The Lab
Global Innovation Lab for Climate Finance

AGRI-SMALLHOLDER RESILIENCE FUND

INSTRUMENT ANALYSIS
OCTOBER 2025

Agri-Smallholder Resilience Fund (ASRF)

LAB VEHICLE ANALYSIS

October 2025

The Lab identifies, develops, and launches sustainable finance vehicles that can drive billions to a low-carbon economy. The 2025 Lab cycle targets three thematic areas (mitigation, adaptation, and sustainable agriculture and food systems) and five geographic regions (Brazil, East & Southern Africa, India, Latin America & the Caribbean, and the Philippines).

AUTHORS AND ACKNOWLEDGEMENTS

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SUMMARY

The Philippines ranks among the world's most climate-vulnerable nations, and escalating climate shocks including severe typhoons, prolonged droughts and coastal flooding have deeply impacted the livelihoods of smallholder farmers and fisherfolk. While these producers sustain food security and drive rural economies, they face obstacles in accessing the financing needed to adapt to the escalating climate shocks. Traditional financial institutions persistently fail to meet their needs, with key barriers including the perceived high credit risk of producers, financial instruments misaligned with seasonal production cycles, and a persistent lack of actionable data to support informed lending.

Given this challenging climate finance reality, Philippine agri-tech platform Mayani is launching the Agri-Smallholder Resilience Fund (ASRF). The smallholder centric USD 22.5 million blended debt fund will accelerate smallholder transition to sustainable production practices, expand national access to fresh produce, and cut post-harvest losses.

- **Innovative**: The fund adopts a whole-of-value-chain approach to de-risking that combines market offtake, parametric insurance, climate-smart agri-inputs, and science-based agronomic support to strengthen lending and repayment viability. Ring-fencing loan proceeds exclusively for tangible production and post-harvest needs and leveraging proprietary supply chain data to credit-score smallholders holistically further sharpen the innovative nature of the instrument.
- **Actionable**: Mayani's nuanced understanding of the sector, as well as initial partnership with GCash[1] and HSBC[2], indicates positive market buy-in and the early traction necessary for successful implementation. The localized networks and domain expertise of Mayani also strengthens its ability to secure additional strategic partnerships in support of ASRF.
- **Financially Sustainable**: ASRF will pair its lending to cooperatives with technical assistance to adopt climate-smart practices, ensuring strong repayment capacity. In addition to interest income, the fund captures revenues from input facilitation, parametric insurance, and post-harvest cold storage. These diversified streams generate stable returns for commercial lenders and position the fund for long-term market viability.
- **Catalytic**: Structured with a capital stack that includes a catalytic first-loss layer, ASRF de-risks investments in rural smallholders and builds confidence among private sector investors in what is otherwise seen as a risky sector. By absorbing early portfolio volatility, the first-loss tranche enables the fund to expand lending to underserved cooperatives and generate the repayment data needed to establish credit histories. This growing dataset strengthens underwriting models, reduces information asymmetry, and consequently supports the scaling of private capital into smallholder agriculture.

A USD 1 million pilot will be deployed within the first year of the blended debt fund's operations, geared towards financing an agri-cooperative of highland farmers in the Cordillera Mountain region of the Philippines. This will be done after the formation of a Singapore-domiciled Special Purpose Vehicle with the assistance of a regional law firm. From thereon, the fund's direction is to deploy the remaining AUM over the remainder of the 5-year fund life.

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[1] GCash is a leading Philippine mobile wallet and digital finance platform, which has partnered with Mayani to extend loans to rural farmers and fisherfolk (Asian Banking & Finance 2024).

[2] HSBC, through its grant programs and partnerships such as with the Bayan Family of Foundations, has supported Mayani in capacity development on cooperative governance.

The Lab Secretariat recommends endorsing the Agri-Smallholder Resilience Fund (ASRF), given its clear and implementable pathways and structurally sound framework. Within the next 12 months, ASRF is expected to progress from securing anchor investors to operationalizing the SPV, while finalizing a comprehensive risk management system. The timeline appears achievable given the early progress and structured implementation plan.

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CONTEXT

Facing severe climate risks, systemic financial exclusion, and a USD 7 billion credit gap, Filipino smallholders need finance for affordable credit, climate-smart tools, insurance, and market access to reduce risks and boost resilience, productivity, and income.

The Philippines' agricultural sector is central to national food security and rural livelihoods but faces mounting threats from climate change, systemic financial exclusion, and entrenched structural inefficiencies. Smallholder farmers and fishers who produce most of the country's rice, corn, vegetables, and coastal catch are among the most vulnerable. Despite contributing 8.9% to GDP and employing nearly one-fourth of the workforce, the sector received only 2.6% of total bank lending in 2022 (Skalon and Plevin 2024). Less than 30% of smallholders have access to formal credit, leaving many reliant on informal lenders charging rates as high as 30% per month. This has created an agricultural credit gap of about USD 7 billion, reflecting unmet loan demand (Ducanes 2020; ACPC 2016). Persistent barriers include perceived high borrower risk due to production volatility and insecure land tenure, and data deficits that hinder accurate underwriting (Capacio et al. 2021; Poliquit 2006; World Bank 2018; FAO 2017). Moreover, the low-touch lending models currently available to smallholders provide capital without technical support, making them ill-suited to bridge these risks in an advisory-intensive sector. These constraints perpetuate financial exclusion and underinvestment in a sector critical to both food security and climate resilience.

Climate shocks further compound these challenges. Agriculture already suffers average annual losses of USD 136 million from typhoons and droughts, with damages projected to reach USD 500 million by 2050 (Rosegrant et al. 2015; Dikitanan et al. 2017). Weak logistics and insufficient cold storage drive post-harvest losses of up to 30%, while reliance on intermediaries suppresses farmgate prices and farmer incomes (Philstar 2024; FAO 2019). These weaknesses, coupled with intensifying climate risks, trap smallholders in cycles of low productivity, chronic debt, and rising vulnerability. Without systemic interventions that link finance, climate-smart tools, and reliable markets, these pressures threaten to deepen poverty and undermine food security.

At the same time, these gaps create opportunities to reimagine rural finance. Blended finance can unlock capital by combining concessional and commercial funds to provide affordable loans, de-risking investments and encouraging banks and investors to serve smallholders. With accessible credit and tailored services, smallholders can increase productivity, reduce debt burdens, and build sustainable livelihoods. Linking loans to bio-inputs, regenerative farming, and index-based insurance fosters climate-resilient production systems. Strengthened market linkages through offtake agreements connect farmers directly to buyers, reducing post-harvest losses and opening premium markets for traceable, eco-friendly produce. Successful repayment then reinforces lender confidence and attracts additional private capital into rural communities. Together, these drivers create both a scalable investment opportunity and a pathway for inclusive rural transformation, strengthening rural livelihoods and laying the foundation for a more sustainable and secure food system.

By narrowing the USD 7 billion credit gap and ensuring access to climate-smart finance, insurance, and stable markets, smallholders can shift from vulnerability to resilience and from subsistence to entrepreneurship.

DESIGN AND POSITIONING

1. INTRODUCTION TO THE VEHICLE

ASRF blends tiered capital (senior/junior/catalytic) to provide Philippine smallholders with climate-smart finance, insurance, and market access, balancing risk-adjusted returns with measurable climate and socio-economic impact.

1.1 **INVESTMENT THESIS:** TRANSFORMING SMALLHOLDER AGRICULTURE FROM RISK TO RESILIENT BANKABLE BUSINESSES

The Agri-Smallholder Resilience Fund (ASRF) presents a unique platform to generate measurable, risk-adjusted returns while addressing a critical market failure: the USD 7 billion agricultural credit gap that leaves Philippine smallholder farmers financially excluded and acutely vulnerable to climate shocks. ASRF's thesis is that by systematically de-risking the agricultural value chain through a structured, blended finance approach, it can unlock the latent economic potential of smallholders, transforming them from climate-exposed borrowers into resilient entrepreneurs.

To achieve this, the Fund applies a whole-of-value-chain model that tackles the root causes of risk in smallholder finance. It improves bankability through offtake-based lending and uses loan proceeds to finance climate-smart inputs, cold storage facilities, and parametric insurance, while integrating agronomic support and data-driven underwriting. This approach is fully aligned with the Fund's Theory of Change (see Annex A), which details how these integrated interventions translate into resilient, inclusive, and climate-smart smallholder value chains.

1.1.1 THEORY OF CHANGE

The Fund's approach follows a clear causal chain (see Annex A). At the activity level, ASRF mobilizes blended capital, applies risk-mitigated loan underwriting, and delivers farmer training and capacity-building alongside input procurement and distribution.

