INCLUSIVE LABOR INSTITUTE | GLOBAL FAIRNESS INITIATIVE

INCLUSIVE FINANCE FOR CLIMATE RESILIENCE

An Assessment of Grassroots Financing for Sustainable Livelihoods

CASE STUDIES ON GRASSROOTS CLIMATE INITIATIVES IN INDIA | 2024

The Global Fairness Initiative's Inclusive Labor Institute (ILI) is a worker-centered knowledge hub on the conditions and experience of work for the 2 billion+ essential workers who power the informal economy. ILI leverages grassroots data, information and intellectual leadership to deepen our understanding of the issues that create vulnerability, and of the opportunities to strengthen the future of workers, especially women. Through the Institute, Global Fairness Initiative provides Global South and North organizations alike a platform for collaboration on labor rights, women's empowerment, community resilience and social and economic progress to help ensure that communities of promise become centers of prosperity.

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Executive Summary

Over the past decade, climate disasters in India have upended thousands of small and marginal producers and workers lives and livelihoods. Across sectors, informal and vulnerable workers, primarily women, are disproportionately impacted by climate change and are pushed further into poverty as they struggle on the front lines of the climate crises.

Since 2000, the Self-Employed Women's Association (SEWA) have worked to enhance financial stability and prosperity for its members through the transition to green technology and into the green economy in what is termed as building 'climate resilience'. SEWA help build the skills, capacity, and confidence of workers to have livelihood security and resources to withstand the changing physical landscape and the significant increase of climate and economic shocks.

In 2024, Global Fairness Initiative (GFI), an international NGO with experience in evaluating economic empowerment of women, assessed the impact of SEWA's on-going initiatives designed to engender inclusive financial growth and development through climate resilience. The following report focuses specifically on SEWA's efforts, and the economic and social impact of those efforts, while also articulating the investment framework and financial partners and model used within each case study. The purpose of the report is to present different case examples of climate-linked financial models and their scope, structure and impact.

Through primary and secondary data collection, GFI's assessment found that small and marginal producers, mainly women, gain stability and security as a result of targeted financial solutions that address specific climate challenges. When initial investments are activated, women producers reported sustained increases in their income, and a reinvestment of their income into their businesses and to climate friendly solutions linked to livelihood security. Furthermore, opportunities for expanded investments by SEWA to sustain and scale up successful models can provide further wrap-around support to deepen resilience against climate shocks for workers and communities.

Introduction

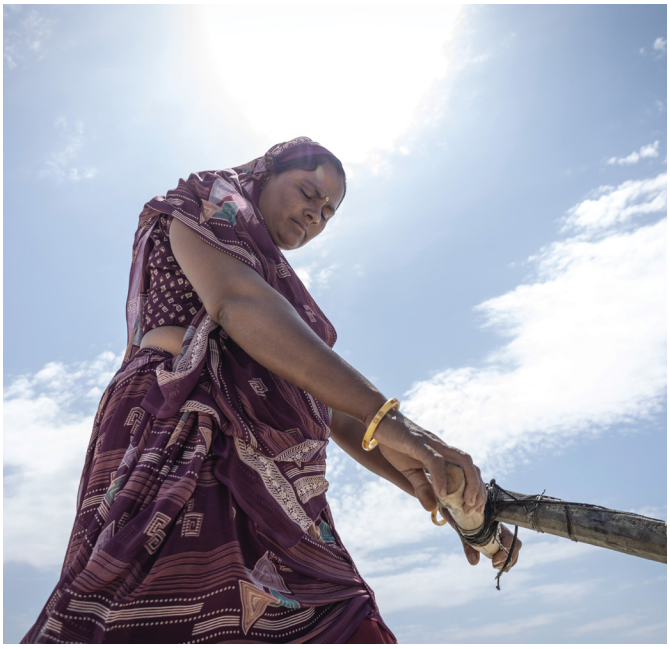
Over the last year, India and South Asia experienced cyclones, extreme flooding, and some of the hottest temperatures on record. According to a recent study, more than 85% of districts in India are exposed to climate events leading to around 8% GDP loss in 2022 alone, and a cumulative capital wealth decrease of 7.5%[1]. Through these imminent climate emergencies, poor, informal sector workers were disproportionately affected as they were ill-prepared to handle such shocks. Among the poor, women and youth bear the brunt of the damage caused by climate disasters.

At the same time, the informal sector plays a pivotal role in low and middle-income countries as it contributes close to 35% to the GDP and 38% to exports. Informal work provides the main means of income for daily workers, and nearly 90% of employment in India derives from the informal economy, with women constituting a large portion of the unorganized labor force[2]. Many informal workers are marginalized, already facing precarious and, oftentimes, unsafe working conditions. The increasing frequency of climate disasters exacerbates workers' vulnerabilities and compounds the negative impact on their livelihoods, their ability to work, and their health. More and more, workers are experiencing direct physical harm and poorer health with rising temperatures and intensifying weather events.

Challenges in Accessing Finance

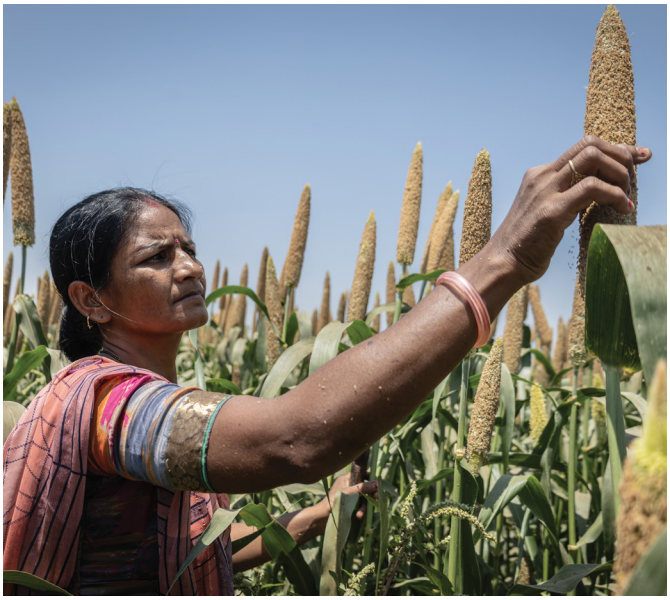
An undercurrent of workers' struggles against climate impacts is the economic stress of not only recuperating from climate events, but also having difficulty in preventing or reducing the impacts before they occur. Informal women workers face inaccessible formal financial markets where the only capital available to them is in the form of high-interest debt with highly unfavorable terms of repayment. As a result, they are stuck in a vicious cycle of poverty and cannot invest in equipment and materials that could prevent or reduce setbacks from climate disasters.

To build financial and environmental resilience among informal sector workers, there is a dire need for capital. It is critical that women micro-entrepreneurs are given access to affordable and accessible means to build and scale up their micro-enterprises as well as finance climate protective measures to aid themselves and their families. Providing a blended pool of finance for initial capital, which consists of a mixture of grants, patient capital, and debt, can help strengthen business processes and integrate technology in their micro-enterprises to kickstart operations. In addition, financial options can be put towards building robust infrastructure and resources to thwart immediate climate shocks while better adapting to climate change in the years to come.



"Our members belong to various trades, some are home-based workers, while some are salt-pan workers. More or less, everyone suffered from heat strokes and exhaustion. Lack of drinking water led to frequent UTIs. Food spoilage due to unavailability of storage facilities led to increased cases of diarrhea and vomiting. SEWA sisters who were working in the scorching heat had to face weather's wrath and suffered from skin rashes. All this not only affected our health but also decreased their work productivity."

