

Case study:  
Developing a digital  
platform for  
smallholder farmers  
in Madhya Pradesh,  
India to improve crop  
monitoring, program  
metrics, and climate  
risk assessment.

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Presented by: **AGTUALL**

Supported by:



Adaptation SME Accelerator Program



global environment facility  
INVESTING IN OUR PLANET

# EXECUTIVE SUMMARY

## Problem

The world's agriculture sector is increasingly vulnerable to impacts of climate change including rising temperatures, heat waves, changes in weather and rainfall, and extreme weather events including droughts and floods. Building climate resilience in agriculture is imperative to food security in the face of these growing challenges. Smallholder farmers are particularly vulnerable to the impacts of climate change, as they often lack access to new technologies, climate resilient inputs, and climate analysis to inform the management of their crop yield. Additionally, smallholder farmers lack access to financial products that can offset risk or provide capital for adopting additional climate adaptation technologies.

## Objective

To implement a digital platform that enables the delivery of climate-resilient technologies and knowledge to smallholder farmers. The platform digitizes and analyses farm and regional data to monitor the effectiveness of these services. It tracks parameters such as changes in yield, crop rotation, and changes in income. The platform also provides climate risk analytics that enables insurers and lenders to underwrite customized financial products, making them more accessible for smallholders.

## Key activities

- Analyze and identify gaps in the current process for data collection and reporting
- Develop a platform to bridge the previously identified gaps
- Onboard farm data to start monitoring the program
- Develop and showcase climate risk models to insurers and lenders for creating customized financial products

## Impact

The platform has been used to provide services to 20149 farmers (7774 women) within a period of 6 months. The data on the platform represents 1656 villages and 54912 acres of farmland in the state of Madhya Pradesh, India.

## Scaling for the future

There has been interest to scale the platform to include climate-smart agriculture programs in 16 states in India. Follow-up pilots with financial institutions are being defined which involve the design and distribution of parametric insurance products based on the platform's risk models in the upcoming agriculture cycle. This project has been a catalyst for a similar platform providing livestock index insurance for pastoralists in Sudan and Tanzania.





Image Credits : AEGF

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# About Agtuall ([www.agtuall.com](http://www.agtuall.com))

Agtuall focuses on creating digital platforms that enable the design and delivery of risk transfer instruments (e.g. parametric insurance products) for smallholder farmers worldwide. We specialize in embedding insurance products with services such as farm advisory, market access, and farm loans. Our aim is to increase the resilience of smallholders through the adaptation of crop insurance products. We are currently **operating in Asia (India) and Africa (Uganda, Sudan, and Tanzania)**.

In 2022, Agtuall was selected to be a part of the ASAP Accelerator program led by the Lightsmith Group and supported through funding from the Global Environment Facility's Special Climate Change Fund and facilitated by Conservation International. The program was designed to support small and medium-sized enterprises (SMEs) in developing countries to develop and scale innovative solutions to address climate change adaptation challenges.

As a part of the program, Agtuall was provided a Technical Assistance (TA) facility for activities that would address some of the key bottlenecks for scaling its solutions. The TA supported the creation of additional features on the platform that shortened the process of onboarding farmer data and program-related data. The TA was also utilized to create functionality that addressed the lack of access to climate data for insurers and lenders.



Ongoing and planned projects for designing and delivering innovative insurance products for smallholders

# About Partners

Syngenta Foundation, India ([www.syngentafoundation.org](http://www.syngentafoundation.org))



Syngenta Foundation India is a non-profit organization focusing on sustainable agriculture in India. They work to enhance smallholder farmers' livelihoods and food security. Their initiatives include promoting sustainable farming practices, empowering farmers, and establishing market linkages. The foundation collaborates with various stakeholders and emphasizes the adoption of innovative agricultural technologies. Their goal is to contribute to the long-term development of Indian agriculture and rural communities.