These activities lead to tangible outputs, including disbursement of climate-smart input loans, sales of index-based insurance policies, training sessions for farmers, and execution of offtake agreements with corporate partners. From these outputs emerge intermediate outcomes: reduced production risks, more stable market demand, strengthened farmer capacity, and improved lender confidence. Together, these outcomes enable smallholders to increase adoption of climate-smart practices, improve their risk-return profiles, and gain access to inclusive finance.

The ultimate impact is greater resilience and regenerative capacity of smallholder agri-fishery value chains, reducing vulnerability to climate shocks and improving farmer livelihoods and incomes. This impact contributes to the overarching goal of accelerating the transition of smallholder farmers and fisherfolk to sustainable and climate-resilient farming practices.

Investment Pillars & Expected Impact

To overcome the barriers that keep smallholders excluded from finance, ASRF integrates four mutually reinforcing verticals that together move farmers from high-risk operations to resilient, bankable businesses:

- **Working capital loans and climate-smart inputs** such as drought-resistant seeds and bio-pesticides raise farm productivity by 30–50%, strengthening household incomes and improving repayment capacity.
- **Parametric insurance** delivers automatic payouts during climate shocks, stabilizing incomes and lowering default risk.
- **Offtake agreements with institutional buyers** provide guaranteed markets and predictable cash flows, enabling reinvestment and long-term planning.
- **Cold storage and post-harvest infrastructure** reduce losses from ~30% to <10% and open access to premium markets, raising farmer margins and cooperative revenues.

Together, these verticals mitigate production, market, and climate risks while enhancing smallholder competitiveness, creating a scalable pathway for both impact and returns.

Financial Viability

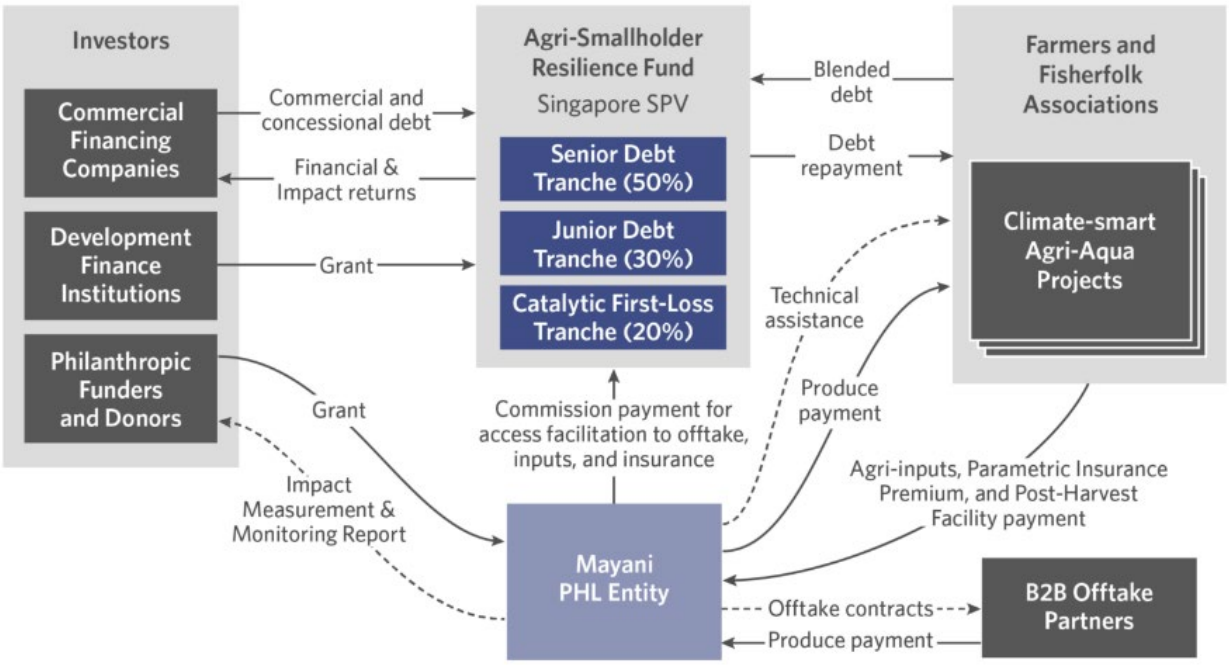
ASRF's blended debt structure ensures that financial sustainability is embedded alongside systemic impact. Senior tranches deliver stable yields to institutional investors, while catalytic and junior capital absorb early-stage risks. The Fund targets ~9% internal rate of return (IRR) with a strong Debt Service Coverage Ratio (DSCR) and stress-tested downside protection. By reducing volatility in farmer incomes through bundled insurance, guaranteed markets, and improved infrastructure, the Fund stabilizes portfolio cash flows and enhances investor confidence.

1.2 **VEHICLE MECHANICS:** MULTI-TIERED FUNDING WHILE SCALING IMPACT

ASRF is a blended finance instrument designed to mobilize capital at scale while targeting the root constraints faced by smallholders in the Philippines. The Fund channels investment through agri-aqua cooperatives to finance climate-resilient production practices, post-harvest infrastructure, and integrated risk management solutions. Mayani, the proponent of ASRF, is Philippines' fastest growing agritech platform (USA Today 2024) and aims to empower rural smallholder farmers and fisherfolk across the Philippine archipelago. It has a strategic partnership with GCash (backed by Ant Financial and MUFG) to provide smallholders with access to formal and affordable credit, promoting sustainable agricultural practices and driving rural financial inclusion. To scale its financing reach, a more robust and diversified funding structure is required, leading to the development of ASFR, which will expand coverage to 50,000 farmers and fisherfolk managing 50,000 hectares over the next decade.

As illustrated in Figure 1, ASRF aggregates different types of capital, such as commercial senior debt, concessional junior debt, and grants, into a special purpose vehicle (SPV) domiciled in Singapore. The SPV structure ensures enforceability, cross-border efficiency, and institutional-grade governance.

Figure 1. Instrument Mechanics



The vehicle integrates core lending with complementary services to address structural barriers to smallholder finance. At the center is cooperative lending tied to climate-smart inputs and corporate offtake contracts, which generate predictable income streams and strengthen repayment capacity. Around this core, ancillary services such as parametric insurance and cold storage reduce production and market risks. Delivered through specialized third-party partners, these layers create both resilience at the farmer level and stability at the fund level, while diversifying revenue streams through commissions. The sales of climate-smart agri-inputs are facilitated by ASRF and the commission revenues from offtake contracts and climate smart agri-inputs flow directly into ASRF.

1. **Core Business:** ASRF provides working capital loans, backed by offtake agreements, to farmers and fisherfolk.
    a. **Smallholder Cooperative Loans** - these loans are tied to existing offtake agreements with buyers, such as food processors and aggregators, allowing cooperatives to invest in productivity-enhancing technologies and climate-smart inputs. This directly addresses the USD 7 billion credit gap that continues to hinder smallholder viability.
    b. **Corporate Offtake Contracts** - de-risks the vehicle by providing secure, stable demand for smallholders. Contracts with reliable buyers reduce price volatility and improve loan repayment rates. Facilitation of the offtake agreement contributes 1% to 2% fees on a USD 36 billion market.
    c. **Climate-Smart Agri-Inputs** - resale of drought-resistant seeds, drip irrigation systems, and biofertilizers. By bundling these inputs with financing, the Fund improves uptake while aligning payments with producitivity gains. Selling these items can generate 2% to 3% commissions for ASRF.

2. **Ancillary Services: Parametric Insurance and Cold Storage Facilities through Third Party Providers**
    a. **Parametric Insurance** is offered alongside loan packages. The insurance is managed by third party providers and mitigates production risk by offering automated weather-indexed payouts, giving farmers the opportunity to safeguard themselves and their lenders from the financial impact of climate shocks. The Fund earns about 15% to 20% commissions on

insurance premiums, aligned with current benchmarks in the USD 120 million climate risk market, and it's expected that uptake will increasingly become the norm among all farmers.

b. **Cold Storage Facilities**, managed by third-party providers, are made available to ASRF borrowers. This feature adds a crucial role in Mayani's debt fund supply chain approach by reducing post-harvest losses and preserving product quality. This enables the fund to support longer storage periods, stabilize farmer incomes, and ensure a reliable supply for offtakers. The Fund typically earns around a 5% commission on the contract value. ASRF assumes the farmer uptake for cold storage facilities will gradually increase over time.

Mayani will manage the ASRF's end-to-end roll-out, from inception to implementation. Their role involves attracting SPV investors and building the ecosystem by sourcing borrowers, and third-party service providers. By combining lending, inputs, insurance, and storage into a single package, ASRF de-risks smallholder finance, diversifies fund revenues, and creates a scalable model for transforming smallholder agriculture into a resilient, bankable asset class.