GAURIBEN DARJI (PATAN)



1 How can India address Climate Extremes, IPE Global & Esri India, 2024.

2 https://www.imf.org/en/News/Articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy

The Study

There is a burgeoning and urgent need to collectively recognise the contribution of women workers in the fight against climate change, and to explore the financial opportunities that have helped aid poor women producers adapt to the changing global climate patterns.

This report analyzes three different innovative case studies being implemented in India related to 'Climate Resilience' for women micro-entrepreneurs, and an evaluation of the financial models used. Each of these pilots discusses the livelihoods, health background and context; the objectives of the program; the model and approach of financial innovation used; the methodology of the financial model for structure, affordability, and accessibility to women workers; the qualitative and quantitative impact of these innovations; and the opportunity to achieve scale and sustainability through expansion and replication.

Study Objective

Through this study, GFI documents diverse innovative pilots being implemented in India related to 'Climate Resilience' for small and marginal producers and how innovative financial models have been incorporated to achieve scale and sustainability. GFI hopes that the learnings from the study will help facilitate the development of an 'Investment Framework' for both policy makers and investors who are interested in exploring a blended finance model. By providing 'Risk Capital' at a rate that is affordable to the poor producers, it enables a cushioning mechanism and helps strengthen the poor by incorporating technologies and systems that can provide a safeguard against adverse climate shocks.

Selection of the Pilots

For the study, GFI looked at a number of green initiatives implemented by Self-Employed Women's Association (SEWA). The main criteria of selection were based on the following broad criteria:

- Geography- represents urban, peri-urban, and rural initiatives
- Multiple livelihoods/enterprises/sectors
- Variation of climate risks
- Different project life cycles

Based on the above criteria, following three pilots were selected.

- *Hariyali* or Green Villages/Wards Initiative
- Solar Pumps for Salt Pan Workers
- Parametric Heat Insurance

Methodology

The researcher accessed three case studies innovates, and collected primary and secondary data to evaluate the mechanics of each program and the scale of impact. Primary data collection came through semi-structured interviews of key program staff of SEWA and their partners, members, and other relevant stakeholders. Documents such as proposals, base line evaluations, interim reports, vulnerability tests, and impact assessments were analyzed, and field visits were conducted.

CASE STUDY 1

Hariyali or Green Villages Initiative

Background

Globally, 58 percent of working women are employed in the informal economy. In developing countries, that figure rises to 92 percent[3]. Women in India—and their incomes—are profoundly and disproportionately impacted by climate change, particularly extreme heat, which claims more lives than any other climate hazard. Economic inequalities including lack of access to education, resources, assets, and decision-making power, compounded by cultural practices and social norms, critically constrain women's ability to adapt to climate change.

Members of SEWA reported on the various and profound impacts of climate change on their lives and livelihoods.

A. Impact on Livelihoods:

- 90% of respondents reported that heat waves adversely affect their livelihoods.
- Major impacts include decreased work efficiency (79%), reduced work hours (64%), increased expenses (44%), increased medical expenditure (43%), and spoilage of goods (42%).

B. Impact on Health:

- Common symptoms experienced during heat waves include headaches, rashes, fever, dizziness, and diarrhea/vomiting.
- 38% of members stated that heat waves adversely impacted their mental health.

C. Food Security:

- 60% reported food spoilage due to extreme heat.
- 27% stated that they consumed spoiled food.
- Water supply was adversely impacted for 82% of respondents.

E. Impact on Children:

- 30% of respondents reported adverse health impacts on children, and 74% cited school disruptions.

F. Impact on Energy/Utilities:

- 78% faced electricity supply issues, with 66% experiencing weekly power outages.
- Increased electricity consumption led to higher bills for 54% of respondents, straining already limited household budgets.

Green adaptive technology and renewable energy alternatives can mitigate the harmful impacts of climate events, increase access to energy and fuel, improve work productivity, and promote environmental sustainability. These solutions generate cleaner energy, and save families from high recurring costs like electric and gas bills. However, access and affordability to greener alternatives remain a challenge. The initial costs of renewable energy sources are higher than those of their non-renewable counterparts. For poor or low-income workers who rely on daily wages, they cannot afford to pay upfront costs to invest.

Women-Led Climate and Clean Energy Solutions

Starting in 2009, SEWA in partnership with the National Resources Defense Council (NRDC)[4] launched the *Hariyali* Green Village Program to enhance clean energy access in rural India and urban slums through policy and market solutions led by women. The objective of the Hariyali Initiative is to accelerate the uptake of clean energy and reduce energy poverty amongst SEWA members. Through a targeted, needs-based approach, the initiative works alongside members to:

- Increase the affordability of energy
- Improve the availability of energy for both household and livelihood-related activities
- Expand the adoption of clean energy sources and energy-efficient technologies
- Enhance the living conditions and reduce the burden of strenuous work for women
- Enhance health, air quality, and environmental conditions by reducing harmful emissions.

Awareness-building, installation, and implementation of climate adaptive technology and devices are the core of converting a village into a Haryali. When the following two criteria are met, a village or ward is designated as Green.

- Either 25% of SEWA members implement at least 3-4 climate solutions **or**
- 10% of members implement 3-4 climate solutions including at least one community level intervention like community biogas plants, community solar pumps for irrigation activities or micro-grids for electricity generation

3 https://www.imf.org/en/News/Articles/2021/07/28/na-072821-five-things-to-know-about-the-informal-economy

4 **NRDC** advises and provides solutions to organizations that are seeking to advance national and global climate goals through community-based solutions.

CASE STUDY 1

Hariyali or Green Villages Initiative

Model and Approach

The Hariyali Green Village Initiative aims to enhance accessibility and affordability of clean energy technologies and improve livelihood opportunities at the household level in rural India. Each Green Village, or Hariyali, includes a suite of clean energy and environment-friendly technologies such as

- **Cool roof** to reduce ambient household heat
- **Energy efficient kit** which includes solar fans, solar lantern, 2 solar LED lights for lighting and thermal comfort
- **Solar fencing** to deter wild animals against crop damage
- **Solar traplight** against pests and insect damage
- **Biogas plants** for clean cooking

Based on its interactions with members, SEWA, in partnership with the NDRC, developed a framework to identify clean energy interventions and design a Green Village. It consists of five broad steps, outlined below.

STEP 1—Selection
Design a structure to identify key districts and select pilot villages.

Pilot Villages were selected based on the following eight criteria:

1. Strong SEWA presence
2. High rural population so as to have maximum coverage
3. Low electricity access
4. High dependence on firewood, dung cakes and other solid cooking fuels
5. Low asset ownership (TV, computer, internet, two-wheeler)
6. Limited access to banking services
7. Vulnerability to climate change using information on the district that the village is located in from National Initiative on Climate Resilient Agriculture[5]
8. A greater number of small and marginal farmers

STEP 2—Identify Opportunities:
Review national, state, and local government policies, and identify market programs for clean energy so as to establish convergence with existing schemes and programs of both the Central and State Governments.

STEP 3—Develop Socio-Economic Profiles
Green solutions and energy audits at the household level are facilitated by a newly developed cadre of young SEWA women called climate entrepreneurs. Climate entrepreneurs create awareness about different green energy solutions available under the Hariyali Initiative, and assist households in selecting green energy tools and technology depending on members' priority and affordability. They are also trained to address financial barriers in order to facilitate links with banks, financial actors, and vendors to invest in green energy technology.