The Adaptation SME Accelerator Program (ASAP) and The Lightsmith Group ([www.climateasap.org](http://www.climateasap.org)) ([www.lightsmithgp.com](http://www.lightsmithgp.com))



ASAP is a program dedicated to assisting small and medium-sized enterprises (SMEs) in adapting to climate change impacts. It offers tailored support and resources to vulnerable SMEs in developing countries. ASAP focuses on capacity building, mentorship, and access to financing, helping SMEs identify climate risks and implement resilience strategies. The project aims to integrate climate resilience into SMEs' business models and foster sustainable practices. Through its targeted efforts, ASAP contributes to enhancing the adaptive capacity of SMEs in the face of climate challenges. ASAP is led by the Lightsmith Group with funding from the Global Environment Facility's Special Climate Change Fund and the Inter-America Development Bank. ASAP is facilitated by Conservation International.

The Global Environment Facility (GEF) ([www.thegef.org](http://www.thegef.org))



GEF is an international institution that funds projects to address global environmental challenges. It supports initiatives in areas like biodiversity conservation, climate change, sustainable land management, and pollution reduction. The GEF collaborates with governments, civil society, and the private sector to promote sustainable development and environmental protection. It plays a key role in facilitating international cooperation and fostering innovative solutions for global environmental issues.

Conservation International (CI) ([www.conservation.org](http://www.conservation.org))



Conservation International (CI) is a global nonprofit organization dedicated to protecting nature and its biodiversity. It works in partnership with governments, communities, and businesses to implement science-based conservation initiatives. CI focuses on preserving ecosystems, promoting sustainable practices, and empowering local communities. Through its efforts, CI aims to ensure a healthy and prosperous planet for future generations.

# 03/ Climate risks in Madhya Pradesh



# The platform was launched in Madhya Pradesh, India

Madhya Pradesh (MP), India is a key agricultural state in India. It is ranked 4th among states (Ministry of Home Affairs India report in 2018) as highly vulnerable to climatic disasters. Farmers in the state primarily rely on rainfed irrigation and are particularly at risk of crop loss due to impacts of climate change including but not limited to extreme weather, flooding, droughts, and increases in disease and pest attacks.



NEWS

Farmers in Madhya Pradesh, Rajasthan, and Uttar Pradesh Fighting the Worst Locust Attack in 27 Years

May 26, 2020 / Gurneel Kaur / 1 Comment

The dependence on rainfed irrigation leaves them vulnerable to episodes of excessive rainfall. In 2019, the state experienced one of its worst floods in history, the floods caused crops in 75000 Hectare land and loss worth around 8000 crore. (Source: Deccan Herald Sep 16, 2019).

Sudden fluctuations in temperature and humidity are also on the rise leading to frequent episodes of disease and pest attacks (for e.g. the locust attack in 2020 caused a loss of 8000 crore INR to the state's agricultural economy).

## MP floods: losses pegged at Rs 10,000 crore; over 220 lives lost

36 districts affected; 45,000 people evacuated; 18,000 are in relief camps



By Sravani Sarkar | Updated: September 16, 2019 18:47 IST

Source: [theweek.in](http://theweek.in)



# The AEGF Program



The Agri-Entrepreneur Growth Foundation (AEGF), launched in 2019 is a collaboration between Tata Trusts and Syngenta Foundation India (SFI). Indian agriculture has made significant progress in the last few decades. However, vast numbers of smallholders still struggle to earn decent incomes.

These farmers could benefit from many existing technologies and innovations but cannot get hold of them. The problem here is inadequate 'first-mile access' – or from the suppliers' point of view, 'last-mile delivery', which essentially means that farmers are not able to access new technologies in an efficient manner.

The Agri-Entrepreneur (AE) program trains and mentors unemployed rural youths to sustainably provide a bouquet of agriculture and allied services to smallholder farmers, thereby bridging the first-mile access gap. The program has already achieved a substantial impact such as over **11000 local youth trained** to deliver services and **1.300.000 farmers reached so far**.