The Fund adopts a three-tier capital structure to balance risk and return across investor types, detailed in section 1.3 below.

1.3 TARGET PIPELINE

1.3.1 PIPELINE SOURCING AND VETTING PROCESS

ASRF sources its pipeline through strategic partnerships with cooperatives, agri-tech providers, and corporate buyers. Key partners include CLIMBS (parametric insurance)[3], CLIMBS' Co-operative College of the Philippines, and Government programs, such as the Department of Agriculture's (DA) Philippine Rural Development Project (Philippine Rural Development Project n.d.). Cooperative vetting criteria include financial viability, governance strength, market linkages, climate resilience, member engagement, scalability, and legal compliance, as outlined in Annex B.

To qualify, cooperatives must achieve a minimum weighted score of 70 out of 100. High-performing groups will receive expedited loan processing and access to larger credit amounts. Pilot testing is planned to validate operational models before wider deployment.

[3] Partnership Agreement signed last May 28, 2025, with the CLIMBS executive leadership. The overarching thrust of the partnership is to build smallholder resilience through an innovative parametric insurance built around the nuances of the Philippine smallholder agri-value chains.

1.3.2 TARGET PIPELINE OF COOPERATIVES

Figure 2. Target Pipeline of Cooperatives located around the Philippines

ASRF's initial deployment targets a geographically diverse pipeline of farmer and fisherfolk cooperatives across Luzon, Visayas, and Mindanao—the Philippines' three main island groups, covering the northern, central, and southern regions of the country. These cooperatives were selected based on their engagement in climate-resilient production systems and established offtake partnerships with institutional buyers.

Involved in high-value crops such as vegetables, rice, and coffee, as well as aquaculture (e.g., milkfish and tilapia) and agroforestry, each cooperative will receive bundled support tailored to its production context, including financing for drought-resistant seeds, bio-stimulants, irrigation infrastructure, and climate-smart technologies. Complementary offerings include Parametric Insurance to cover local climate risks such as drought, wind speed, and precipitation, as well as Cold Storage, which helps reduce post-harvest losses.

The pipeline reflects ASRF's commitment to regenerative practices and gender inclusion, with 30% of borrowers expected to be women. Detailed profiles of the initially identified cooperatives, including geographic location, number of borrowers, hectares managed, targeted verticals, and estimated loan amounts, are provided in Annex C.

1.4 DETAILED INVESTMENT STRATEGY

A fully capitalized ASRF of USD 22.5 million is projected to reach up to 8,800 smallholders over five years. The Fund deploys a layered capital stack, with each tranche designed to align with a distinct investor risk-return profile:

- **Senior debt (50%)** for low-risk commercial and institutional investors seeking stable returns over five to seven years, with a one- to two-year grace period post-harvest.
- **Junior debt (30%)** for impact-first investors or DFIs over five to seven years in exchange for greater social and environmental outcomes.
- **Catalytic capital (20%)** from philanthropic or public sources to absorb early-stage defaults and enhance the creditworthiness of the vehicle, enabling commercial participation in what would otherwise be perceived as a high-risk sector.

This structure allows ASRF to offer affordable and flexible loan terms to cooperatives that often lack formal credit histories. Loans are guaranteed at the cooperative level, removing the need for individual collateral, and repayment schedules are aligned with seasonal cash flows. The presence of catalytic capital functions as an internal credit enhancement mechanism, making concessional pricing viable for borrowers while protecting more risk-averse investors.

The lending model is designed to reflect the operational realities of smallholder farmers. Core features include:

- Repayment schedules timed to harvest cycles;
- Interest rates tailored to household repayment capacity;
- Embedded technical assistance and agronomic support to enhance productivity;
- Guaranteed market access through forward offtake agreements, ensuring stable incomes.

For investors, this approach provides a compelling combination of downside protection and measurable climate and social impact. Even the most conservative tranches benefit from built-in de-risking mechanisms and portfolio-level resilience. The structure ensures that incentives are aligned between borrower performance, impact objectives, and financial sustainability.

2. MARKET ADDITIONALITY ANALYSIS

ASRF is the first blended finance vehicle in the Philippines designed exclusively for agri-smallholders, uniquely combining parametric insurance, municipal-level microclimate data, and corporate offtake agreements to de-risk lending and build climate resilience.

2.1.1 COMPARATIVE INSTRUMENT LANDSCAPE

Several blended finance instruments have emerged to support agricultural value chains. While these models demonstrate the potential of climate-aligned investment, most prioritize agri-SMEs rather than directly serving smallholder farmers and fisherfolk. The following initiatives illustrate this pattern:

- **Root Capital (Latin America, Africa, Southeast Asia):** Provides debt and technical assistance to agricultural SMEs, successfully scaling climate-smart practices but with limited reach to the most marginalized farmers.
- **GrowBeyond Fund (Southeast Asia):** Delivers blended finance for climate-smart SME-led initiatives but lacks farmer-level risk tools such as index insurance.
- **AgriFi (EU-funded, Global):** Deploys debt and quasi-equity through intermediaries across agri-food and forestry value chains, with limited direct engagement with cooperatives or fisherfolk.
- **IFAD smallholder program (Southeast Asia):** Provides blended finance and technical assistance through government and NGO partnerships, achieving outreach but offering limited risk mitigation mechanisms or secured market linkages.

These instruments establish clear precedents but reveal persistent gaps in **direct smallholder engagement, risk management integration, and reliable market access**. See Annex D for further comparison.

2.1.2 SWOT ANALYSIS AND MARKET DIFFERENTIATION

To assess how ASRF addresses these gaps, Annex E highlights its key strengths, weaknesses, opportunities, and threats. The SWOT analysis underscores ASRF's distinctive positioning. Unlike comparable vehicles, which broadly target Agri-SMEs, ASRF is the only Fund in the region dedicated exclusively to smallholder farmers and fisherfolk cooperatives paired with market-facilitation tools. It differentiates itself in four critical ways:

- **Exclusive smallholder focus:** ASRF deploys blended finance directly to cooperatives for climate-smart Agri-aqua projects, tackling a USD 7 billion credit gap.
- **Integrated market access:** Secured corporate offtake agreements and agronomic support reduce market volatility, stabilize farmer incomes, and improve repayment rates.
- **Advanced risk management:** The integration of parametric insurance and municipal microclimate data strengthens resilience against climate shocks and enables smarter underwriting, an innovation unmatched by other funds.
- **Post-harvest infrastructure investment:** Cold storage solutions directly address the Philippines' 30% post-harvest loss challenge, improving both income stability and climate impact by reducing food waste emissions.

Although weaknesses and threats remain, including reliance on concessional capital and climate-related risks, ASRF mitigates these through a layered capital stack, embedded technical assistance, diversified buyer agreements, and data-driven underwriting.

IMPLEMENTATION AND OPERATIONALIZATION

3. IMPLEMENTATION PATHWAY AND REPLICATION

The ASRF pilot establishes a scalable model for climate-resilient agriculture financing. It follows a structured implementation pathway, from institutional setup to production monitoring, while leveraging blended finance and strategic partnerships to enable replication across a broader cooperative network.

3.1 NEAR-TERM IMPLEMENTATION PLAN

3.1.1 PILOT LAUNCH VISION AND KEY ACTIONS

The ASRF pilot will establish an integrated financial vehicle anchored in the Taloy Farmers Multi-Purpose Cooperative (TFMPC) in Buguias, Benguet, in northern Luzon. It will support 2,800 smallholder farmers, 30% of whom are women, across 2,800 hectares, targeting the production of 20 metric tons of highland vegetables per month (e.g., Romaine lettuce, potatoes, carrots, cabbage, and cucumber). A USD 1 million loan facility will finance the initial rollout of bundled solutions through the pilot program.