STEP 4—Develop Village Plans
Based on the analysis of the data collected and social acceptance by at least 25% of its members in a pilot village, village plans are developed for implementation of Haryali Initiative. The plans include technical and financial requirements, possible convergence with existing schemes of the government and skills requirement for installation, repair and maintenance of the green technologies.

STEP 5—Installation, Operationalisation and Maintenance
Once selected and financed, Climate Entrepreneurs ensure installation, repairs and maintenance of these green technology assets at the members' doorstep.

Innovative Financial Models for Adoption of Green Solutions

Finance and upfront investment are the key to adaptation and mitigation measures implemented under the Green Villages/ Wards program. SEWA used some innovative financial arrangements to provide easy access to credit for its members.

5 https://en.wikipedia.org/wiki/National Initiative on Climate Resilient Agriculture

CASE STUDY 1

Hariyali or Green Villages Initiative

1. Livelihood Recovery Fund

In 2015, SEWA entered into a partnership with ICICI Bank, one of India's largest private banks to create a loan facility of $3,846,153 USD[6] with an annual interest rate of 6% with the objective of providing loans to SEWA members who had been impacted by climate shocks. The loan facility was managed by the Grassroots Trading Network for Women (GTN)[7] on behalf of SEWA and the loans were distributed to the members through SEWA's District Association (DA).

The total lending amount was fixed in the range of $350-$600 per member to support the Green Villages/Wards program. This facility was operational until it expired in 2022.

2. Loans from SEWA Bank and District Associations

Since 2022, the District Associations (DA's) of SEWA have been providing loans to members directly or linked them with SEWA Bank. For an upfront deposit of $31, the members can repay the loan in installments of $12 per month. The amount and schedule is based on members' cash flows from the sale of milk to the local milk cooperative.

3. Carbon Credit-Based Subsidy

SEWA has entered into an agreement with a supplier of biogas plants for its members in certain geographies based on demand from its members, where the supplier provides a plant of 3 cubic meters (cu.m) for $148 against the listed price of $519. The supplier recovers the rest of the amount from selling carbon credits in the open market. This provides a win-win situation for both the supplier and SEWA members.

Table 1: Subsidy and payment schedule for Biogas Plant

Cost of 3 cu.m Biogas Plan	$519
Life of Plant	15 years
Subsidy by Manufacturer	$370
Effective Cost to Member	$148
Upfront Deposit (From Savings Group)	$31
Balance Amount	$117
Installment Amount (Per Month)	$12
Total Repayment Time	10 months

Analysis of Impact

As of date, there are a total of 173 designated green villages spread over the states of Gujarat, Uttar Pradesh, Rajasthan and Maharashtra, and the target is to take it to 250 by the end of this year.

The major impacts of Haryali can be summarized as:

a. **Income:** Replacing traditional or fossil fuel energy equipment with free solar energy equipment directly reduces expense on fossil fuels. This is immediately felt by the members who have more money in their hands at the end of the month.

b. **Environment:** One study conducted of replacing lighting and fans to energy efficient alternatives, found that just 100 fans and 200 LED bulbs replaced in each village can conserve approximately 84 megawatt-hours (MWh) of electricity per village each year.[8] This translates into a reduction of around 77 metric tons of carbon dioxide (CO2) emissions, which is equivalent to the amount of carbon absorbed by 700 tree saplings for a period of 10 years[9].

   Another internal study found that by converting 50% of diesel water pumps to solar-powered systems, and reducing kerosene usage by 80% through the adoption of solar lighting, an additional 8 tons of CO2 emissions can be avoided per village annually.

c. **Health:** Households with a biogas cook stove have more diverse diets.[10] Because the fuel source is self-sufficient and burns without the constant need to maintain an adequate flame, women are able to multitask while cooking. This allows them both to add more food items to a single dish and to diversify the type and quantity of dishes included in a meal.

   Reduction in indoor air pollution directly improves the lung and eye health of women—who are the first ones impacted by smoke—and their families. Children no longer need to study in kerosene lanterns that emit harmful carbon monoxide.

d. **Livelihoods:** The products and services of Hariyali aim to build members' ownership of income-generating green technology assets at the household and community level. These are provided through affordable installments (with the support of a bank loan). The two key aspects of the endeavor are to

6 USD to INR (2015): 65. Amounts in this report are listed in USD.
7 The goal of the GTN is to strengthen, support, and expand market opportunities for **grassroots** producer organizations with a particular focus on **women** producers.
8 Internal assessment conducted by SEWA's Grassroots Trading Network for Women (GTN)
9 https://onetreeplanted.org/blogs/stories/how-much-co2-does-tree-absorb
10 Biogas Cook Stoves for Healthy and Sustainable Diets? A Case Study in Southern India Tal Lee Anderman, Ruth S. DeFries, Stephen A. Wood, Roseline Remans, Richie Ahuja, and Shujayath E. Ulla

Hariyali or Green Villages Initiative

align these installments to the underlying cash flows of the members in their respective trades, and training on how to use energy assets to increase their incomes in their existing trades.

e. **Gender Empowerment:** Ownership of the energy asset, combined with an increase in incomes and reduction in costs of fossil fuels helps the women have a greater say in decisions within their families and communities. It also helps convey such role models to the next generation.

Opportunities for Expansion and Replication

The key to the success of Hariyali Green Villages has been a model and approach that is sustainable, replicable, and scalable. Three key learnings emerging from the Hariyali Green Village initiative:

A. The ***model*** must be decentralized and encourage members to be the owners and managers, and must be involved in implementing and directing the initiative. This was achieved by aggregating women's co-operatives and building partnerships with manufacturers and providers of technology and finance.

B. The ***focus*** must be on how energy will improve the lives and the livelihoods of poor technology users, especially women, and how energy will reduce poverty. An increase in livelihoods will enable them to pay installments for modern, clean energy access. The emphasis must be laid on linkages for livelihood creation.

C. The ***approach*** must be holistic, integrated, and self-sustaining where:

- » Each family is viewed as one unit with multiple energy needs for its family members (lighting, cooking, heating, running small tools). Addressing these needs holistically builds the target users' trust and 'buy-in' for the program.
- » View each family as part of the community, akin to the ecosystem. Each energy solution needs to be evaluated on how it integrates with other energy solutions to fulfill the needs from the family and community's point of view, and help the family and community build livelihoods and incomes.

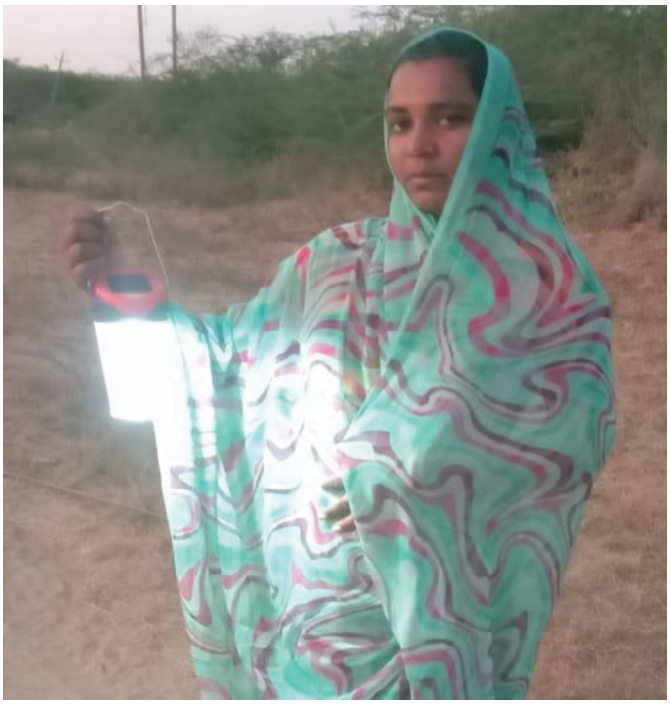
The way forward is to have an integrated, holistic and self-sustaining approach, which aims to provide solutions that cater to multiple energy needs of the family and the community, today as well as tomorrow.

