



MONETIZING RESILIENCE BENEFITS AS A NEW FINANCIAL TOOL TO UNLOCK PRIVATE SECTOR FINANCING

Background

Resilience is the capacity of a system to cope with, or recover from, the effects of external shock events either expected or unexpected, as well as the uncertainty caused by these events, while either retaining or improving the essential components of the original system. Resilience is not specific to climate. Economic, health and other shocks can serve to either trigger, reinforce or amplify vulnerabilities. In this paper, the concept of resilience focuses on the capacity of rural communities – including their social structures and economic activities – to respond to shocks, particularly those related to climate change and natural disasters (but also others such as price shocks). Such events may be of a sudden nature (e.g. typhoons) or have a slow onset (e.g. desertification).

What does this paper do? To monetize resilience, carefully structured financial instruments can create the necessary incentives for (select) private sector investors, international organizations, third party verifiers, community-based organizations, agricultural off-takers and farmers to join forces to achieve three objectives: i) increase private sector investment in resilience; ii) build greater resilience of smallholder farmers; and iii) enhance resilience of food systems.

The discussion is divided into the following sections:

- a) Current challenges for the private sector against investing in adaptation/resilience
- b) Approach to resilience measurement
- c) Proposed six-step model for structuring resilience monetization
- d) Way forward.

The approach explained in this paper focuses primarily on climate resilience in the agriculture sector. If proven successful, this can be replicated in other resilience sectors such as water, forests and urban development to address shocks beyond climate. The paper considers adaptation as a process while resilience is framed as an outcome but they are used interchangeably.

The concept is a “work in progress” with joint contributions from the Ministry of International Cooperation (MoIC) of Egypt and IFAD. It requires further studies on approach, methodology, pilot testing and final roll-out under the leadership of an advisory group.

The Challenge and Opportunity

Realizing resilience-related impacts is attractive to most policymakers, practitioners and investors. Much like in the health sector, where a lack of resilience to health shocks represents a burden to society and for governments, in the agricultural sector in the rural economies, shocks can be categorized across five dimensions: climate, biological, market related, labour/health and policy. This paper focuses on climate as a shock. Overall, vulnerability to shocks is a clear danger to most systems: food, health, education and livelihoods overall.

Currently however there is inadequate investment in resilience. More precisely, climate finance does not flow towards resilience efforts sufficiently.¹ Insufficient investment in this area has been decried and is much to the detriment of development pathways in developing countries. Yet, investments in resilience could be attractive for government and private capital. Any surplus capital generated could either be used to potentially pay

¹ There are about 500 million small farms in the world. Small-scale farmers produce one-third of the world's food, more than 70 per cent of the food in Africa and

Asia and about 50 per cent of the food in Latin America. They only receive 1.7 per cent of climate finance.

dividends and re-distribute benefits to the community or to further bolster resilience.

There are a number of reasons for this. Adaptation, a key characteristic of resilience, has been difficult to distinguish from development. Furthermore, it is difficult to measure the additionality of adaptation compared to conventional developmental finance. Third, it is difficult to standardize measurement of adaptation, particularly as it relates to different contexts. Fourth, the long-term accrual of benefits and up-front nature of investments, as well as the complexity of decision-making and management, limit the ability to finance resilience strategies. It is often difficult to fund resilience building in developing countries due to imperfect and missing markets. The fifth factor is that resilience benefits are often local and unrecognized, and post-hoc remedies are easier to observe than preventative measures.

It is only over time that a resilience benefit surplus can be generated, so investors need to recognize the stream of benefits over and above business as usual. Productivity and income streams increase as a result of these benefits. When the positive externalities of resilience are not appropriately considered, it may result in inaction, missed opportunities and socially inefficient decisions.

Agriculture, rural development and food security often have broad scopes and limited cash flows, making it difficult (or unmarketable) to accurately measure how inputs affect or generate outputs. In these areas, adaptability and resilience projects often involve (i) multiple interventions on the territory, landscape, infrastructure, people and livestock, and (ii) multiple agents, resulting in difficulty estimating costs and benefits. It is also possible for interventions to evade monetization because they are not always measurable. In addition, investors may be turned off by the lag between interventions and resilience dividends. **All this means that it is difficult to transform adaptation into an assets class even though it generates benefits for society at the individual and aggregate levels.**

The opportunity: Conceptually, any surplus generated from investments in resilience, at the individual or aggregate level (community, national) could be used to potentially pay dividends and re-distribute benefits to the individual/community or to further bolster resilience. On the benefits side, resilience investments generate a 'resilience dividend'², broadly defined as the difference in the outcomes between the scenario with a resilience approach and without. This resilience dividend may also include the benefits arising from the reduction of losses which would otherwise be incurred because of future shocks (the probability and

magnitude of which may be estimated despite stochasticity).