Key actions and resource pillars for the pilot include:

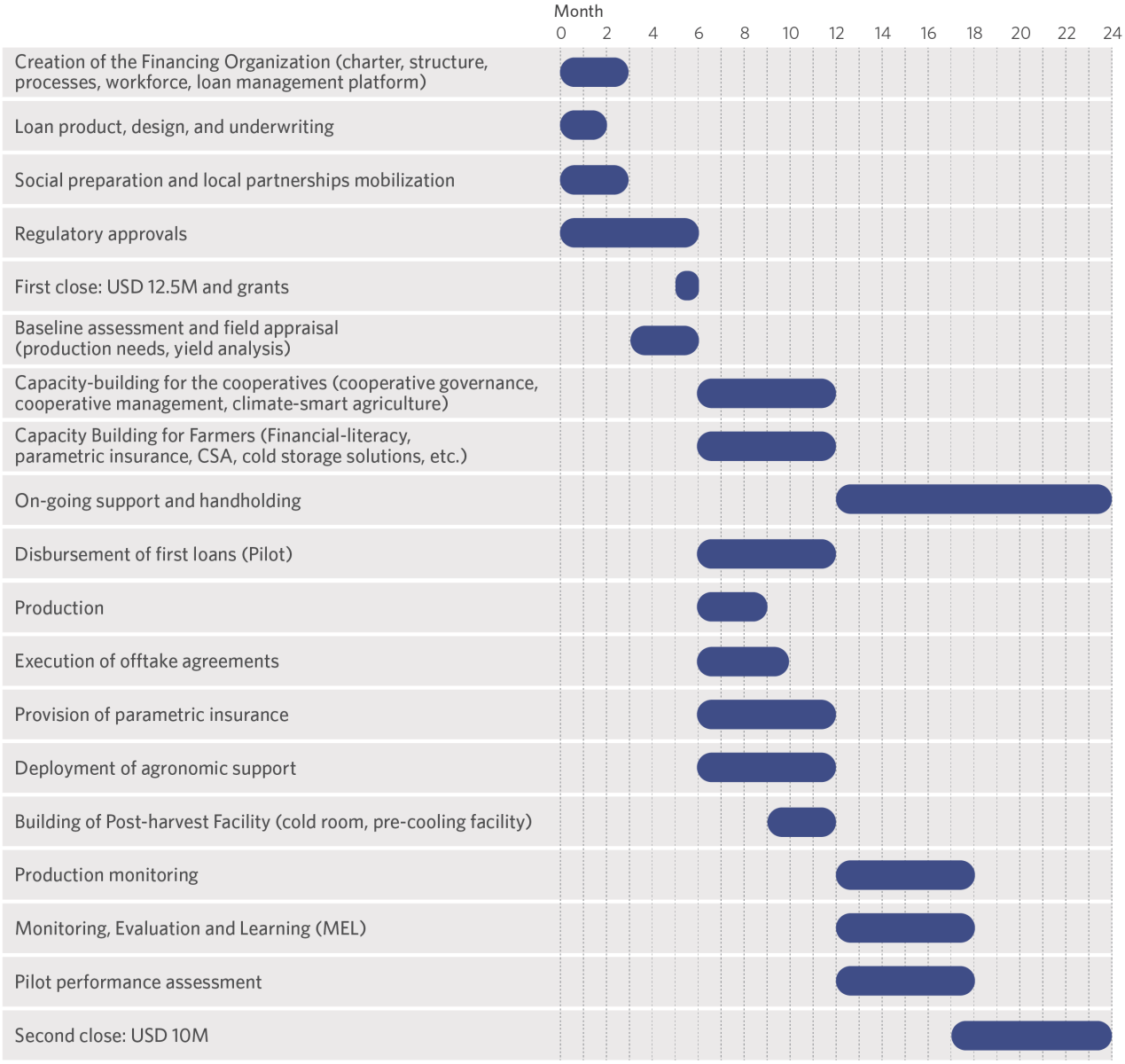
- **Institutional Set-up (Midstream Pillar):** Establish the financing organization, including its charter, digital platform, regulatory registration, and operational workforce.
- **Capital Mobilization (Upstream Pillar):** Achieve first close of USD 12.5 million alongside grant funding to support baseline assessments and capacity building. Design cooperative-level loan products and underwriting frameworks in collaboration with anchor investors.
- **Community Preparation (Downstream Pillar):** Mobilize local partnerships, prepare the cooperative and broader agri-community, and deliver governance, climate-smart practices, and financial literacy training.
- **Bundled Service Deployment:** Execute offtake agreements and roll out parametric insurance, agronomic support, and post-harvest infrastructure (e.g., cold storage and pre-cooling facilities).
- **Performance Monitoring:** Implement a monitoring, evaluation, and learning (MEL) system to assess cooperative performance ahead of the second close (USD 10 million).

After successful completion of the pilot, ASRF expects to disburse approximately USD 22.5 million across two lending rounds, thereby covering a total of 8,800 hectares and reaching an estimated 8,800 smallholders altogether. The ASRF team is proactively de-risking the Year 1 deployment by validating a robust pipeline through a pre-launch feasibility study. It will maintain a continuous pipeline development strategy to ensure a consistent supply of creditworthy borrowers.

3.1.2 IMPLEMENTATION TIMELINE

The sequenced rollout of these activities from institutional setup in months 1 to 4, to production monitoring by months 12 to 18, follows a structured, milestone-driven timeline. This phased approach allows for iterative learning and operational refinement, ensuring the model is adaptable and replicable. The full implementation pathway is illustrated in Figure 3.

Figure 3. Implementation timeline of the pilot



3.1.3 STAKEHOLDER/ENABLING ENVIRONMENT ANALYSIS

Proponent Team

The Agri-Smallholder Resilience Fund (ASRF) is spearheaded by Mayani, a Philippine agri-tech platform with established experience in farmer cooperative engagement, supply chain management, and digital market access. The team brings together agricultural practitioners, supply chain managers, and legal advisors with backgrounds in cooperative finance and agri-fisheries. This combination positions the proponents to manage a blended finance vehicle that integrates affordable credit, climate-smart inputs, insurance, and market access.

Enabling Environment

The ASRF will be structured as a Singapore-based SPV, providing a clear legal framework for governance and investor protection.

In the Philippines, the current regulatory environment already permits cooperative lending, blended finance, and index-based insurance. The instrument does not depend on new laws or regulatory reforms, but active engagement with these stakeholders will be important to ensure smooth approvals and alignment with public programs.

3.1.4 SCALING UP ASRF ACROSS LUZON AND REPLICATING IN VISAYAS & MINDANAO

The full USD 22.5 million ASRF fund addresses just 0.32% of the Philippines' estimated USD 7 billion agricultural financing gap, underscoring the scale of unmet demand. ASRF's replication strategy is designed to be regionally adaptive and operationally rigorous, building on lessons from the Luzon pilot while expanding across diverse agro-ecological and market systems.

Scaling will follow a phased approach, beginning with the refinement and expansion of the model in Luzon (Year 2), followed by rollout in the Visayas (Years 3–4) and Mindanao (Years 4–5). Each region presents distinct conditions, necessitating tailored interventions:

- In Visayas, which is more exposed to typhoons and fisheries-based economies, greater emphasis will be placed on climate resilience, cold chain development, and post-harvest infrastructure.
- In Mindanao, where droughts and export crops dominate, the focus will shift toward water-efficient production, diversified offtake channels (e.g., bananas, coconuts), and partnerships with processors such as Mega Global.

The seven-point cooperative vetting process (see Annex B) will continue to guide selection, with regional adjustments to account for local conditions. Training modules will be adapted to context-specific needs, such as flood-resistant cropping systems in Visayas and drip irrigation in drought-prone Mindanao.

Partnerships with local financial institutions, micro-insurers (e.g., CLIMBS where an MOU has been executed for them to offer parametric insurance to cooperatives through Mayani), and agribusiness buyers will be expanded to embed market linkages and enhance sustainability. Infrastructure investments will also be adapted, including solar-powered dryers for coastal cooperatives and climate-resilient processing facilities for export-oriented production.

To ensure inclusivity, ASRF will pursue partnerships with indigenous cooperatives in Mindanao and ensure participation of underrepresented groups throughout the scaling process.

3.2 POTENTIAL RISKS AND CHALLENGES TO INSTRUMENT SUCCESS

While ASRF addresses fundamental barriers faced by Filipino smallholder farmers, it must navigate several risks that could affect its performance and long-term viability. Four key risk categories are summarized below, along with their associated challenges and mitigation strategies.

Table 1. Key Risk Categories, Challenges, and Mitigation Strategies

Risk Category	Key Challenges	Mitigation Strategies
Credit Risk	Smallholder defaults resulting from climate shocks, pest outbreaks, or price volatility.	• **Dynamic Credit Scoring:** Integrate climate vulnerability assessments (e.g., satellite weather data, soil health) into loan eligibility criteria. • **Grace Periods & Rescheduling:** Allow payment deferrals for climate-affected farmers, backed by insurance payouts.
Operational Risk (Low Adoption of Climate-Smart Practices)	Farmers may revert to traditional methods if new practices are perceived as costly, risky, or inaccessible.	• **Embedded Technical Assistance:** Tie loan disbursements to proof of practice adoption (e.g., soil testing reports). • **Demo Farms:** Identify within the pilot cooperative a demo farm to showcase ROI of climate-smart inputs. • **Mobile Platforms:** Explore apps for real-time advice and input delivery tracking.
Market Risk: Offtake Agreement Failures or Price Collapses	Offtake contracts may fail, or price crashes may undermine repayment capacity.	• **Diversified Offtakers:** Secure contracts with multiple buyers (e.g., supermarkets, processors, exporters) to avoid reliance on one. • **Forward Contracts:** Lock in minimum prices with buyers' pre-harvest to hedge volatility.
Liquidity Risk: Investor Exit or Fund Capital Shortfalls	Capital shortfalls may occur if investors exit or return fall short.	• **Tranching with DFI Anchor:** Secure long-term commitments from DFIs (e.g., IFC, ADB) for junior/deep-loss layers. • **Recycling Mechanism:** Reinforce repaid loans into new lending to maintain capital velocity.