Within the next 3-5 years, SEWA will be expanding the Hariyali Initiative from 130 villages to 500 villages across districts in India. SEWA aims to expand financial partnerships to increase the number of loans to members within the next 3 years to promote investment into the green transition. The short repayment schedule demonstrated by participants in Hariyali Initiative indicates a strong return on investment. Furthermore, climate resilience financing and SEWA Bank continue to help members build necessary capital, grow their enterprises, generate larger incomes, take out larger loans, and deepen their purchasing power towards green technology.

To compound the financing opportunity, SEWA is working with carbon credit suppliers to integrate incentives into the existing model. Through small changes such as transition to cleaner, biogas fuel, members have reliable access to energy, lower energy bills, less reliance on high priced diesel, cleaner air, and additional income from buy-back carbon credit from companies.

These targeted solutions streamline SEWA members and Hariyali villages' transformation into the green economy, and provide additional income and financial security to women workers.

> ***"SEWA has introduced us to different products that operate on solar, and it has changed our lives. I want that these solutions should be available to all my 2 million sisters in SEWA. But I do not want that they should wait 20 years for it."***
>
> **KAPILABEN (VILLAGE RASNOL, ANAND, GUJARAT)**



CASE STUDY 2

Solar Powered Pumps for Salt Pan Workers

Background

The salt pan farmers (*Agariyas*) of Surendranagar district of Gujarat, India, work in inhabitable climatic conditions with temperatures as high as 50°C for six months of the year. The salt making and farming process includes operating diesel or solar pumps around the clock to extract brine from the ground. Diesel pumps are commonly used and are cheaper, but have high operational costs to maintain in terms of the expenses for diesel and spare parts.

Salt pan farmers need working capital at the beginning of each season to operate and rely on traders for funds due to a lack of land records in their name to access finance from formal institutions. The traders exploit them by giving high-interest (24%) advance monthly payments of $147-$172 USD[11] per month for six months starting in October–out of which the majority is spent on buying diesel and spare parts for the pump-sets and the rest for monthly groceries, leaving the salt farmers with no savings.

A single salt farmer produces an average of 600-650 tons of salt from a 2.5-acre pan over six months. Traders fix the price of this salt at $1.60-$1.72 per ton before the season commences, and avoid paying added costs by stopping advance payments right before peak months. As solar heat is one of the major factors influencing the amount of salt produced, production is highest in April and May, and families could improve their income by $430-467 annually if they had sufficient diesel for the pumps.

However, this would also mean that the traders would have to pay the balance cost of salt to the farmers. To avoid this situation, the traders' cartel prevents the salt-farmers from producing more salt by stopping the advance payments just before the month of March. Thus, despite working hard and producing good quality and quantity of salt, the salt farmers hardly get competent prices, leaving them with hardly any income to sustain their families in the off-season months.

Model and Approach

Over the last 24 years, SEWA, through its district association (DA), has organized 1,632 women salt workers in Little Rann of Kutch to provide full employment, self-reliance, and autonomy for their wages and salt production. In 2010, SEWA discussed with the salt workers about the possibility of harnessing solar energy for salt production. Solar energy does not emit greenhouse gases or other air polluting toxins, so replacing diesel with solar power can provide significant climate and health benefits for people's health and the environment.

In 2014, SEWA initiated a pilot that transitioned 12 diesel pumps to solar pump sets. During the pilot, the solar pumps demonstrated higher efficiency and reliability, enabling Agariyas to increase their harvested salt output, pursue other income-earning activities, and power other household items when they don't need the solar pumps for pumping brine. Despite these profound benefits, Agariyas faced significant hurdles when switching to solar due to initial costs and barriers to acquiring capital.

11 1 USD = INR 81.3

CASE STUDY 2

Solar Powered Pumps for Salt Pan Workers

Table 2: Comparison Between Diesel Pump vs. Solar with Limited Diesel Pumps

Assumptions	
Pricing of salt if sold to money lenders/ton (USD)	$2.71
Pricing of salt if sold in open market/ton (USD)	$3.08
USD to INR conversion	81.3

Expense	Scenario 1: Diesel Only	Scenario 2: Solar + limited Diesel
Initial Investment—Approx. Pump Cost for 3 HP	$922.51	$1,353.01
Approx Diesel consumption / hour running (Liters)	1	1
No of Hours operated with Diesel	16	6
No of Hours operated without Diesel	0	10
Average annual salt production (tons)	250	500
No of days pump is required in a season	50	50
Diesel Consumption per season (50 days pump use)-litres	800	300
Price of Diesel (USD/Litre)	$1.05	
Labour cost (mostly done by family)	$147.60	$147.60
Travel cost	$123.00	$123.00
Trolley rental etc	$123.00	$123.00
Total Diesel Consumption Per season	**$836.41**	**$313.65**
Avg Total Expenses (INR)	**$1,230.01**	**$707.26**
Savings in Expenses Per Season/Pan from use of Solar Pumps		**$522.76**
Revenue	**$676.51**	**$1,537.52**
Additional Revenues per season/Pan from use of Solar Pumps		**$861.01**
** Working capital and initial capital for purchase of Solar Pumps not included in this analysis*		
Average Working capital loan interest per season if borrowed from traders		**24%**

CASE STUDY 2

Solar Powered Pumps for Salt Pan Workers

Since initial investments in solar pumps are high, SEWA carefully designed a repayment model with low risk not only for salt pan workers but also for the organization. The District Association and SEWA Bank facilitated funds to pilot 12 solar pump sets in 2014. As more salt farmers became attracted to solar pump sets, SEWA circulated a new Request for Proposal (RFP) for new pump set vendors and identified a vendor offering the complete solution for $2,214 per unit. With the Government of India offering a subsidy of $1,230 per unit, the effective price salt farmers had to pay for the pump sets came to around USD $984—the equivalent to the price of a diesel pump set.

Multi-Stakeholder Model

After the pilot, the objectives were well-defined, SEWA entered into partnerships with various financial intermediaries and solution providers to provide expanding support for transitioning to solar pumps. Each major sponsor developed a customized approach to finance the program, as described below.

SEWA Bank[12]**:** SEWA Bank provided loans of up to 90% of the cost for solar pump to 600 salt pan workers, amounting to a total of $1,000,000 to purchase the solar pump sets against a guarantee of $63,000 deposited by SEWA in the form of a fixed deposit in SEWA Bank.

Yes Bank Foundation: Yes Bank Foundation provided a grant of $63,000 to be used by SEWA to deposit a Fixed Deposit with SEWA Bank as collateral for the loan provided by SEWA Bank to the salt pan workers. Additionally, it also provided an 8% interest subsidy to salt farmers.