The Solution: Measuring and Monetizing Resilience

Turning the benefits from resilience investments into a monetized asset class will require the following steps:

- a. Identify potential resilience-generating investments
- b. Measure resilience benefits in a standardized and verifiable manner
- c. Price resilience benefits and turn these into standardized resilience units
- d. Offload upfront investment risk through a first loss risk facility
- e. Improve overall resilience of individual communities thus safeguarding future investments
- f. Create a new asset class in the form of resilience credit that can be traded
- g. Generate overall societal value (i.e. improving overall resilience of the community and thus saving lives).

Each of the steps can serve as an incentive for the private sector to invest in resilience.

The proposed solution is to first measure resilience benefits using existing methodology that standardizes resilience benefits irrespective of context; then translate these standardized benefits into units or "credits" that can be bought and sold on and off market. For this to occur, other steps need to be undertaken:

First, identifying cash flows is important to establish a financing instrument capable of aligning the interests of investors, donors and stakeholders. Through adaptation and resilience interventions, there are direct and measurable benefits associated with increased production or improved quality of production in the agriculture sector. Adaptation costs may be funded by governments (or multilateral development banks (MDBs) and development partners) in exchange for a later dividend. Another option is to have governments or the development partners directly pay (or subsidize) ecosystem services as a way to encourage conservation and adaptation. These approaches are important to de-risk investments from the private sector. Those monetary incentives can be financed and scaled up against specific resilience-related performance.

As an example, monetizing resilience dividends may be achieved under broader programmes of climate smart agriculture (CSA).³ As the natural climate rapidly deteriorates, CSA's main objectives

that they support sustainable development and can ensure food security under climate change (FAO 2017).

² <https://www.rockefellerfoundation.org/blog/valuing-resilience-dividend/>

³ CSA is an approach for transforming and reorienting agricultural production systems and food value chains so

are to sustainably increase agricultural productivity and incomes; adapt and build resilience to climate change and reduce and/or remove greenhouse gas emissions, where possible (FAO 2017).

Second, financial engineering to fit the purpose of investors is required to address a variety of adaptation and resilience projects, but defining the main agents and objectives remains paramount. Investment capital is transferred to beneficiaries against an expected return using a financial instrument (see section 4.2 for further details). Resilience dividends are owned by the beneficiaries, and as long as the beneficiaries can measure and monetize them, they can reward investors. There are different types of beneficiaries, from governments to households, and they can be homogeneous groups or groups aggregated by technology, objective or strategy. Through the methodology described in Box 1, both types of resilience benefits can be captured. Improving the resilience of a rural community can be different from improving the resilience of a specific crop.

Third, data and historical observations, reputable agents, and a proven, verifiable and transparent methodology to collect the data are all necessary elements to structure this (and most) financing solutions. Data used in performance-based financing is usually reliable, produced by reputable agents, and replicable and verifiable by a third party, meaning the issuer or fund manager or other agents cannot be held liable for misrepresentations made to investors. It is necessary to collect data in order to plan the outcome of a project and to determine the relative performance, especially in light of the potential loss of capital for investors.

Fourth, it is important to recognize that pricing or monetization resilience is economically like frontloading a future net revenue (less losses minus investment; i.e. a dividend), with an expected value and estimated volatility (given the uncertainty around the probability of the shock occurring and the impact that it would have). Insurance works in a similar way. Investments in resilience can theoretically be priced with stochastic models that project experiences of an indicator or an index by frontloading future dividends. Additionally, the underlying benefit is a change in status (a project) and data must be detrended. Pricing is determined by a net positive

dividend (resilience premium), which is determined by a variety of factors. These include: i) cost of the investment; ii) type of event (heating, cooling, rainfall, water shortage, war and civil disturbances, food shortages, famine, malnutrition, natural disasters, climate migration) to be covered; iii) severity of a range of events and relative losses or missed opportunities (namely exceedance curve); iv) frequency of each event in the reference range; and, additionally, v) the positive externalities (improved productivity, for example) (see Box 1).