In alignment with ASRF's Theory of Change (Annex A), the following mechanisms further support de-risking across the value chain:

- **Forward offtake agreements** to reduce market exposure
- **Parametric index insurance** to mitigate production risks
- **Agronomic technical advisory** to ensure adoption of resilient practices
- **Data-driven underwriting** to improve credit decisions

To strengthen governance and accountability, ASRF's Singapore-based SPV will be overseen by an Independent Advisory Board comprising representatives from farmer cooperatives, insurers, and offtake partners. This body will guide strategic decisions and ensure that farmers' interests remain central. Transparent reporting, including quarterly impact and financial dashboards aligned with GIIN's IRIS+ standards, will enable real-time performance monitoring and build investor confidence.

To further strengthen oversight and accountability, ASRF will conduct quarterly performance reviews to monitor operational and financial risks. These reviews will be guided by standardized indicators, including:

- **Loan delinquency rates** (target: roughly 3%);
- **Parametric insurance payout timelines** (target: <30 days post-event);
- **Offtake contract fulfillment** (target: 90% of contracted volume).

These mechanisms will ensure early identification of delivery risks, reinforce investor confidence, and maintain alignment with the Fund's resilience and impact objectives.

In parallel, ASRF has defined contingency protocols to address operational disruptions. For offtake agreement failures, secondary buyers such as the National Food Authority or alternative hotel and retail chains can be engaged, with longer-term plans to support farmer-led aggregation platforms. In cases of extreme climate events, parametric insurance will trigger payouts based on thresholds (e.g., wind speeds over 100 km/h or sustained drought), and a portion of first-loss capital may be used to support rapid replanting. For cooperative defaults, ASRF will follow a stepwise process—beginning with loan restructuring, followed by technical support, and as a last resort, asset recovery. These mechanisms reinforce ASRF's risk governance and help ensure continuity of operations even under adverse conditions.

4. FINANCIAL MODELING OUTCOMES

4.1 QUANTITATIVE MODELING

4.1.1 ASRF MODEL OVERVIEW

ASRF debt fund's structure reflects an indicative pipeline comprising 30 farmer cooperatives across the Philippines (see Annex C), representing a total project value of approximately USD 22.5 million.

The model is structured around a five-year investment horizon, with capital raised in two tranches: USD 12.5 million in Year 1 and USD 10 million in Year 2. Investor repayments begin immediately in Year 1, with principal returned in rising annual instalments - 10% in Year 1, 15% in Year 2, 20% in Year 3, 25% in Year 4, and 30% in Year 5. This schedule ensures full 100% repayment by the 5-year maturity, provides predictable cash flows, and minimizes back-ended risk exposure.

The model adopts a conservative approach in estimating investor paybacks by assuming interest payments are made based on a blended average cost of capital across all investor classes. If the structure prioritized repaying senior debt (which carries a higher interest rate) earlier in the projection period, total interest expenses would decline over time as the remaining obligations shift to lower-cost capital. As a result, this would improve fund performance metrics. A blended capital stack is employed to balance risk-adjusted returns for investors while maintaining affordability for farmer cooperatives, as shown in Table 2.

Table 2. Proposed capital structure

Capital Type	Amount (USD)	Target Investors	%
Commercial Debt (Senior Debt)	11,250,000	Commercial Banks, Market-rate Impact Investors	50%
Concessional Debt (Junior Debt)	6,750,000	DFIs, Concessional Impact Funds	30%
Catalytic First-Loss (Grant)	4,500,000	Philanthropic donors, Climate and Development Foundations	20%
Technical Assistance	2,500,000	Bilateral Donors, Philanthropic Foundations	N/A

4.1.2 FINANCIAL ASSUMPTIONS AND REVENUE STREAMS

The financial model assumes a 3% portfolio-level default rate, based on repayment performance from Mayani's proof-of-concept with GCash, where cooperative borrowers showed strong discipline under bundled lending conditions. This rate aligns with benchmarks from Philippine microfinance institutions such as ASA Philippines, which reports defaults of around 3% for loans under PHP 300,000. By coupling credit with parametric insurance, pre-negotiated offtake agreements, and technical support, ASRF reduces production and market risks, making the 3% assumption realistic despite typically higher default rates in agriculture. In addition, the interest rates offered by ASRF to farmer cooperatives are deliberately priced to be competitive, based on prevailing informal market references. This ensures that loan pricing remains significantly lower than what smallholders typically face from informal lenders, making the credit both affordable for cooperatives and sustainable for the Fund.

The blended cost of capital across the capital stack is estimated at 8.4%, reflecting the weighted average of senior debt, junior debt, and catalytic grant components. This cost structure supports affordable loan pricing for smallholder cooperatives while at the same time enabling commercially viable returns for investors.

In addition to interest income from loan repayments, ASRF's financial model includes complementary revenue streams from value-added services offered to farmer cooperatives, as highlighted in Section 1.2.

4.1.3 VIABILITY OF LOAN REPAYMENT AND REASONABLE RETURNS

Preliminary proof-of-concept testing assessed loan uptake and repayment capacity among smallholder cooperatives in target regions[4]. In 2023, Mayani partnered with GCash, a Philippines-based payment super app, to pilot production loans for a smallholder farmers' association in Lian, Batangas province.

[4] One year loan tenor for smallholder growers of pakbet vegetables (i.e. squash, okra, eggplant) that marked their foray into format credit. Underwriting was based on Mayani's data on smallholders and historical supply chain relationship with them.

With a 100% repayment rate over a one-year loan tenor covering lowland vegetable production backed by Mayani's offtake, this provides evidence of the viability of nuanced, smallholder-focused loan products.

The ASRF's loan package uses a one-year term to cooperatives and local market rates to ensure repayment is viable for smallholders, which makes the model work: early validation shows it delivers significant social impact alongside reasonable risk-adjusted returns for investors. The key to this performance is the use of data-driven underwriting, which meticulously selects borrowers and scores credit to bolster strong repayment across the entire portfolio.

The ASRF structure targets a debtholder IRR of approximately 9% over six years, with projected blended returns of 8.4% for investors, derived from the weighted average of return rates across shareholding classes. Furthermore, the model demonstrates robust repayment capacity, with an average Debt Service Coverage Ratio (DSCR) of 1.25x and a minimum DSCR of 0.9x across the projection period, indicating sufficient cash flow coverage to meet debt obligations.

Sensitivity testing as shown in Figure 4 indicates that the fund remains resilient under varying capital costs and default scenarios. Even when the blended cost of capital from investors varies from 6% to 12%, the average DSCR across the projection period of six years remains roughly at or above 1.0x, suggesting that debt obligations are still serviceable. Similarly, under default rate shocks from 0% to 6%, the average DSCR gradually declines but does not fall below 0.9x, indicating that repayment viability is maintained even under stressed conditions. These results underscore that the structure provides sufficient buffer against downside risks while still delivering reasonable returns to investors.

Figure 4. Financial Model - Sensitivity Analysis on IRR (interest rate to investors and default rate)

5. CLIMATE AND SOCIAL IMPACT STRATEGY AND PROJECTIONS

By linking climate-smart loans, insurance, cold storage solutions, and offtake deals, ASRF reduces emissions while directly boosting farmer incomes and women's leadership and participation.

5.1 IMPACT MEASUREMENT AND MANAGEMENT STRATEGY

ASRF's Impact Measurement and Management (IMM) framework ensures that outcomes are measurable, transparent, and verifiable, in alignment with the Sustainable Development Goals (SDGs) and international standards such as GIIN IRIS+ and IPCC guidelines.