Alectrona Energy Pvt Ltd (AEPL): AEPL was selected through a Request for Proposal from a host of suppliers based on the lowest price per unit for supply of 200 units of solar pumps.

Revolving Fund for Working Capital Support: To meet the increasing demand of the farmers, SEWA worked with the Asian Farmer Association for Sustainable Rural Development (AFA)[13] in 2021 to create a revolving fund of $17,000 to provide working capital loans to members who have installed solar pumps during the start of the season.

Analysis of repayment patterns has shown that, on average, the repayment period for loans to purchase solar pumps was about five years with negligible default.

To date, a total of 85 beneficiaries have participated in the revolving fund and gaining access to capital loans that average around $922 at the start of the production season. Importantly, in addition to zero default, the repayment period has decreased over the years from an average of 1 year 2 months in FY 2020-21 to 8 months in FY 2023-24.

Table 3: Analysis of Repayment of Working Capital Loan Through Revolving Fund

District Name:
Surendranagar

Working Capital Loans for Salt Farmers

Total Revolving Fund Available:
$18,450

Interest:
1%

Year	Total Loan Disbursed	Total no. of beneficiaries	Repayment Period
2020-21	$18,450	20	1 Year 2 months
2021-22	$18,450	20	1 Year
2022-23	$18,450	20	9 months
2023-24	$22,690	25	8 months
Total	**$78,041**	**85**	

12 Shri Mahila SEWA Sahakari Bank, Ltd (SEWA Bank) is a cooperative bank that was founded in 1974 by a collective of poor women to serve the needs of Indian women working in the informal sector

13 The Asian Farmers Association for Sustainable Rural Development or AFA is a regional alliance of farmer federations and organizations in ten Asian countries, representing 10 million farmers

CASE STUDY 2

Solar Powered Pumps for Salt Pan Workers

"If I had not taken the loan through the challenge fund, I would have left with no choice, but to accept the price quoted by merchants in the market. Because I have working capital with me, I was able to hold on to my production and negotiate better prices in the market. Thanks to the Challenge Fund, I am at present more secure financially and emotionally. Now I can dream of becoming owner-manager of my own production."

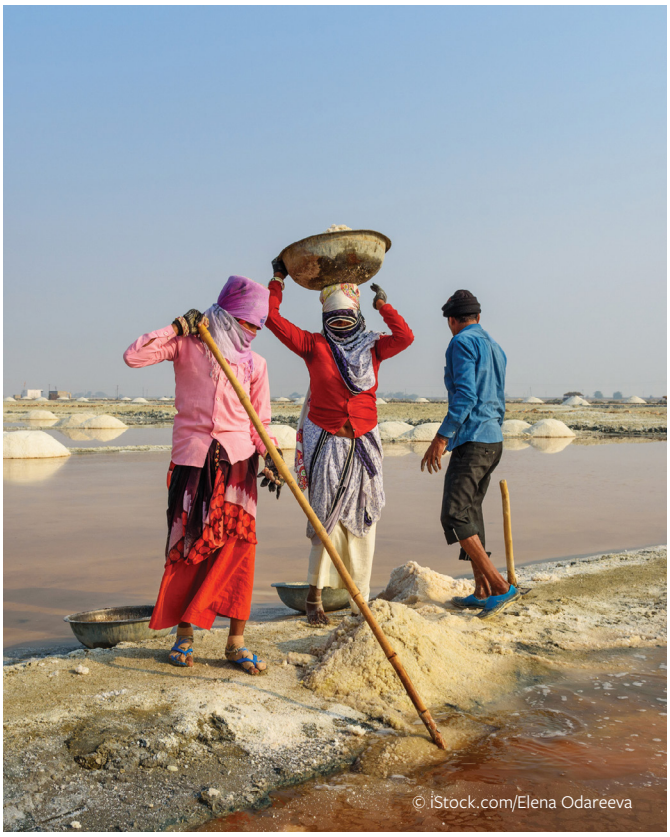
JENIBEN NAVGHANBHA (SURENDRANAGAR, GUJARAT)

Analysis of Impact

The solar pump sets provided by SEWA have changed the lives and livelihoods of 1,632 salt farmers. Reduction in input or operational costs, and increases in savings and income, have gradually started making salt farmers productions sustainable and pulling them from the vicious cycle of debts and loans.

Increase Household Income: Salt farmers using solar pump sets have reduced the amount of diesel needed by almost half, saving about $522 per season in diesel costs. Using the amount saved, the salt farmers can purchase 1-2 extra barrels of diesel for April and May during peak farming months, leading their salt production to almost double. This, in turn, has led to an increase in income by $861. In return, salt farmers use a part of this diesel savings to repay the loan for solar pump sets. In 5 years, the salt farmer can completely repay the loan and become debt-free. This process ensures salt farmers direct access to buyers and eliminates the need for brokers in the consequent years to come.

Lifestyle Changes: With the income and savings, salt farmers have started enrolling their kids in formal educational institutes. They have also started constructing proper houses and pursuing farming as a secondary occupation during non-salt producing seasons.



Opportunities for Expansion and Replication

SEWA's longstanding collaboration with partners has created a model which empowered members to have the necessary financial foundation to purchase tools and equipment in order to transition from diesel powered pumps to solar energy. By fronting costs to purchase solar pumps members substantially improved their financial stability throughout the season. The success of initial investment into solar pumps has diminished costs towards expensive diesel, increased output of their products, extended their working months, increased their income directly and indirectly, and created financial independence from traditional exploitative practices.

The architecture of the financial model used to pilot and expand solar pump sets has been viable, affordable, and scalable. Looking at the demand for more solar pumps from members, there is an opportunity to scale and replicate the success and SEWA has set a target goal of expanding the solar pump initiative to reach 15,000 salt farmers in the next five years.

The widespread use of low efficiency diesel pumps throughout farms in India's combined with a near doubling of the cost of fuel since 2014 means that solar pump technology has substantial room for growth and for climate impact. The development of affordable, inexhaustible, solar energy technologies will have longer-term economic improvements for poor, rural households, and a significant environmental benefit.

There is a need to strengthen the entire green energy ecosystem so that poor women producers not only have access to the best technologies, but are able to access capital based on their

CASE STUDY 2

Solar Powered Pumps for Salt Pan Workers

repayment capacities. SEWA has been exploring a number of innovative concepts, but there is also a need for other players to identify the potential of such a large customer base.

Ease of Access to Markets and Finance: Through the aggregation of salt farmers, SEWA has linked the Agariyas directly to large companies and industries, bypassing exploitative brokers. Simultaneously, SEWA is working with industries to adopt a financial model similar to the brokers but by offering competitive prices upfront to salt farmers as advances, and paying the remaining at the time of delivery. This advance payment can be used as working capital by the farmers to eliminate their need for working capital loans from formal financial institutions.