## ■ CURRENT REACH

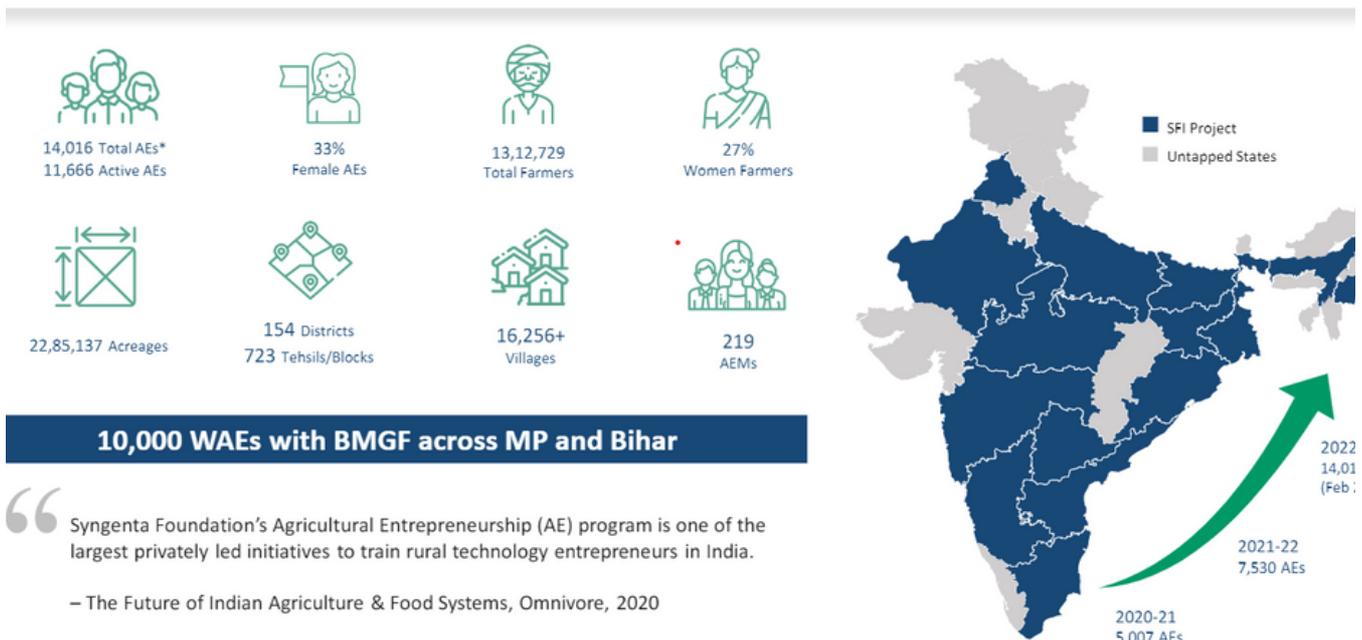


Image Credit: SFI current reach

# 04/ Bottlenecks for climate adaptation



*“By making data and analytics available to small-holder farmers, Agtually is building climate resilience and enhancing the ability for farmers in India to understand & respond to the local impacts of climate change. This understanding can then allow financial institutions to better assess climate risks and provide financial products to previously under-served communities.”*

*-Brian Parham, the Program Director, ASAP*

# Addressing key bottlenecks for climate adaptation

SFI and Agtually have collaborated to create a platform that enables the efficient delivery of climate adaptation products for smallholder farmers in India. The platform supports the following activities:

- Enable the (digital) onboarding and monitoring of farmers' and Agri Entrepreneurs
- Analysis tools to understand and act based on differences in:
  - yields
  - crop choices
  - sowing, and harvesting time
- Matching the region's needs to the right services such as agronomic advisory, irrigation services
- Share these analyses and progress with partner organizations
- Design and create climate risk scores based on the platform data that could be used by financial organizations to deliver customized farm credit and insurance products



# 05/ Activities executed under the TA



Image Credits : AEGF

# Major activities executed during the project

1

## Gap analysis and platform design

- Analyzing and identifying gaps in the current farm and program data collection process.
- Designing a new process based on the identified gaps and providing specifications for platform improvement.
- Designing technical architecture for data collection and processing functionality.

### Key learning:

- Our analysis revealed inaccuracies in capturing farm geo-locations. To address this, we automated the process, significantly improving accuracy. We learned that limiting manual data entry fields enhances data quality and processing time.