5.1.1 VISION FOR IMPACT

- **Climate Mitigation:** Reduce greenhouse gas emissions through sustainable inputs, regenerative practices, efficient irrigation, and cold storage to minimize post-harvest losses (see Annex F for baseline assumptions and emission reduction calculations).
- **Climate Adaptation:** Enhance farmer resilience via drought-resistant seeds, weather-indexed parametric insurance, and water-efficient technologies, ensuring stability even in adverse climate conditions.
- **Nature and Biodiversity:** Expand regenerative farming practices that restore soil health, improve water efficiency, and enhance ecosystem services.
- **Socio-Economic Outcomes:** Increase smallholder incomes, improve food security, strengthen market access through bundled finance and guaranteed offtake agreements, and generate rural employment opportunities in production, logistics, and post-harvest services.
- **Gender Equity:** Ensure women farmers gain equitable access to loans, training, and leadership opportunities, addressing structural barriers.
- **Scalability and Sustainability:** Strengthen cooperative governance and repayment performance to enable replication across diverse regions in the Philippines.

Table 3. Impact Vertical, Key Performance Indicator (KPI) and Data Collection Method

Impact Vertical	Key Performance Indicator (KPI)	Data Collection Method
Climate Mitigation	Tonnes of CO_2e reduced through fertilizer substitution and efficient irrigation	Third-party carbon audits, remote sensing
Climate Adaptation	% farmers using drought-resistant seeds, irrigation	Farmer surveys, cooperative reporting
Nature and Biodiversity	Hectares under regenerative farming	Satellite imagery, field assessments
Socio-Economic Outcomes	% increase in household incomes; % reduction in post-harvest losses	Mobile-based income tracking
Gender Equity	% of loans accessed by women; % women in leadership/cooperatives	Cooperative records, interviews
Scalability and Sustainability	Number of cooperatives onboarded; repayment performance metrics	ASRF M&E dashboards

While ASRF's IMM framework is designed to ensure robust tracking of impact across climate, socio-economic, and gender dimensions, several challenges are anticipated in data collection. These include inconsistent record-keeping at the cooperative level, limited digital infrastructure in remote areas, and potential underreporting or recall bias in household surveys. To mitigate these issues, ASRF will invest in mobile-based data systems, provide training for cooperative staff on monitoring protocols, and engage third-party verifiers for critical metrics such as carbon reductions and regenerative land use. Periodic data validation and triangulation across sources will also be embedded to enhance accuracy and reliability across reporting cycles.

5.2 PRE-INVESTMENT IMPACT MODELING PROJECTIONS

5.2.1 BUSINESS-AS-USUAL (BAU) SCENARIO

In the absence of targeted interventions, Philippine smallholder farming remains highly vulnerable to climate and market risks. Heavy reliance on synthetic fertilizers generates 1–3 kg CO_2e per kg of nitrogen applied (IPCC 2006), while diesel-powered irrigation contributes 0.1–0.3 tCO_2e/ha annually. Without access to insurance, frequent crop failures lead to replanting emissions of 1–2 tCO_2e/ha (Suminski et al. 2016).

Post-harvest losses, currently estimated at 30% of production (Philstar 2024), further suppress incomes and exacerbate food insecurity. Women farmers face additional structural barriers, including limited access to credit and underrepresentation in cooperative leadership. These pressures collectively reinforce cycles of poverty and climate vulnerability.

To illustrate the transformative potential of the ASRF pilot, Table 4 compares projected annual outcomes under a business-as-usual scenario with those expected from the ASRF intervention across 2,800 hectares and 2,800 smallholder farmers.

Table 4. Projected Annual Outcomes

Scenario	BAU (Traditional Farming)	ASRF Intervention
Emissions	High emissions from fertilizers and diesel; 1–2 tCO_2e/ha replanting after crop failure	4,400–10,600 tCO_2e reduced annually via organic inputs, soil sequestration, irrigation efficiency, and avoided replanting
Farmer Income	Stagnant due to high input costs, volatile prices, and 30% post-harvest losses	30–50% increase through yield gains, cost savings, and stable offtake agreements
Post-Harvest Losses	~30% of production lost due to weak logistics and no cold storage	Losses reduced by up to 20% through cold storage and improved supply chains
Jobs & Beneficiaries	Limited job creation; reliance on informal sector	2,800+ smallholders reached; new rural jobs in farming, logistics, and cold storage
Resilience	No insurance; high vulnerability to climate shocks	70% of climate-related losses covered by parametric insurance, ensuring solvency and repayment
Gender Equity	Women underrepresented in credit access and leadership	40% of loans directed to women; 30% of cooperative leadership reserved; tailored training and mentorship

The ASRF pilot is projected to achieve a total annual climate benefit of 4,400–10,600 tons CO_2e reduced or sequestered (refer to Annex F). Socio-economic outcomes include a 30–50% increase in household incomes, a 20% reduction in post-harvest losses, and expanded gender equity with 30% of loans directed to women and 30% of leadership positions reserved for women leaders within the targeted cooperatives. Please refer to Annex G for detailed methodology and projections for the socio-economic impact indicators.

Looking ahead, the pilot results offer a benchmark for scaling ASRF's broader pipeline. Based on preliminary outcomes, the model delivers an estimated 1.6 to 3.8 tons of CO_2e reduced or sequestered per hectare annually, alongside 30% to 50% increases in farmer incomes. When applied to the projected pipeline of 8,800 smallholders across 8,800 hectares, the ASRF has the potential to deliver substantial climate and socio-economic benefits at scale, reducing up to 33,000 tons of CO_2e annually while improving livelihoods for thousands of rural households. These outcomes also represent a measurable contribution to the Philippines' Nationally Determined Contribution, which targets a 75% reduction in greenhouse gas emissions by 2030 relative to business-as-usual levels (Republic of the Philippines 2021).

5.3 PRELIMINARY GENDER STRATEGY

ASRF recognizes gender equity as a cornerstone of both financial sustainability and climate resilience. Evidence shows that women farmers demonstrate lower default rates and faster adoption of sustainable practices, strengthening loan repayment performance and amplifying environmental benefits (FAO 2019).

Key Interventions:

- **Access to Finance:** Direct at least 30% of loan allocations to women through tailored products with reduced collateral and flexible repayment terms.
- **Capacity Building:** Deliver training accessible to women (location and timing) by female trainers, to accommodate caregiving responsibilities and enhance participation.
- **Leadership Equity:** Reserve 30% of cooperative leadership seats for women, supported by mentorship to strengthen decision-making and build leadership pipelines.

Accountability and Partnerships: Progress will be tracked using gender-disaggregated indicators, including women's loan access, leadership representation, and income parity. Partnerships with the Bayan Family of Foundations and HSBC Philippines through the latter's philanthropic support in building smallholder resilience across 30 agri-cooperatives across the Philippines (Sustainability Online 2025)[5] will ensure the design and monitoring of gender-smart interventions. Mobile platforms will expand access to financial literacy and cooperative governance training, ensuring inclusivity at scale.

[5] A USD 53,570 philanthropic grant will cover key climate-vulnerable agri-aqua cooperatives across the Philippine archipelago: Luzon, Visayas, and the Bangsamoro Autonomous Region in Muslim Mindanao.

REFERENCES

Agricultural Credit Policy Council. 2016 Apr 28–29. Overview of agricultural credit in the Philippines. Paper presented by Jovita M. Corpuz at the ACPC APRACA Policy Forum on Microinsurance and Microbanking, and ACPC's 30th Anniversary Celebration; Quezon City (Philippines): Novotel, Araneta Center.

AgriFI (EU-funded). EDFI Management Company. n.d. AgriFI agriculture financing initiative. [accessed 2025 Aug 6]. Available from: https://edfimc.eu/what-we-do/agrifi

AgTech Navigator. 2025 Jul 23. SBC-backed Bayan–Mayani initiative eyes long-term climate resilience impact in the Philippines. [accessed 2025 Jul 23]. Available from: https://www.agtechnavigator.com/Article/2025/07/23/sbc-backed-bayan-mayani-initiative-eyes-long-term-climate-resilience-impact-in-the-philippines/

Asian Banking & Finance. 2024. GCash, agrifisheries platform Mayani to offer loans to rural farmers, fisherfolk. [accessed 2024 Jun 20]. Available from: https://asianbankingandfinance.net/lending-credit/news/gcash-agrifisheries-platform-mayani-offer-loans-rural-farmers-fisherfolk

Capacio JL, de Dios ES, van Tulder R. 2021. Bridging the agriculture credit gap: Case study of the Farmer Entrepreneurship Program. *EMIT UP Case Study Series*.

CGIAR Gender Review. 2022. Integrating gender equality in climate-smart agriculture.

Cruz L. 2018. Challenges to climate change resilience and financial support for commercial farmers in the Philippines: Implications for sustainable agricultural production. *Journal of Development Studies in Asia*. 14(2):112–130.

Department of Agriculture (Philippines). 2023. *Annual report 2023*. Republic of the Philippines.