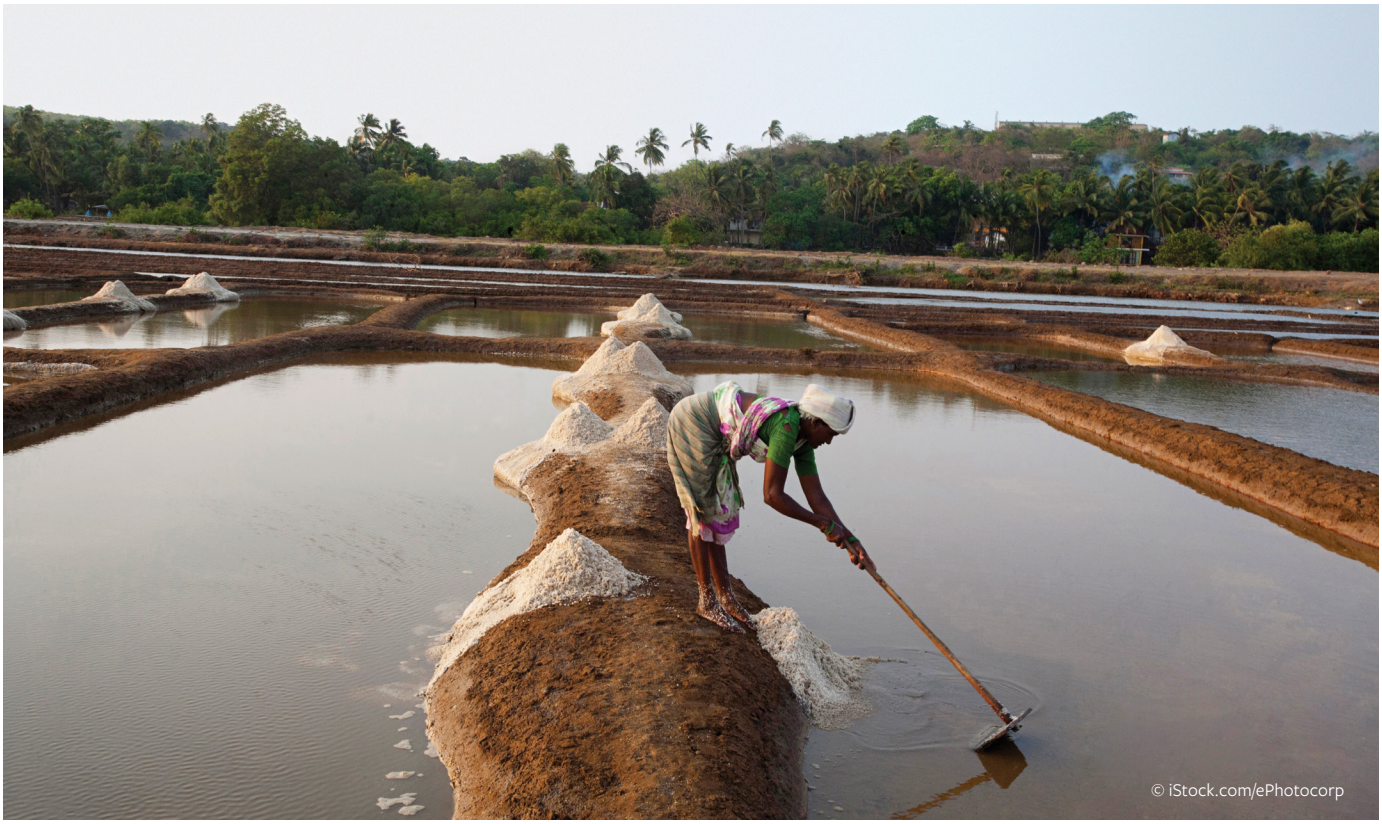
Setting up Micro-enterprises: By linking up salt farmers to the government's Udyog Aadhar[14] registration for Small and Marginal Enterprises (SME) initiative, each salt farmer can convert her salt pan into a startup enterprise. By registering, they are opening the door to various subsidies, loans, and grants which they can use as working capital to bypass the broker cartel.

Policy makers: At present, there is a 18% GST[15] on solar pump sets. This discourages poor consumers from transferring from exclusively diesel, which causes heavy carbon emissions and higher expenses, to clean pumping. To encourage the poor, rural salt workers and communities to switch to clean green pumping, a tax break should be considered.

Technology Providers: Since the villages are scattered far and wide in India, it is difficult for any particular manufacturer to provide nationwide service. However, ineffective, after-sales service is a major reason for customer dissatisfaction, leading to a reduction in sales. To avoid this situation, various manufacturers of similar products can come together to create a common service platform for after sales. This would not only help improve the customers' sales but be beneficial to the consumers' experience.

14 **Udyog** Aadhaar is a unique identification number for micro, small and medium enterprises in India, launched in 2015 by the Ministry of MSME, Government of India to help them access different government schemes and subsidies.

15 Goods and Services Tax (GST), levied by Government on Sale and Purchase



CASE STUDY 3

Parametric Heat Insurance for Informal Women Workers

> *"Social Security is both a concept as well as a system. It envisages that the members of a community shall be protected by collective action against social risks—many of the risks are beyond their control and for which they have no wherewithal or countervailing power."*
>
> **ELABEN BHATT, FOUNDER OF SEWA**

Background

According to a new Intergovernmental Panel on Climate Change (IPCC) Working Group II report, India is one of the most vulnerable countries in the world to climate-induced flooding, heat stress, and droughts[16]. In general, insurers have long relied on 'catastrophic models', which use historical loss data to price future risks. However, unprecedented climate conditions have made modeling future losses more difficult than ever before.

People living in developing countries are least prepared for the consequences of climate change. Women are more vulnerable than men to the impacts of climate change, mainly because they represent the majority of the world's poor and are proportionally more dependent on threatened natural resources. It is critical that the insurance industry, the development community, and governments across the world come together even more closely to extend much-needed, affordable insurance to some of the world's poorest and most vulnerable communities.

Need for an Innovative Insurance Product

The devastating impact of frequent climate shocks on members' livelihoods, health, children's education, and food security necessitated the urgent implementation of an intervention that not only offers financial security but also emotional relief in the face of this escalating crisis. In 2023, SEWA, in partnership with the Adrienne Arsht-Rockefeller Foundation Resilience Center (Arsht-Rock) and Blue Marble, an impact insurance technology (Insurtech), launched a pilot parametric heat insurance product called the 'Extreme Heat Income Insurance', to help women in India recover wages lost due to climate-driven extreme heat events. This parametric insurance is activated once specific extreme heat conditions that could endanger healthcare are met.

Parametric Heat vs. Indemnity Insurance

Unlike traditional indemnity insurance where one must prove losses before payouts, parametric insurance is designed so a beneficiary is able to get paid within days, directly to their bank account, due to predetermined thresholds and satellite data providing evidence of crossing the threshold. Payouts are faster, often within days or weeks, rather than months like with traditional insurance, where an insurance adjuster must visit the site and assess the damage. They are also flexible and can be used for a wide range of needs rather than being designated for specific reimbursement. This creates a much lower risk and time-effort for participants. Hence, products like this ensure that, by reducing vulnerabilities and increasing earnings and savings, financial services allow poor households to transform from 'everyday survival' to 'planning for the future.' When insured against such risks, individuals and communities can recover more swiftly and with fewer long-term consequences.

Model and Approach

The Climate Insurance initiative works to offset income losses and detrimental impacts of excessive heat by providing money directly to workers. The insurance was developed to deliver payments to workers directly once the sum of 3 consecutive daily high temperatures reaches a threshold. In Ahmedabad city, for example, payouts would occur if temperatures added up to between 134°C and 138°C over the course of three days, assessed using satellite data from the National Aeronautics and Science Administration (NASA). Additionally, the program included the procurement and distribution of various climate adaptation interventions to protect women workers from the effects and mitigate the livelihood and health impact of extreme heat.