2

## Platform development and feedback from end users

- Developing the platform to incorporate the new functionality.
- Conducting continuous testing with potential end-users.

### Key learning:

- Regular, brief meetings with the Syngenta Foundation team to address the platform's user interface has significantly reduced development re-work. This learning complements the importance of frequent engagement with end-users.

3

## Risk Modelling and testing

- Analyzing and designing risk models that could be used by insurers.
- Back-testing the models and deploying them on the platform.
- Engaging with potential partners (insurers and lenders) for piloting the risk models.

### Key learning:

To score individual farms accurately, we recognized the necessity for high-resolution satellite images and climate data. However, due to budget constraints and scalability concerns, we made a strategic shift. Instead, we started generating risk scores at the village level, leveraging publicly available climate and satellite data. This adjustment still allows us to offer parametric insurance.

4

## Farm data onboarding and Partnership Engagement

- Onboarding farm data onto the delivered platform.
- Obtaining end user sign-off on meeting the initial project requirements.
- Organizing a workshop with financial institutions to showcase the platform and farm-risk score.

### Key learning:

It was logistically challenging to get multiple insurers and lenders together in one workshop. Instead, we conducted individual discussions with the financial institutions and moved ahead with defining follow-up pilots with them.

5

## Case study publication and roadmap for scaling

- Publishing a case study on the project's learnings.
- Creating a roadmap for further scaling of the platform.
- Producing a final summary report detailing the use of funds, work summary, impact, progress, lessons learned, and next steps.

# 06/ Digital components developed



*"A detailed monitoring, reporting and verification tool developed by Agtuall is helping tracking and monitoring of the farmers field which further helps understanding the crop dynamics as well as geographical representation of the farmers. Further the tool helps in visualizing the farmers source of irrigation, crops being grown, cropping pattern in different season. The given analysis is being considered by the farmers to avail the weather information, credit resources for their farms. Syngenta Foundation India would like to explore the opportunities to take the platform to 16 states being worked across India."*

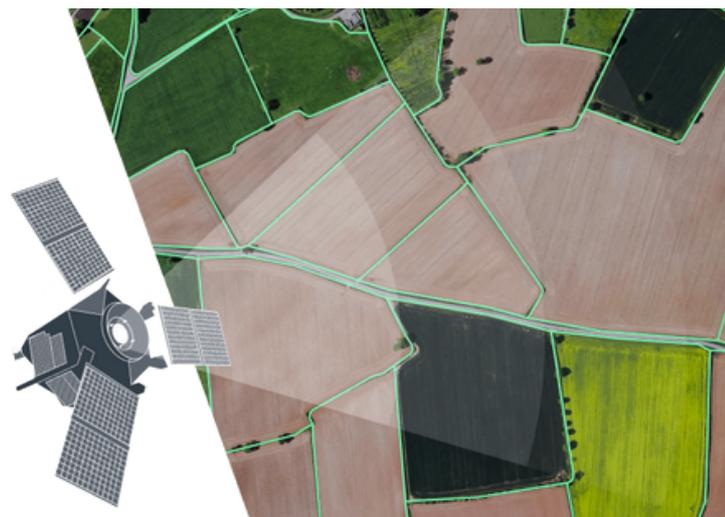
*-Rahul Tidake, Head Strategy & New initiatives, Syngenta Foundation India*

# Onboarding and digitizing farmers in a cost-effective manner

The AE program uses a mobile app for data collection. The app captures farmers' information, such as farm size, crop yield, and inputs used. During our gap analysis, we discovered that the Geo-locations of these farms were not being accurately captured. This led to a lot of re-work and reduced the overall reliability of the data collected. The Agtual team created a workflow that checks and auto-corrects the geo-locations thereby reducing re-work and increasing the reliability of the data.



Image Credits : AEGF



The platform provides insights that benchmarks (anonymously) the individual farmer's progress (e.g. farm income, types of crop sown, average yield achieved, and access to financial services) with aggregated data at a village and district level.

Key decision-making such as selection of intervention area, types of AE services to launch, and farmer onboarding with special attention to gender diversification will now be a more data-oriented approach. An added benefit of the platform is that now it can be used as a monitoring and reporting mechanism for donors and partners of the AE program.



