barriers may also arise such as poor supply chain infrastructure, inflexible import/export tariffs and controls on foreign borrowing and exchange rates (AGRA 2014).

IMPACT

The Platform could help farmers achieve two to four times higher profits and reduce their exposure to losses due to climate impacts, as well as reduce credit provider's climate related default risk, mobilizing up to USD 97 million in private finance

QUANTITATIVE MODELLING

We have carried out quantitative scenario analysis to explore the potential impact of the Platform.[3] The results are preliminary and prepared for illustrative purposes only. We first simulate the impact of CSA practices on farmer revenues and second on local lender default risk. The modelling looks primarily at rice production in Indonesia, but the approach could be applied for other geographies and crops where data is available. Rice was chosen due to expected climate impacts on production and its importance to Indonesia's domestic economy and livelihoods where smallholders dominate production.

Impact of CSA lending on farmer revenues[4]

Figure 4 shows that, in the event of unexpected climate events, CSA practices[5] improve farm resilience and protect farmers against financial shocks, reducing lost yields and as a result lost revenues by 38% compared to farmers who do not adopt CSA practices.[6] It also shows that farmers adopting CSA practices will be able to receive, on average, 24% higher revenues per year from produce sales due to increased farm

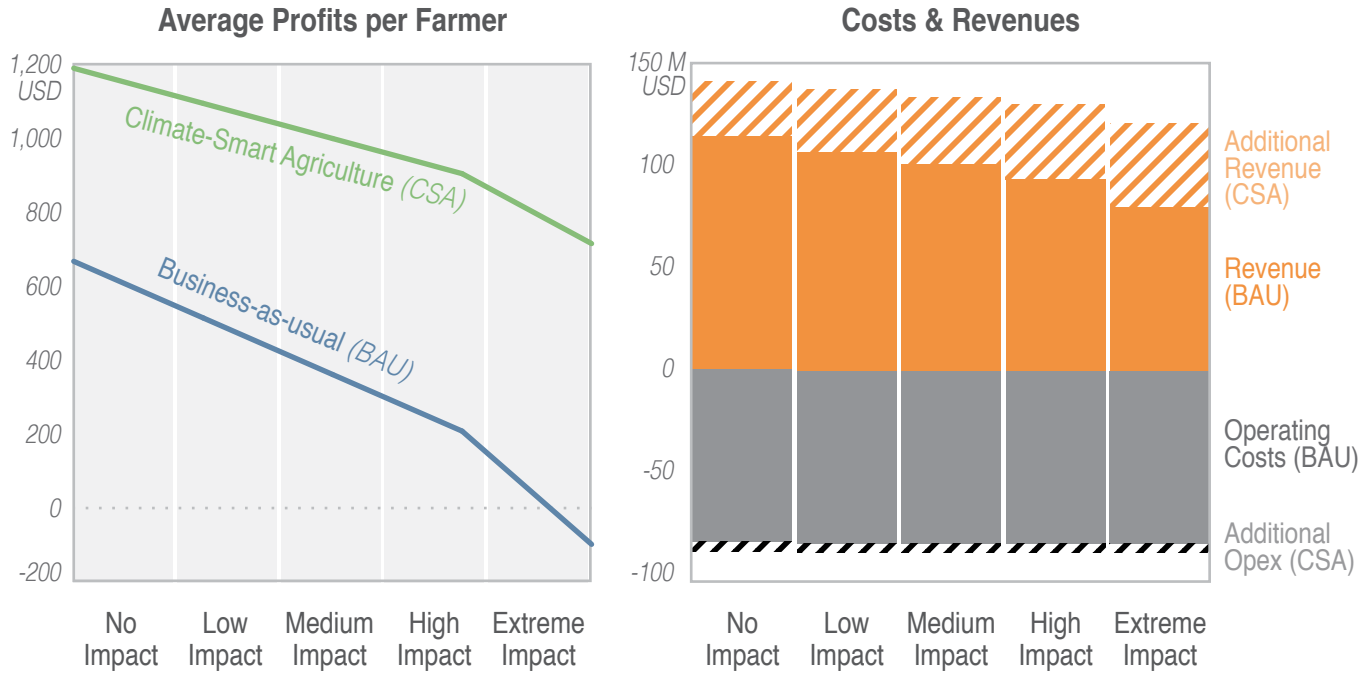
3 More accurate modeling requires probabilistic climate impact risk data, as well as impact data which takes account of extreme events, variability and long-run climate effects. We assume that CSA measures cut yield losses by 50% in the year of a climate event. More analysis would be needed to ensure that CSA practices written into loan conditions can achieve such reductions.