Guiding principles for measuring resilience include the following:

1. A clear definition of the boundaries of climate resilience investments and activities, as well as the risks and outputs, and the interlinkages with other assets, investments, activities and systems (to reduce adverse selection).
2. Resilience investments and activities need to be analysed to respond to the physical climate hazards and other vulnerabilities (market, health, policy) across time using methodologies and data that are available, stable, verifiable and replicable.
3. The resilience investment to respond to shocks must be scoped and must pass the fit-for-purpose test. This means that it: i) significantly contributes to improve the part or full agriculture system's resilience; and ii) reduces and mitigates risks in the face of coming climate change over its operational life and does not harm the resilience of the system of which it is a part. This principle is critical and requires thorough analysis and adaptability given the uncertain and stochastic nature of climate change or macroeconomic risks.
4. A trade-off analysis may be required to evaluate potential mitigation trade-offs and to potentially lower requirements for climate resilience-focused assets or activities with benefits that considerably outweigh an alternate outcome, for example increased greenhouse gas (GHG) emissions in the event of a natural disaster or a shock. Monitoring and evaluation is required to ensure that the investment is flexible enough to changing conditions, new risks and shocks, unforeseen situations, changes in technology and institutional framework, and in general that assets and investments continue to be fit-for-purpose.

Box 1: Resilience credits - Translating benefits into standardized units





IFAD monitors and measures resilience building as a Recovery Index based on subjective measures of resilience to a set of self-reported shocks.

It first designs and monitors for resilience: The Resilience Design and Monitoring Tool of IFAD helps design and monitor the performance of resilience-building interventions during project implementation. It helps to identify resilience-building interventions ex ante and track their adoption and effectiveness in enhancing rural households' resilience capacities. An adoption score is generated that checks if the household has access to resources promoted by resilience-enhancing interventions. The question seeks to verify the effectiveness of the intervention in reducing the impacts of shocks and stressors. Resilience is observed through the specific results the different interventions aim to achieve (e.g. reduction of crop losses despite shocks and stressors; access to water despite shocks and stressors; increased access to markets despite shocks and stressors). Long-term impacts of the interventions of food security, income and poverty reduction, are derived from the successful achievement of these results.

IFAD then measures resilience through a set of recovery indicators. The recovery indicators are measured through the self-assessment of a farmer's perceived ability to recover from different typologies of shocks. The assessment of the recovery indicator is based on households' answers to two questions. First, IFAD asks to the respondent "did your household experience any of the following shocks?". The answers to this question measure the *exposure* to shocks. The list of potential shocks experienced by the households can be broadly categorised into **climatic and non-climatic shock domains**. Households not experiencing any of these shocks during the reference period are not asked the second question, therefore will not have a resilience indicator.

Households declaring to have experienced at least one shock during the reference period are then asked the following question "After experiencing the shock, is your household worse off, same as before, better off than before?". Using the answer to this question, IFAD builds a binary indicator for each shock, which are then combined to create the recovery indicator for the above domains. These recovery indicators take value equal to one if the respondent reports that the household has recovered at the same level or better off after experiencing the shock, and zero otherwise. If the household has experienced more than one shock within each domain, as often occurs in the contexts where the projects are implemented, IFAD builds the binary indicator on the median value of recovery across the set of shocks declared. The final *Recovery indicators* are then employed to estimate the impact of IFAD projects on the ability to recover, using probabilistic models and inverse probability weighting techniques.

In addition to the ability to recover indicators, IFAD also measures the self reported intensity of each shock that can be used to create an indicator of *severity*, as well as a livelihood diversification index that is a proxy of *livelihood resilience* based on economic theory of portfolio diversification.

Changes	Indicator	Calculation
 Ability to recover	Ability to recover from shocks	Subjective measure of (perceived) resilience capacity in the aftermath of one or more shocks, developed using the IFAD methodology
	Ability to recover from shocks – climatic	Same as above – disaggregated for climatic shocks only
	Ability to recover from shocks – other	Same as above – disaggregated for non-climatic shocks
 Exposure	Exposure to shocks	The shock exposure measure is a weighted average of the incidence of experience of each shock (a variable equal to 1 if it was experienced and 0 otherwise), multiplied by the perceived severity of the shock.
 Livelihoods	Livelihood/income diversification (GINI SIMPSON INDEX)	$GSI = 1 - \sum a_i^2$ where a_i is the gross income share from the i th household income source
 Severity	Number and severity of shocks	Number of shocks that affected the hh during the last 12 months Severity of shocks (1–4) multiplied by respective shocks

Estimate impact by comparing outcome indicators of beneficiaries to that of a matched counterfactual/comparison group using quasi-experimental econometric methodologies *ex-post*

Figure 1: IFAD's resilience indicators

Proposed Approach for Monetizing Resilience Benefits

4.1. Six step model

The step-by-step model is illustrated in Figure 2.