The micro-insurance products were designed using historical satellite weather data to determine at what temperature (the "trigger") payouts would have been distributed. The trigger of the insurance product was determined statistically using a historical daily temperature dataset spanning 40 years collected by a weather satellite.

In the pilot phase from May 5th to June 30th 2023, the program was broken into six 10-day phases with a different trigger for each phase to reflect how temperatures fluctuate throughout the season. Due to the insurance policy being designed with phases, a member could have been paid multiple times during the coverage period, up to the total sum insured amount of $95. The premium per member was fixed at USD $12.14, and the product is designed to pay out multiple times in one heat

16 IPCC Sixth Assessment Report, Working Group II, 2022

CASE STUDY 3

Parametric Heat Insurance for Informal Women Workers

season to replace lost income (around $3 per day). The calculation determining the trigger varied across districts to reflect the geographical differences in temperature. In the parametric climate insurance used by SEWA members, the trigger represents a specific weather condition (in this case, the maximum daily temperature) that must occur for the policyholder to receive compensation.

The pilot insurance covered 21,000 SEWA members over 5 districts in 2023 and was scaled up to 50,000 members and 22 districts across Gujarat, Rajasthan, and Maharashtra in 2024. All 21,000 women enrolled last year in the pilot were provided one of the four interventions: solar lights, insulated water jugs, tarpaulin sheets, or umbrellas. The program covered farmers and animal husbandry workers, salt pan workers, waste recyclers, head loaders, street vendors, ship breakers, construction workers, and home-based workers.

> ***"These climate shocks like floods or heat waves might occur for a period of 2-3 days at a stretch. But the trail of impact they leave behind is long-lasting. It impacts our income for the present season as well as the following several months to come. Our savings get drained. Very often we are left with no other option on hand but to wait for the correct time."***
>
> **KOKILABEN (ANAND)**

Table 4: Key Players and their Roles (2023)

Name of the Partner	Role
SEWA	Design and Implementation/ Group Policy Holder
Adrienne Arsht-Rockefeller Foundation Resilience Center	Grant to subsidize Premium
Blue Marble Micro Ltd.	Product Design
ICICI Lombard General Insurance Co.	Underwriter

Climate Insurance Product-2024 (Insurance++)

Since the trigger temperature for the 2023 pilot was set at 46°C, which was high, the insurance product did not pay out, although all members of SEWA were affected by intense heat. Based on the learnings from the 2023 pilot, the threshold temperature for the trigger was set between 41.6°C to 46.1°C for a minimum of two consecutive days, thus partially compensating women for their losses. The trigger temperatures varied by district to account for the historical temperature variations among the districts.

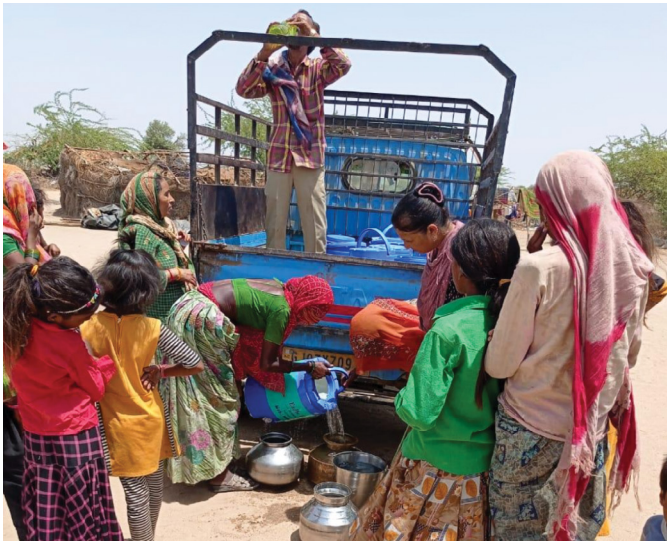
One of the major innovations that were incorporated into the 2024 design was a one-time direct cash assistance that was given to members at lower temperature thresholds of 40°C. This cash assistance provided women with a supplement for lost income during periods of high, but less severe, temperatures that can still harm their health and livelihoods. The premium per member was $5.36 which was entirely funded by the Climate Resilience Fund.

Table 5: Key Players and their Roles (2024)

Name of the Partner	Role
SEWA	Design and Implementation/ Group Policy Holder
Climate Resilience for All	Grant to subsidize Insurance Premium
Swiss Re Ltd.	Product Design and Re-Insurance
ICICI Lombard General Insurance Co.	Underwriter

Analysis of Impact

Although the product didn't pay out in 2023, in 2024, to date, including both the cash and insurance layers, the average product payout was ***$11.82*** *per member*, with members in Dungarpur, Rajasthan state receiving the highest amount of ***$19.8*** *per member*.



CASE STUDY 3

Parametric Heat Insurance for Informal Women Workers

Table 6: Cash Assistance and Insurance Payout (2024)

Component	Trigger	Total Payouts	Members Benefitted
Direct Cash Transfer	40°C for two consecutive days	$40,000	50,000
Insurance	41.6°C to 46.1°C for two consecutive days	$350,859	46,339

"We always thought that only the rich could buy insurance. For the first time, we heard about a climate insurance program. The money I received was used to pay children's school fees and purchase books, bags and uniforms for them. The financial aid enabled our children to continue with their education without us compromising on our dignity and borrowing money from elsewhere."

SAROJBEN (ANAND)

Contribution from Members

As part of SEWA's policy that nothing is free, the members collectively decided to contribute at least some amount to the fund, based on their ability, through the District Associations. In both 2023 and 2024, SEWA members contributed up to $2.50-$3.00 per member to the fund. This helps SEWA compensate approximately 30-35% of its costs towards implementation and monitoring the program effectiveness including payments. During internal meetings, the members have shown willingness to pay up to $6 per member.

Opportunities for Expansion and Replication

As the program scales and the product is able to diversify risks through wider spread across different geographies, the overall operational and payout risks can significantly reduce.

Expanding Parametric Insurance

2023 emerged as the hottest year in India on record. Despite this, the insurance product did not trigger since the trigger was set quite high at 46°C. Additionally, in 2023, other climate-shocks like unseasonal rains, hail storms, and cyclones impacted members across districts. These frequent and intense climate shocks underscored the need for an all-weather catastrophe insurance product that responds to more realistic trigger mechanisms that are based on real-time data. Providing coverage for a wider range of disasters will help members cope with the escalating climate volatility.

In addition, the current payout threshold only considers daytime temperatures, however, a more complex measure in the future could incorporate nighttime temperatures, humidity, and health impacts. Future iterations of climate insurance will move towards offering protections based on predictive outcomes rather than reacting afterward to climate events.

Moreover, the longevity of climate insurance depends on the ability to raise further funds. Parametric climate-linked insurance in low and middle-income countries is a niche but growing field, primarily subsidized by nonprofits, governments, and donors. To ensure the sustainability insurance product, creative and effective funding programs will have to be developed.

SEWA plans to scale the program to cover 500,000 members by 2025. In partnership with technical and financial service providers, SEWA will evaluate existing insurance schemes to address gaps in coverage and adopt an inclusive benefit model aimed at protecting workers. Further analysis of the financial impacts from the 2023 and 2024 indicates that Parametric Insurance will work to offer wider coverage to protect more workers impacted by climate disasters, including extreme heat. Expansion of the program through investment by SEWA members and financial service partners will help mitigate against the substantial direct and indirect impact on income resulting from the loss of sellable products and materials, or delays in accessing necessary tools and services due to supply chain issues. Through Parametric Insurance, women reduce financial risk and build resilience to climate related economic shocks.