4 Our simulation demonstrates the impact of 45,000 rice farmers adopting CSA practices, regardless of financing sources and terms.

5 Possible CSA measures for rice include reducing post-harvest loss, drought tolerant seeds, water pumps and storage facilities, guidance to farmers on crop calendar (ASEAN et al. 2015).

6 Given that current estimates of climate impact on rice productivity available in the literature (Oktaviani et al. 2011, Syaukat 2011, ASEAN 2013, Mohanty et al. 2012) do not take into account volatility of climate change and extreme events, our modeling conservatively assumes the higher end of possible climate impacts on crop production output, at 12.5% loss as "medium impact" while "extreme impact" assumes a 30% loss. Reduced yield and revenue losses based on 50% assumption applied to total production estimates.

Figure 4: Impact simulation results: BAU and CSA scenarios



productivity and price premiums obtained for better quality outputs under normal weather conditions. Additionally, farmers who adopt CSA receive significantly higher profits under adverse weather conditions, earning, on average, 2-4 times higher profits[7] compared to the less resilient farmers.

Impact of CSA lending on lender default risk

Figure 5 suggests that adoption of CSA practices by farmers can reduce the credit provider's climate related default exposure considerably. Adoption of CSA practices enables farmers to access higher amounts of debt, owing to increased productivity and higher resilience to weather impact. This leads to increased income and family livelihoods (in particular if women farmers are involved), while adoption of CSA practices reduces losses in the event of unexpected climate events compared to farmers who do not implement CSA practices, making CSA farmers less risky for lenders.[8] [9]

ENVIRONMENTAL AND SOCIAL IMPACTS

Environmental and social impacts of the Climate-smart Lending Platform include:

- Better protected livelihoods due to enhanced resilience of farmers to climate shocks. In F3 Life's demonstration site, a 95% rate of conversion to climate-smart agricultural

7 We also simulate the impact of CSA practices on the income of tea smallholder farmers in Kenya, albeit though data is less reliable. Our analysis suggests that, on average, farmers who adopt CSA practices earn 43% higher revenues and 46% higher profits under various weather impact scenarios. In addition, CSA practices can also reduce lost revenues resulting from climate impacts, on average, by 34%.

8 We consider the impact of CS lending on a single, average farmer, and therefore, do not take into account the wide variation of farm profiles (i.e. productivity, cost structures, additional income from non-farming activities). The estimate does not therefore assess the impact of adverse weather conditions on a credit provider's loan portfolio.

9 We use an adjusted Debt Service Coverage Ratio (DSCR) as an imperfect measure to assess the local lender´s risk exposure to unexpected climate events when lending to smallholder farmers at different loan amounts. We consider farmers with a DSCR >1.3 to be bankable. DSCR is typically measured as revenue minus operating costs over debt repayment costs (interest plus principal). Given that we are assessing working capital agriculture loans, we replace operating costs in this calculation with a portion of the costs needed to fund operating costs in the next farm cycle, to more accurately assess farmer's ability to repay the loans.

Figure 5: Simulation Results of Impact of Yield Loss Caused by Climate Shock on Creditworthiness

Debt Service Coverage Ratio (BAU)

Debt Split	No Impact	Low Impact	Low-Med Impact	Med Impact	Med-High Impact	High Impact
20%	4.0	3.3	2.7	2.1	1.5	0.8
30%	2.6	2.2	1.8	1.4	1.0	0.5
40%	2.0	1.7	1.4	1.0	0.7	0.4
50%	1.6	1.3	1.1	0.8	0.6	0.3
60%	1.3	1.1	0.9	0.7	0.5	0.3
70%	1.1	1.0	0.8	0.6	0.4	0.2

Debt Service Coverage Ratio (CSA)

Debt Split	No Impact	Low Impact	Low-Med Impact	Med Impact	Med-High Impact	High Impact
20%	5.1	4.7	4.4	4.0	3.6	3.2
30%	3.4	3.2	2.9	2.7	2.4	2.2
40%	2.6	2.4	2.2	2.0	1.8	1.6
50%	2.0	1.9	1.7	1.6	1.4	1.3
60%	1.7	1.6	1.5	1.3	1.2	1.1
70%	1.5	1.4	1.2	1.1	1.0	0.9

practices has been achieved. This compares with 5-15% of participants in standard agri-environmental programs.