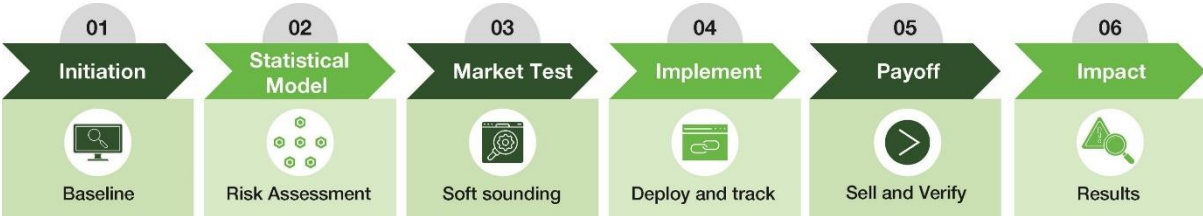


Figure 2: Type of resilience indicators to support measurement

1. Conduct a dynamic baseline survey with a pool of potential beneficiaries and other stakeholders to collect data, while including relevant historical data. Specific subtasks of this step include:

- Collect available data to analyse, assess, identify geographies, communities, beneficiaries, and their state of development, as well as potential for and vulnerability to various types of shocks (climate, wars and conflict, prices, etc.)
- Assess governments' strategies as well as current or programmed assistance of the international community.
- Use IFAD analytical models, GIS and other tools to assess how different shocks, investments and development initiatives and strategies impact income, health and wealth dynamics and create impact pathways.
- Agree an objectively verifiable set of measurements of resilience/adaptation and social development (human capital and access to basic services).

2. Use a model to calculate probable resilience benefits while designing an investment. This step should produce clear targets with outcome and output indicators to value improvements in the baseline conditions. It is important these are standardized in order to make the model replicable in other geographies and similar conditions (see Box 1). These indicators include:

- **Shock events:** Use a catalogue of historical data on shocks/events and actual losses associated with those events
- **Output indicators per event:** Use a catalogue of the experiences of the output indicators per event (improved/deteriorated) (see Figure 2)

- **Cost of losses:** Estimate monetary losses given improvements or deteriorations in the output indicators
- **Outputs of project activities:** Calculate improvements or deteriorations of the output indicators due to project activities/initiatives.

3. Consult with the investors' community to assess the appetite for investing in resilience benefits based on the objectively verifiable output/outcome indicators. These investors may be categorized into three rough categories:

- Structuring firms such as banks, specialized modelling firms, other specialized entities, insurers, think tanks, academia, donors and foundations.
- Investors and development partners for concessional or commercial capital. The former would include governments, philanthropists, development finance institutions (DFIs) and impact investors. The latter may consist of banks, real money investors, asset managers or impact investors.
- Commercial sector stakeholders such as banks and non-bank financial institutions, financiers and offtakers to support value chain investments, and other MDBs, DFIs and international financial institutions.

4. Deploy catalytic first loss capital (in the form of grant/equity/guarantee) for credit enhancement for buying/selling entities (i.e. farmer organizations (FOs)). This step should facilitate potential offtake agreement with the private sector. For this step, it is critical to start tracking GHG emission and resilience benefits against targets as soon as implementation begins. The first loss capital is only one example of an instrument that could be used. Resilience impact funds, climate funds and impact investment funds are examples of other instruments.

5. Sell produce to offtakers; This could be facilitated through a zero per cent loan or a reimbursable grant. This step should also include verification by a third party before a resilience credit is issued (see section 4.2 for more information).

6. Assess the impact of project specific results. Examples of predicted results may be increased community resilience, income, general welfare, societal value creation and an increased contribution to the delivery of the Paris Agreement.

Box 2: The concept of resilience monetization and credit can incentivize the private sector for several reasons. It:

- Identifies investment opportunities
- Provides incentives across the value chain of players including to the private sector to invest in resilience
- Follows a blended financing approach, including ability to offtake risks
- Opens up the possibility of creating resilience credit as a separate asset class
- Demonstrates mitigation-adaptation co-benefits and links the outcome of the former with the carbon market
- Provides an opportunity for value creation (beyond market return) for financiers.

4.2 Transaction flow

The transaction flow may be divided into two categories (see Figure 3).