"I am the sole breadwinner in my family. The day I am unable to work, we have to sleep hungry. With the insurance product, I had a reassurance that even if something happens to me, I can manage from the pay-out money. Also, the umbrella reduced my heat exposure enabling me to work long hours without extra breaks. This helps me not only during the extreme heat, but also prevents my products from getting drenched during the episodes of unseasonal rains."

DEVIBEN (AHMEDABAD)

Financial Innovations and Scaling Up of Pilots

> *"I understood the benefits of solar pumps demonstrated by Hariyali, but the bank officer will not give me a loan to buy it. He wants me to mortgage the little land I have."*
>
> **DIVUBEN (DHANGADHRA, SURENDRANAGAR)**

Since poor women producers lack access to formal financial markets that can help them overcome the short and long-term economic impact of climate shocks, they are left reliant on high-interest debt and repayment schedules with unfavorable terms. Traditional lenders hesitate to finance small and microenterprises owned and managed by poor women producers due to perceived risk, and this system perpetuates a cycle of poverty. To facilitate poor rural members' access to mainstream market products and services and access to green jobs, many innovations in the architecture of financial products and services are needed. SEWA case studies explored a number of innovative financial arrangements that brought different players together to help develop the funding ecosystem. These models ensured women members were integrated into the solutions, and both of them partnered with agencies, businesses, banks, and foundations to create a multi-prong financial approach to tackling the impacts of climate on everyday women's life.

Understanding Members' Cash Flow: SEWA analyzed the cash flow pattern of its members to tailor the loan product and repayment to suit their cash-flow pattern. By doing this, the instances of loan defaults came down as members were able to repay based on their ability, and members were able to become financially self-reliant.

First Loan Default Guarantee (FLDG) Structure: Due to a lack of assets as collateral, formal financial institutes were skeptical about providing loans to the poor members of SEWA. To overcome this challenge, SEWA deposited a Fixed Deposit (FD) of $63,000 as a First Loss Default Guarantee (FLDG) in the SEWA Bank for the Solar Pumps Pilot. SEWA Bank would use this FD as collateral to disburse the loans to SEWA members for buying solar pump sets for salt farming. If a member defaulted on her loan, the Bank would deduct this amount from the FD instead of directly from the member. SEWA, in turn, would collect the missed loan installment from the members depending on their cash flow and replenish this FD for future loan disbursals. Lending Without Collateral: The lease of the land on which salt-pan workers made salt expired in 1995, and the area was declared a Wildlife Sanctuary. No formal financial institution was willing to disburse loans to poor salt-pan workers without collateral. In a first of its type loan model, SEWA facilitated the disbursal of loans to salt farmers without any land collateral. The grant given by Yes Bank Foundation deposited in SEWA Bank as a FD. The FLDG was also used as collateral for these loans disbursed to salt farmers.

Lending Without Collateral: The lease of the land on which salt-pan workers made salt expired in 1995, and the area was declared a Wildlife Sanctuary. No formal financial institution was willing to disburse loans to poor salt-pan workers without collateral. In a first of its type loan model, SEWA facilitated the disbursal of loans to salt farmers without any land collateral. The grant given by Yes Bank Foundation deposited in SEWA Bank as a FD. The FLDG was also used as collateral for these loans disbursed to salt farmers.

Down Payment: Loan models prevalent in the current market require customers to pay 10% of the cost of the product as a down payment, and the remaining amount is then disbursed by the bank as a loan. Poor workers survive day-to-day and commonly do not have money to pay the 10% down payment. For solar pumps, a 10% down payment would cost a worker $221. SEWA provided down payments for members through a portion of an ICICI Bank loan.

Grant Support for Piloting to Create Member's Confidence: The poor are cautious of financial insurance that asks them to pay upfront, since previous experiences with crop insurance products in India has not been effective or efficient. Poor farmers have encountered delays in the submission of rapid assessments of crop damage data, delays in payment of premium subsidies by the government to the insurance companies, delays in payment to beneficiaries, and a lack of monitoring stations for estimating micro-level crop loss estimates[17]. By subsidizing the insurance premium through a grant, SEWA was able to demonstrate the effectiveness of the Parametric Heat Insurance product to its members. Once members saw the quick disbursement of insurance amounts into their accounts, the demand for the product rose significantly. The same can be seen in the case of Haryali Solar Pumps where SEWA subsidized initial costs.

There is a need for **Development Finance Institutions (DFI)** to start looking at the poor members as micro-enterprises. By providing back-to-back loans to these micro-enterprises and their consumers, the investment into these micro-enterprises will allow the poor producers to expand and improve sales. Both will help micro-enterprises, in turn, pay off their loans and enhance revenues. This model would not only mean increasing business opportunities for the financers but also help poor, small-scale manufacturers start micro-business without capital.

Insurance++: One of the major innovations incorporated into the 2024 design of the Parametric Heat Insurance was a one-time direct cash assistance component when the temperature crosses a certain threshold. Additionally, the program included the procurement and distribution of various wrap-around climate adaptation interventions to protect women workers from heat effects and mitigate the livelihood and health impact of extreme heat. This provided an additional layer of safety net for the women producers affected by extreme climate events.

Community-Based Health Savings Plan: A key challenge posed by climate change is the increasing out-of-pocket expenditure on medical treatment and emergencies caused by climate shocks. Members stated that they lack a financial safety net to reduce the risk of catastrophic healthcare costs. To prevent medical bankruptcy, SEWA sisters collectively contribute a part of their livelihoods towards a pool of healthcare funds. A community- based health savings scheme provides a lifeline, enabling individuals to save small, manageable amounts. It also ensures access to timely care in medical emergencies and prevents sudden out-of-pocket expenditure. Additionally, the community-based health savings plan fosters a sense of community ownership.

17 Why are farmers not insuring crops against risks in India? A review, Biswal, D, Bahinipati, S C, Progress in Disaster Science, Volume 15, October 2022

Conclusion

A review of the case studies covering the financial architecture of each initiative and their social and economic impacts were carried out. The study revealed that the financial stability of small and marginal producers, primarily women, has successfully increased. Further, the initiatives undertaken by these women have made measurable contributions in transitioning India to the green economy while also combating climate disasters. The case studies also highlight cross sectoral approaches like solar pumps, heat insurance and green jobs emphasizing scalability and adaptability of these solutions across regions, thereby increasing their impact on a larger scale.

Initial awareness about different green solutions and buy-in at the forefront and continued investment through a mix of loans, risk capital and subsidies facilitate financial security, expansion of business, and improved purchasing power. As a result, women were able to repay loans quicker and reinvest. In this regard, the interventions promoted economic development and technological advancements that helped workers, particularly women informal workers through increase in green skills sets. These breakthrough actions emphasize the urgency and the importance of viable and scalable innovative solutions and technologies to be deployed to grow immediate and long-term financial and climate protections.

Affordability and access to climate interventions is critical to creating lasting change at the individual and community level. There is a need to look at capital beyond credit by including the right set of financial services like insurance, savings and also wrap-around climate adaptation interventions. Fostering more knowledge sharing and collaboration among financial partners, and the green community at large, is crucial and will generate existing synergies to develop strong complementarities among strategic partners, and ultimately support the scaling and replication of the three case programs, and the innovation of new opportunities.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