- Job creation in the agricultural value chain, in local financial institutions and associated service/TA providers.
- Improved livelihoods, social, and educational opportunities as a result of increased farm productivity and increased incomes for farming households. Half of F3 Life's demonstration clients are female farmers and have used loans both to improve farm productivity as well as household well-being. Similar impacts can be expected in other climate-smart loan products.
- GHG emissions reduction through incorporation of climate-smart loan conditions related to increasing productivity, decreasing agricultural land expansion and maintenance of natural landscapes

The scale of these impacts cannot be quantified at this stage as they will be highly dependent on the loan product design, geographical and crop context.

PRIVATE FINANCE MOBILIZATION AND REPLICATION POTENTIAL

Table 2 presents an overview of the types of financing and support requirements foreseen for the various phases of development of the CSLP.

As described above, during Phase 1, a series of projects will be developed in collaboration with different types of financial institutions in three different geographies and crop contexts (nine projects in total). These projects would be funded

variously under partnerships, which bring together relevant local and international organizations. Table 3 presents estimates of the funding needs for each such project, while Table 4 aggregates funding needs to show overall funding needs for each Phase of development and for the running of the platform itself. Estimates of financing needs for roll out of the Platform in Phases 1 to 3 are based on a cash flow model for Indonesian rice smallholders. This financing structure is illustrative only. More context-specific work is needed to build a simple and cost effective financing structure suitable for eventual implementation partners, which builds on the experience of existing smallholder financing initiatives.

The long-term goal of the Platform is to support the mainstreaming of CSA metrics into the credit scoring systems of financial institutions and other organizations providing credit to smallholders. This presents a substantial opportunity to leverage public climate finance to mobilize private finance in the longer term through the mainstreaming of climate-smart financing tools, with the total supply of smallholder finance currently estimated at more than USD 50 billion annually and with needs estimated at USD 200 billion (Dalberg 2016).[10] This is also illustrated in the increasing leverage ratios shown from Phase 1 to 3 in Table 4.

10 Smallholder lending in South and Souteast Asia, sub-Saharan Africa and Latin America, excluding China, Central Asia, Middle East, North Africa and Eastern Europe.

IMPLEMENTATION PATHWAY

Figure 6: Proposed Timeline for the Climate-smart Lending Platform

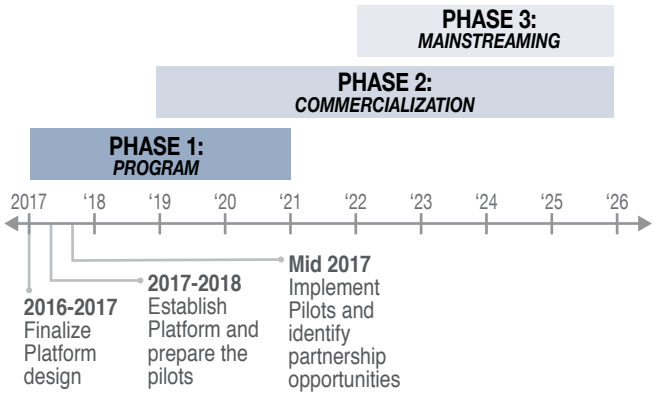


Figure 6 presents a proposed timeline for the development of the Platform. The following key milestones are envisaged for its establishment:

1. 2016 – 2017: Identify partnerships for Phase 1 project implementation and design detailed projects and Platform specifications. Identify funding sources for both.
2. 2017 – 2021: Establish Project partnerships and Platform and prepare for issue of first loans, including a) identifying countries, crops, and potential CSA practices/ investments for the first loan products, b) verifying local regulations on rural bank lending etc. c) determining financing needs and conditions, and d) determining technical assistance needs
3. 2019 – 2026: seek to implement projects with purely commercial capital
4. From mid-2017: Make first loans and identify partnerships for Phase 2 (scale-up)
5. 2020 – 2026: mainstreaming approaches in local FIs

KEY TAKEAWAYS

The Climate-smart Lending Platform brings together the approaches, tools, and actors necessary to facilitate scaled up climate-smart lending to smallholders for a wide range of CSA practices and investments. Ultimately, the Platform aims to reduce climate risk in the portfolios of financial institutions and in the practices of farmers. This in turn would help unblock and upscale financial institutions' lending to smallholder farmers, and, together with other efforts aimed at improving predictable smallholder lending, allow the farmers to invest in improving their livelihoods.