Farm onboarding app

# Quantifying climate risk for designing financial products

Data availability is often mentioned as one of the key bottlenecks towards designing affordable financial products for smallholders. For example, pricing an insurance product becomes a challenge as insurers are often unable to quantify the risk due to lack of historical as well as current farm or village level data. This results in high premiums for an insurance product (in addition to high operational and distribution costs).

The platform addresses this gap by combining historical (rainfall) datasets and the current data to create risk profiles at a sub-district level. The risk score signifies the likelihood of a claim (payout) for a rainfall index-based insurance product. The original intention was to create a farm-level risk score, however cost-benefit analysis of paying for high-resolution data did not work in its favor. Instead publicly available sources for satellite images (NASA, ESA) and weather data (IMD, CHIRPS) were used to create the risk scores.

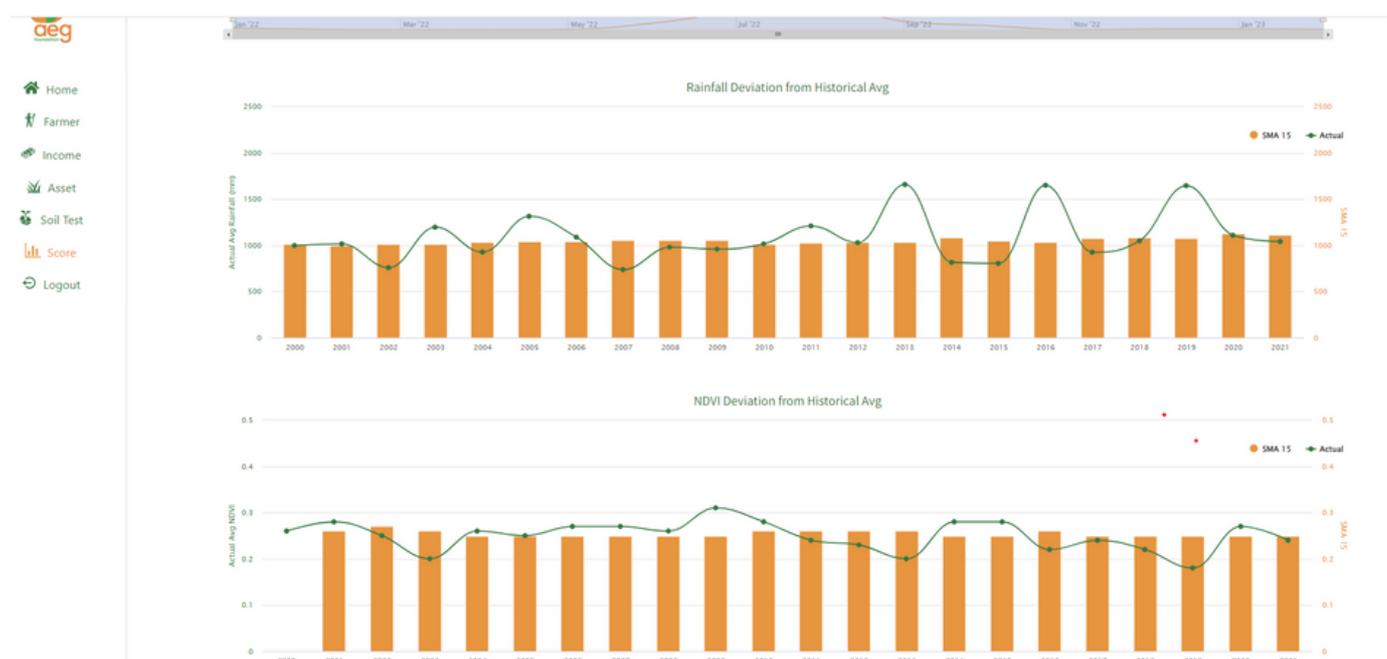


Figure: illustration of analytics of how historical (rainfall) data (top graph) influences vegetation growth (bottom graph)

For example in the figure above, the platform-generated analytics is used to understand and quantify the relationship between rainfall patterns and vegetation growth for a particular area in MP. It clearly shows when rainfall is above or below average, the corresponding vegetation growth index is below average. This helps the insurer to design a specific index for rainfall insurance for that particular area.