Dikitanan R, Grosjean G, Nowak A, Leyte J. 2017. Climate-resilient agriculture in the Philippines. *CSA Country Profiles for Asia Series*. International Center for Tropical Agriculture (CIAT) and Department of Agriculture.

Ducanes GM. 2020. Projecting loan demand from small farmers and fishers in the Philippines (PIDS Discussion Paper Series No. 2020–41). Philippine Institute for Development Studies. Available from: https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps2041.pdf

Food and Agriculture Organization of the United Nations (FAO). 2001. *Global estimates of gaseous emissions of NH_3, NO, and N_2O from agricultural land*. Rome (Italy): FAO. Available from: http://www.fao.org/3/y2780e/y2780e00.htm

Food and Agriculture Organization of the United Nations (FAO). 2017. *Innovative risk management strategies in rural and agricultural finance: The Asian experience*. Rome (Italy): FAO.

Food and Agriculture Organization of the United Nations (FAO). 2019. *The state of food and agriculture 2019: Moving forward on food loss and waste reduction*. Rome (Italy): FAO. Available from: http://www.fao.org/3/ca6030en/ca6030en.pdf

Food and Agriculture Organization of the United Nations (FAO). 2020. *Energy-smart food for people and climate*. Rome (Italy): FAO. Available from: http://www.fao.org/3/i2454e/i2454e00.pdf

Food and Agriculture Organization of the United Nations (FAO). 2021. *Transforming food systems for rural prosperity*. Rome (Italy): FAO.

Grow Asia. 2023 Sep 13. GrowBeyond Fund: US $1 billion impact fund for agri SMEs in Southeast Asia. [accessed 2025 Aug 6]. Available from: https://www.growasia.org/grow-beyond

Gustavsson J, Cederberg C, Sonesson U, van Otterdijk R, Meybeck A. 2011. *Global food losses and food waste*. Rome (Italy): Food and Agriculture Organization of the United Nations. Available from: https://www.fao.org/3/i2697e/i2697e.pdf

International Fund for Agricultural Development (IFAD). 2023 Nov. IFAD and smallholder agriculture in the Asia-Pacific. [accessed 2025 Aug 6]. Available from: https://www.ifad.org/en/annual-report-2021/highlighted-projects/asia-and-pacific/index.html

International Labour Organization (ILO). 2018. *World employment and social outlook: Greening with jobs*. Geneva (Switzerland): ILO. Available from: https://www.ilo.org/global/research/global-reports/weso/greening-with-jobs

Intergovernmental Panel on Climate Change (IPCC). 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories: Agriculture, Forestry and Other Land Use (AFOLU)*. Hayama (Japan): Institute for Global Environmental Strategies. Available from: https://www.ipcc-nggip.iges.or.jp/public/2006gl/

Intergovernmental Panel on Climate Change (IPCC**).** 2019. *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Geneva (Switzerland): IPCC. Available from: https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines/

Lal R. 2004. Soil carbon sequestration impacts on global climate change and food security. *Science*. 304(5677):1623–1627.

Lal R. 2004. Soil carbon sequestration in rainfed production systems. *Soil and Tillage Research*. 79(1):131–142.

Philippine Rural Development Project (PRDP). n.d. The digitalization of Philippine agriculture: How a World Bank-funded project is making headways. Available from: https://prdp.da.gov.ph/the-digitalization-of-philippine-agriculture-how-a-world-bank-funded-project-is-making-headways/

Philstar. 2024 Jan 17. DA: 30 percent of crops wasted due to poor logistics. *Philstar.com*. Available from: https://www.philstar.com/headlines/2024/01/17/2326363/da-30-percent-crops-wasted-due-poor-logistics

Poliquit LY. 2006. Accessibility of rural credit among small farmers in the Philippines [master's thesis]. Palmerston North (New Zealand): Massey University.

Republic of the Philippines. 2021. *Nationally determined contribution communicated to the UNFCCC*. Available from: https://unfccc.int/sites/default/files/NDC/2022-06/Philippines%20-%20NDC.pdf

Root Capital. n.d. Our approach: Climate action through finance. [accessed 2025 Aug 6]. Available from: https://rootcapital.org/our-approach/climate-action

Rosegrant MW, Perez N, Pradesha A, Thomas TS. 2015. The economy-wide impacts of climate change on Philippine agriculture. *Project Policy Note 1*. Washington (DC): International Food Policy Research Institute.

Sander BO, Wassmann R, Siopongco JDLC. 2020. Alternate wetting and drying in Philippine rice production: Mitigating greenhouse gas emissions while maintaining yields. *CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)*.

Skalon T, Plevin J. 2024. Transforming agricultural insurance in the Philippines to help farmers cope with disasters: Three essential reform areas. *World Bank Financial Protection Forum*.

Sustainability Online. 2025. HSBC backs Bayan–Mayani climate resilience initiative in the Philippines. Available from: https://sustainabilityonline.net/news/hsbc-backs-bayan-mayani-climate-resilience-initiative-in-the-philippines/

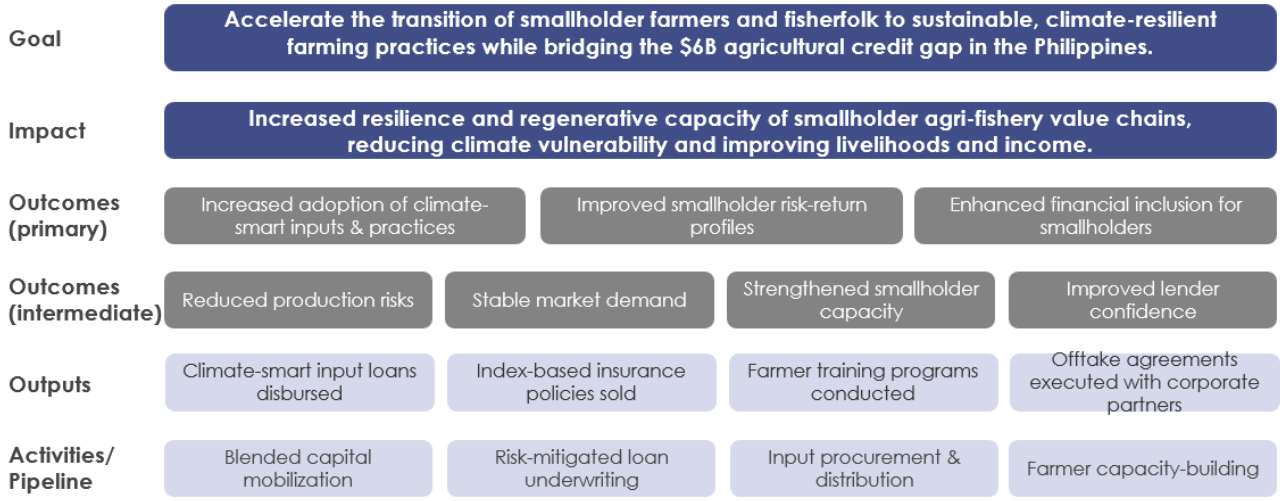
Surminski S, Bouwer LM, Linnerooth-Bayer J. 2016. How insurance can support climate resilience. *Nature Climate Change*. 6(4):333–334. https://doi.org/10.1038/nclimate2979

USA Today. 2024 Jul 31. Industry disruptors: These companies are leading the way. Available from: https://www.usatoday.com/story/special/contributor-content/2024/07/31/industry-disruptors-these-companies-are-leading-the-way/74619984007/

World Bank. 2018. *Enabling the Business of Agriculture 2017*. Washington (DC): World Bank Group.