The Climate-smart Lending Platform aligns well with the Lab's key criteria in the following ways:

- **Innovative:** Climate-smart lending with climate-smart loan conditions and credit risk scoring are unique propositions and will help to mainstrepoam climate risk considerations in the portfolios of financial institutions and in the practices of farmers
- **Catalytic:** Each Phase 1 project could mobilize an estimated USD 0.9 million of private finance while replication in a scaled-up Phase 2 could mobilize USD 154 million. The Platform aims to leverage private finance on a ratio of 0.3 in Phase 1, 1.8 in Phase 2 and 218 in Phase 3 as the lending methodologies established by the Platform are mainstreamed.
- **Transformative:** The long-term goal is to mainstream CSA metrics into the credit scoring systems of local financial institutions without concessional backing, changing the current business model. This is a USD 50 billion market with the potential to grow to USD 200 billion, which the Platform aims to harness for climate change adaptation and mitigation purposes.
- **Actionable:** Considerable work is required to forge necessary partnerships, develop tools and methodologies, identify suitable farmer groups and local lenders, but sufficient early grant and concessional loan funding can provide the resources and incentives necessary to make this happen and enable future replication and scale up.

In order to move forward, the Platform will require support from The Lab and other stakeholders. This support could include financial support as grant and concessional finance, as well as connections to local lenders, tool developers and technical assistance providers to further develop platform design specifications including projects and contractual relationships.

Table 2: Proposed financing structure

	Phase 0 (2016-2017)	Phase 1 (2017-2021)	Phase 2 (2019-2026)	Phase 3 (2022-2026)
Target Number Farmers	0	45,000	500,000	1,000,000
Financing Composition				
Concessional Finance				
Commercial Finance				
-Third party debt investor				
-Local Lender Balance Sheet				
First-Loss Guarantee				
Grant Support				
Grants for TA to farmers				
Grants for loan product and tool development and TA for local financial institution				
Grants to run platform				

Table 3: Estimated financing and grant needs for one five-year project, based on Indonesian rice farming cash flow model

Description	Phase 1 costs per project
Target Number of Farmers	5,000
Timeline	2017 - 2021
Loan Amount per Farmer	USD 500 - 1,000
Target Interest Rate[a]	2.0% per month
Individual Loan Tenor	4 - 5 months for minimum 3 years lending to each farmer
Concessional Finance (USD m)[b]	2.1*
Local Lender Balance Sheet (USD m)	0.9*
Total Financing (USD m)	3.0
Grants for farmer TA (USD m)[c]	0.44
Grants for loan product and tool development and TA for local financial institution (USD m)[d]	0.74
Total Grant (USD m)	**1.2**

* This sum varies according to availability of local lender funds for on-lending.

a Indicative interest rates - actual rates will depend on various factors, including market condition and credit providers' operating cost structure.

b Concessional finance terms: interest rate of 4.35% p.a., 3-year loan tenor with bullet payment; Credit provider contributes 30% from their balance sheet.

c Technical Assistance funding estimates are based on the assumption that 1 FTE TA officer is needed per 300 farmers at an average cost of USD 6,000 p.a. per TA officer, plus additional 20% running costs per year. Costs are assumed to reduce to 70% from year 3 and to 50% from year 4, as farmers are on-boarded and need less support.

d Including development of the climate-smart lending tools, establishment and implementation of projects, as well as financial training and support for local lenders. This number is expected to decrease as "economies of scale" are achieved as number of projects sites are increased. Grant funding per site is expected to phase out completely as the local lender assumes costs of tool use.

Table 4: Estimated financing and grant needs based on Indonesian rice farming cash flow model

Description	Phase 1[a]	Phase 2[b]	Phase 3
Target Number of Farmers	45,000	500,000	1,000,000
Timeline	2017 - 2021	2019 - 2026	2022 - 2026
Loan Amount per Farmer	USD 500 - 1,000	USD 500 - 1,000	USD 500 - 1,000
Target Interest Rate	2.0% per month	2.3% per month	3.3%
Individual Loan Tenor[c]	4 - 5 months for minimum 3 years lending to each farmer	4 - 5 months for minimum 3 years lending to each farmer	4 - 5 months for minimum 3 years lending to each farmer
Concessional Finance (USD m)[d]	18.7	0	0
First Loss Guarantee (USD m)[e]	0	30.7	0
3rd party debt investor (USD m[f]	0	107.6	152.8
Local Lender Balance Sheet (USD m)	8	46.1	65.5
Total Financing (USD m)	**26.7**	**184.5**	**218.3**
Grants for TA to farmers (USD m)[g]	4	18.7	0
Grants for project devt, tool development, TA for FI (USD m)[h]	6.7	31.2	0
Grants to run platform (USD m)	2	3.2	1
Total Grant (USD m)	**12.7**	**53.1**[i]	**1**
Private Leverage Ratio	**0.3**	**1.8**	**218**

a We assume that a MFI or value chain actor (e.g. processor) will serve as the credit provider, while also contributing 30% equity. We assume 30% in our proposed financing structure but this may vary. For instance in Latin and Central America, it has been reported that liquidity is high and micro-finance institutions (MFIs) will not require concessional capital for on-lending. Where non-traditional lenders may act as a lender, full concessional finance would likely be required for on-lending.