# 07/ Key outputs



Image Credits : AEGF

# Support from the TA has enabled the onboarding of 20149 farmers



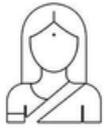
20149  
Farmers



54912  
Acres



1656  
Villages



7400  
Women Farmers



276  
Agri Entrepreneurs



6  
Districts

Some of the key outputs of the platform since receiving the TA are:

- 20149 farmers from six major districts in Madhya Pradesh are now connected on the platform
- Out of the 20149 farmers, there are 7774 women farmers that were on-boarded thereby empowering female farmers and driving gender equality in agriculture
- The platform also hosts 276 AEs (Agri-Entrepreneurs)
- The platform has covered data from 45 blocks, 1656 villages, and 54912 acres,
- Analyzed and designed risk models based on rainfall data for all 6 districts that fit the requirements of financial institutions (banks & insurers)

Farmers will get access to better quality inputs combined with climate-smart agriculture knowledge through the farm digitization process and risk insights. The risk models are showcased to multiple insurers and lenders to explore future partnerships facilitated through the platform.



# 08/ Way forward



Image Credits : AEGF

*"The TA has enabled us to create a platform that supports a consortium of partners to address some of the key challenges when it comes to climate adaptation for smallholders. The new functionalities on the platform enable us to explore new use cases and expand geographically. We are grateful to both ASAP and Syngenta Foundation for partnering with us on this journey. This is just the beginning! "*

*-Vikram Sarbajna, CEO, Agtually*



# The Way Forward

The TA provided by ASAP has enabled Agtually to invest in some of the core functionalities underpinning the platform's scalability. The investment in these core functionalities **has already helped the platform to scale from an original target of 7000 farmers to 20149 farmers within 6 months**. The platform has generated long-term interest from the management at SFI to scale it for other AE programs across 16 states of India **(potentially benefiting 20 million farmers in 5 years)**. In Madhya Pradesh alone, the platform can provide climate-smart agriculture services and financial products to **500000 farmers (50% being women farmers) in Madhya Pradesh by 2025**.

During the course of the project, we showcased the climate risk models to a leading agriculture sector lender and two insurers in India. The initial feedback has been positive and validates the need for a data platform that supports product underwriting. We are now in the process of defining follow-up pilots with financial institutions to test the platform. The project in India has acted as a catalyst for a larger scope of collaboration with the Syngenta Foundation. Together with the Foundation, Agtually aims to design and deliver customized insurance products for smallholders in Eastern Africa and Southeast Asia. For example, **the platform is already being used to design, test and distribute livestock insurance for pastoralists in Sudan and Tanzania**.

The platform also opens up new revenue streams for Agtually. It can be offered to other stakeholders such as government agencies, non-profit organizations, and value chain players/agribusinesses. Some of the use cases we have been able to actively follow up on are:

- **Policymakers:** Governments may use data for better land use management (e.g. suitable crops based on climate), and make policy decisions related to agriculture, such as setting crop subsidies or regulating the use of pesticides.
- **Agri input companies:** can plan their supply chain based on the crop intensity and using the vegetation health data and other satellite data, biotic and abiotic stress could be addressed immediately.
- **Sustainability and carbon credits:** Companies that are interested in reducing their carbon footprint may use data on soil carbon on the platform to identify opportunities for carbon sequestration. Eg, they could identify areas where implementing certain farming practices (such as conservation tillage or cover crops) could increase carbon sequestration and potentially generate carbon credits.

# 09/ Annexure



# Annexure – 1

## Screenshots of the Platform



Figure 1: Data is analyzed and presented on the platform



Figure 2: Farmer data collection is done through an app

# Annexure – 2

## Screenshots of the Platform



Figure 3&4: An example of how data is analyzed and presented for decision-making on the platform

For inquiries regarding the project and collaboration opportunities please contact us at the following email:

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Thank you