World Bank. 2022. *Philippines climate change and development report*. Washington (DC): World Bank. Available from: https://documents1.worldbank.org

ANNEX 1 – THEORY OF CHANGE



ANNEX 2 – COOPERATIVE VETTING CRITERIA & ASSESSMENT PROCESS

Criteria	Key Indicators	Assessment Methods	Weight
Financial Viability	≥80% repayment rate; debt-to-income <30%	Bank statement review, cash flow analysis	30%
Governance Strength	Elected leadership; ≥60% member meeting participation	Interviews, review of meeting minutes & audits	20%
Market Linkages	Existing offtake contracts; <10% post-harvest loss	Contract verification, storage facility inspections	15%
Climate Resilience	Use of drought-resistant crops; ≥50% insured members	Field visits, insurance policy review	15%
Member Engagement	≥30% women in leadership; ≥60% training participation	Demographic data, training records	10%
Scalability	≥10% YoY production growth	Historical yield analysis, expansion potential review	5%
Legal Compliance	Valid cooperative license; up-to-date tax filings	Government registration checks	5%

ANNEX 3 – PIPELINE OF COOPERATIVES

Cooperative	Region	Borrowers per Cycle	Hectares per Cycle	Loanable Amount (PHP)
Malaruhatan Family Farm Association	Calabarzon Region (IV-A)	12	12	3,000,000
Taloy Farmers Multi-Purpose Cooperative	Cordillera Administrative Region (CAR)	2,800	2,800	100,000,000
Samahan ng mga Magbabangus ng Pangasinan	Central Luzon Region (III)	40	40	100,000,000
Manna Agriculture Cooperative	Region XII	30	30	3,000,000
Lengaon Indigenous Farmers Multipurpose Cooperative	Cordillera Administrative Region (CAR)	800	800	80,000,000
Rice Terraces Farmers Cooperative	Cordillera Administrative Region (CAR)	30	30	30,000,000
Barlig Development Cooperative	Cordillera Administrative Region (CAR)	16	16	20,000,000
Kalinga Rice Terraces Farmers Agriculture Cooperative	Cordillera Administrative Region (CAR)	20	20	20,000,000
Anabel Sadanga MPC	Cordillera Administrative Region (CAR)	12	12	5,000,000
Valiant Primary Multi-purpose Cooperative	Central Luzon (III)	12	12	50,000,000
Cebu CFI Community Cooperative	Central Visayas Region (VII)	400	400	50,000,000
ACDI Multipurpose Cooperative	Western Visayas Region (VI)	360	360	40,000,000
Sorosoro Ibaba Development Cooperative	Central Visayas Region (VII)	240	240	40,000,000
Negros Occidental Farming Cooperative	Western Visayas Region (VI)	300	300	30,000,000
Bohol Farmers' Aquaculture Cooperative	Central Visayas Region (VII)	160	160	10,000,000
Negros Oriental Vegetable Growers Cooperative	Central Visayas Region (VII)	180	180	10,000,000
Panay Vegetable Producers Cooperative	Western Visayas Region (VI)	170	170	20,000,000

Cebu Mango Growers MultiPurpose Coop	Central Visayas Region (VII)	140	140	20,000,000
Leyte Agricultural Cooperative	Eastern Visayas Region (VIII)	150	150	10,000,000
Iloilo Aquaculture Cooperative	Western Visayas Region (VI)	120	120	10,000,000
Green Gold Farmers Agriculture Cooperative	Davao Region Region (XI)	500	500	60,000,000
TugBok Progressive Coconut Farmers Multi Purpose Cooperative	Davao Region Region (XI)	400	400	60,000,000
Magsaysay Agriculture Cooperative	Davao Region Region (XI)	360	360	40,000,000
Sto. Tomas Individual Farming Agrarian Reform Beneficiaries Cooperative	Davao Region Region (XI)	300	300	50,000,000
Cagayan Valley Farmers Aquaculture Coop	BARMM	240	240	40,000,000
Maguindanao Smallholder Aquaculture Cooperative	BARMM	200	200	40,000,000
North Cotabato Vegetable Cooperative	SOCCSKSARGEN Region (XII)	220	220	40,000,000
Bukidnon Fruit Growers Cooperative	Northern Mindanao Region (X)	240	240	40,000,000
Zamboanga Aquaculture Cooperative	Zamboanga Peninsula Region (IX)	180	180	20,000,000
Misamis Oriental Farmers Multi Purpose Cooperative	Northern Mindanao Region (X)	170	170	20,000,000

ANNEX 4 – COMPARABLE INSTRUMENT ANALYSIS

Instrument	Overview	Region	TA	Offtake agreement	Parametric Insurance	Microclimate data
Agri-Smallholder Resilience Fund	Blended finance supporting climate-smart agri-aqua cooperatives.	Philippines	✓	✓	**On progress**	**On progress**
Root Capital's Climate-Smart Lending	Lending for agri-SMEs linked to smallholders.	Latin America, Africa, South-East Asia	✓	✓	×	×
GrowBeyond Fund	Lending to support agri-SMEs to scale climate-smart practices.	South-East Asia	✓	×	×	×
AgriFi	Equity, lending to agri-SMEs, microfinance institutions, and impact funds across agrifood and forestry.	Global	✓	×	×	×

ANNEX 5 – SWOT ANALYSIS

Strengths	Weakness
• Blended finance model leveraging concessional & commercial capital • Secured corporate offtake agreements to ensure stable market access • Integration of parametric insurance and microclimate data • Cold storage solutions reducing post-harvest loss • Strong climate resilience focus	• Dependence on concessional capital during early stages • Limited initial geographic reach • Farmer adoption risks without strong TA • Operational complexity in bundling multiple instruments
Opportunities	**Threats**
• Expansion into ASEAN markets • Carbon credit monetization • Digital innovation in credit scoring & advisory • Growing retail impact investment appetite and prospect of entering trade financing	• Climate change intensification increasing default risk • Competition from traditional lenders • Currency volatility impacting investor returns • Reputational risk if pilots underperform

ANNEX 6 – BASELINE ASSUMPTIONS AND EMISSION REDUCTION CALCULATIONS

By calculating potential emissions reductions and sequestration, the pilot establishes a transparent basis for measuring its contribution to the Philippines' climate commitments under the Paris Agreement, while also showcasing the co-benefits for farmer livelihoods. The estimates presented here are grounded in internationally recognized methodologies (IPCC, FAO) and context-specific studies, ensuring conservative yet credible results. The table below summarizes how each intervention translates into measurable climate benefits, forming the basis of the projected 4,400–10,600 tonnes of CO_2e reductions or sequestration per year.

Key Components & Estimated Climate Impacts

Key Component	Mechanism & Assumptions	Estimated Annual Impact	Source
1. Reduced Synthetic Fertilizer Use (Organic Fertilizers & Bio-stimulants)	Synthetic fertilizers emit ~2.5–3 kg CO_2e per kg N applied. Switching to organic reduces emissions by ~30–50%. Assumed 200 kg N/ha/year across 2,800 ha.	~1,000–1,500 tonnes CO_2e reduction	IPCC (2019); FAO (2001)
2. Soil Carbon Sequestration (Soil Conditioners & Improved Management)	Improved cropland regen: ~0.5–2 t CO_2e/ha/year; total 2,800 ha	~1,400–5,600 tonnes CO_2e sequestered	IPCC (2006); Lal (2004)
3. Reduced Post-Harvest Losses (Cold Storage Facility)	Prevents 10–20% waste emissions on 10,000 tonnes output	~500–1,000 tonnes CO_2e reduction	FAO (2019); Gustavsson et al. (2011)
4. Water Efficiency (Rain Harvesting & Irrigation Pumps)	Diesel pumps emit ~0.1–0.3 t CO_2e/ha/year. Efficient pumps and rain harvesting reduce emissions.	~280–840 tonnes CO_2e reduction	FAO (2020); Sander et al. (2020)
5. Parametric Insurance (Indirect Climate Resilience Impact)	Prevents replanting (~1–2 t CO_2e/ha if crops fail). Assumes 10–20% crop loss prevented.	~2,800–5,600 tonnes CO_2e avoided	World Bank (2021); Surminski et al. (2016)

ANNEX 7 – BASELINE ASSUMPTIONS AND SOCIO-ECONOMIC IMPACT CALCULATIONS

By quantifying projected income gains, job creation, resilience improvements, and gender equity outcomes, the ASRF pilot establishes a transparent basis for assessing its contribution to inclusive rural development in the Philippines. The table below summarizes how each intervention translates into measurable socio-economic benefits, supporting the projected 30–50% increase in household incomes, reduction of post-harvest losses, and expansion of women's leadership in cooperatives.

Key Component	Mechanism & Assumptions	Estimated Annual Impact	Source
Farmer Income	CSA adoption (drought-resistant seeds, organic inputs, cold storage) increases yields by **20–50%**, coupled with cost savings and price stability under offtake agreements. Assumed for 2,800 households.	**30–50% rise in incomes**	FAO (2019)
Post-Harvest Losses	National average crop loss ~30%. Cold storage and improved logistics reduce losses by **10–20%**, assuming 10,000 t annual production.	**Up to 20% reduction**	FAO (2019); Gustavsson et al. (2011);
Jobs & Beneficiaries	Inputs, cold chains, and cooperative services generate employment; assuming ~0.2 jobs per farmer household.	**2,800+ households reached; ~600 new jobs**	ILO (2018); FAO (2021)
Resilience	Parametric insurance covers ~70% of climate-related losses, preventing replanting and improving repayment capacity (10–20% crop loss prevented).	**70% loss covered**	World Bank (2022); Surminski et al. (2016)
Gender Equity	Women underrepresented (<30%). ASRF targets **30% loan access for women** and reserves **30% cooperative leadership seats**, alongside gender-responsive training.	**30% of loans; 30% leadership by women**	CGIAR Gender Review (2022)