b Concessional finance terms: interest rate of 4.35% p.a., 5-year loan tenor with bullet payment;

c Phase 1 lasts 5 years with 15000 new farmers coming on board each year. For Year 1 farmers, working capital loans last 4-5 months each and can be repeated twice annually for a period of 5 years. For farmers coming on in Year 3, lending will last for a total of 3 years. Phase 2 lasts 8 years and follows a similar pattern with 100,000 new farmers coming on board each year.

d Concessional finance terms: interest rate of 4.35% p.a., 3-year loan tenor with bullet payment; Credit provider contributes 30% equity.

e Assumes coverage of 20% of total funding. The use of first-loss guarantee is only for illustrative purpose - other credit enhancement instruments could also be applied.

f Commercial finance terms: interest rate of 18.0% p.a., 3-year loan tenor with bullet payment; Credit provider contributes 30% equity.

g Technical Assistance funding estimates are based on the assumption that 1 FTE TA officer is needed per 300 farmers at an average cost of USD 6,000 p.a. per TA officer, plus additional 20% running costs per year. Grant needs are expected to decrease by 70% in Phase II compared to Phase 1, for both farmer TA and support to FI to onboard tools and develop loan products. This reduction reflects firstly, likely “economies of scale” for service providers as number of projects sites are increased and following experience built up in Phase I and secondly, technical assistance costs coming down through adoption of new technologies and experience and thirdly integration of climate-smart elements into existing client engagement activities of local lenders, leading to the costs being partly internalized into the local lenders business model.

h Including development of the climate-smart lending tools, establishment and implementation of 3 projects, as well as financial training and support for local lenders. Costs are discounted by 50% in Phase II to account for likely “economies of scale” achieved as number of projects sites are increased and experience built up in Phase I.

i It may be possible in time to integrate TA costs in the loan price of the local lender.

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ANNEX 1: CLIMATE SMART AGRICULTURE DEFINITIONS AND PRACTICES

Climate-Smart Agriculture (CSA) is an approach to help the people who manage agricultural systems respond effectively to climate change, and pursues the triple objectives of sustainably increasing productivity and incomes, adapting to climate change, and reducing greenhouse gas emissions (FAO 2013). Table A-1 lists examples of CSA practices at the farm level that can be applied by farmers through CSA lending, depending on local, country and crop specific contexts and needs. Loan products may also be developed to address the climate-resilience and GHG impact of landscapes at a larger scale beyond the farm level e.g. on farm agroforestry by dairy farmers or off-farm maintenance of forest areas bordering the farm.

Table A-1. Examples of CSA practices (FAO 2013)

Crop management	• Mulch cropping • Cover cropping • Alteration in cropping patterns and rotations • Crop diversification • Use of high quality seeds and planting materials • Pest, weed and grassland management • Pollination management • Improved cultivation techniques • Appropriate fertilizer and manure use (precision farming)
Livestock management	• Improved breeds and species • Rotational grazing • Composting, improved manure handling and storage • Diet supplementation • Improved feed quality • Improved grass species • Low-cost fodder conservation technologies • Alteration of animal species and breeds • Alteration of ratio of crop-livestock & crop-pasture
Water management	• On-farm water storage: water harvesting • Groundwater development • Breeding for resistance to droughts and floods • Improved drainage system • Introduction of appropriate fish species • Adapting cropping (and fish harvesting) calendar • Supplementary irrigation • Alternate wet and dry production system (for rice farm)
Soil management	• Improving soil water storage • Controlling soil erosion • Improving soil structure with organic matter • Managing soil organic matter for soil carbon sequestration • Boosting nutrient management • Restoration of cultivated peaty soils and degraded lands
Energy management	• Adopting and maintaining fuel efficient engines • Adopting no-till practices • Controlled building environments • Heat management of greenhouses • Propeller designs of fishing vessels • Using bio-fertilizers • Efficient machinery manufacture • Use of information and communication technologies