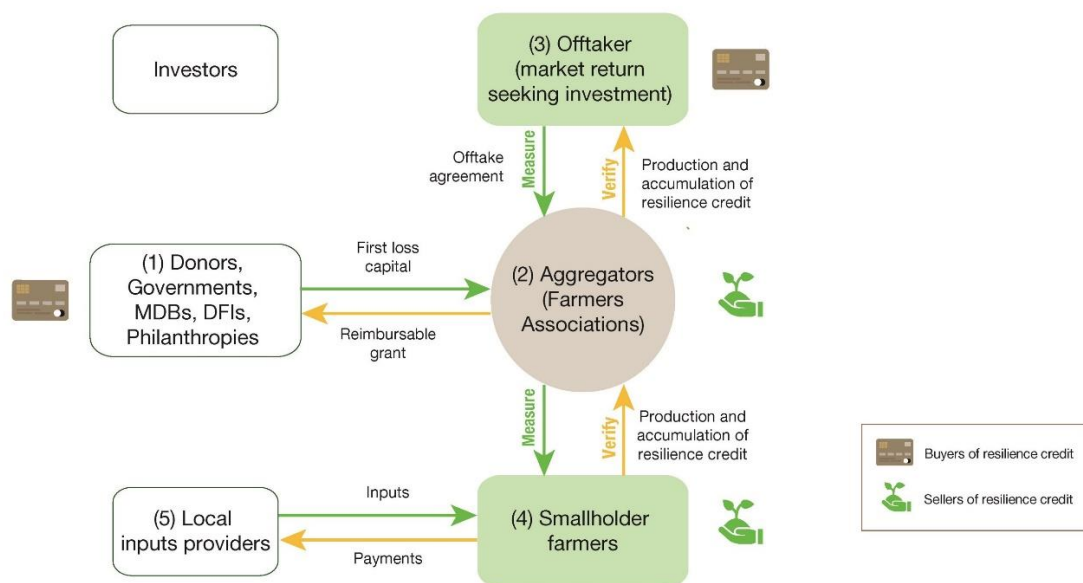


Figure 3: Transaction Process

a. Commercial Transactions

The overall transaction process for creating and monetizing resilience benefits of any specific resilience project can start from development partners and philanthropies who can provide catalytic first loss capital by pooling resources into a facility, managed by a third party (i.e. multilateral entity), and facilitate the overall credit enhancement of intermediaries (i.e. FOs). Other forms of credit enhancement support could be grants, equity investment, or guarantees.

This credit enhancement support can be used to encourage offtake agreements with private investors to buy surplus yield (in a scenario where surplus yield is the key output of the project) from intermediaries such as FOs. It could also be used to access loans from banks by the intermediaries that could be the basis for lending support to smallholder farmers. In the case of predictable capital and market, yield would be sold by the smallholder farmers to FOs who then sell aggregated yield to the private investors against offtake agreements.

b. Value Creation or Social Transaction

In the final stage of the project, a third party would verify all resilience and carbon benefits of the project. With a certain percentage of monetized benefits of resilience measured using standardized methodology, a specific value of resilience credit could be issued to smallholder farmers. The credit could then be bought by development partners, philanthropies and the private sector to incentivize the farmers to create societal value, improve resilience and eventually protect future investment. Initially, the trading could be facilitated amongst members of a coalition of like-minded institutions. Whether the trading could be linked to the carbon market requires further assessment, including understanding and analysing legal requirements. A certain percentage of the proceeds of the sell could be channelled to the first loss capital facility in order to eventually phase out the need for development partner and philanthropic funding, and a loss and damage facility.

Data and historical observations, reputable agents, and a proven, verifiable and transparent methodology to collect the data are all critical elements to structure these transactions. There are also alternative options to a first loss capital facility. These include:

- **A resilience monetization fund** that provides a tranche with grants or first

loss protection by a development partner or the beneficiary of the resilience dividend. The fund investor frontloads resilience dividends, allowing governments or other agents (public utilities, state owned entities, cooperatives, etc.) to finance the upfront costs of adaptation and resilience investment.

- **Sustainable development bonds** (Pay for Success Bonds or Social Benefit Bonds) could facilitate private investors to provide the funding and be repaid later by the donor community.
- **Social Impact Bonds** provide a financial instrument in which commissioners or governments enter into agreements with social service providers and investors to pay for the delivery of pre-defined social outcomes.

Next Steps

While IFAD and MoIC, under the COP27 Presidency, will co-lead the design, a select advisory group constituted by developing countries, non-state actors from the Global South, development partners, philanthropies, multilateral entities and other United Nations organizations will be formed. The concept will be formally launched at COP28 in UAE.

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