Stability-and-Peace Accelerator: Country Cases for Nigeria, Kenya and Jordan

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Contents

Abbreviations

Acronyms	Definition
ABC	Alliance Bioversity International – CIAT
CIAT	International Center for Tropical Agriculture
FCAS	Fragile and Conflict-Affected Settings
FCM	Fragility, Conflict and Migration
IITA	International Institute of Tropical Agriculture
INNODEMS	Innovations in Development, Education and the Mathematical Sciences
IoT	Internet of Things
IPSR	Innovation Packing and Scaling Readiness
IWMI	International Water Management Institute
KPIs	Key Performance Indicators
KRCS	Kenya Red Cross Society
KYC	Know Your Customer
NARC	National Agricultural Research Center
SAPA	Stability and Peace Accelerator
UNHCR	United Nations High Commissioner for Refugees
WFP	World Food Programme

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CGIAR Initiative on Fragility, Conflict and Migration

The CGIAR Initiative on Fragility, Conflict, and Migration addresses challenges to livelihood, food, and climate security faced by some of the most vulnerable populations worldwide. The Initiative focuses on building climate resilience, promoting gender equity, and fostering social inclusion.

Learn more about Fragility, Conflict and Migration Initiative here: Fragility, Conflict, and Migration - CGIAR

Disclaimer

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Executive Summary

The Stability and Peace Accelerator (SAPA) Program was implemented by the World Food Programme's Innovation Accelerator and in collaboration with **International Water Management Institute (IWMI)**, the **Alliance of Biodiversity International and the International Center for Tropical Agriculture (CIAT)**, and the **International Institute for Tropical Agriculture (IITA)**, with support from the CGIAR Initiative on Fragility, Conflict, and Migration[1]. The SAPA program focused on identifying and supporting the scaling of potentially high-impact innovations that bolster resilience of food, land, and water systems (FLWS) in Fragile and Conflict Affects (FCA) settings.

The WFP Innovation Accelerator and CGIAR selected enterprises through a comprehensive multi-step sourcing and evaluation process. The program sought both low and high-tech solutions tailored to meet the distinct challenges present in FCAs, specifically in Jordan, Kenya, and Nigeria. The sourcing strategy was informed by an Ecosystem Assessment of Food, Land, Water Actors in the Humanitarian, Development, and Peace Nexus[2], which helped identify the following innovation priorities per country:

- **Jordan:** Water and resilience in refugee and host communities
- **Kenya:** Digital solutions for climate security and migration
- **Nigeria:** Resilient food systems and nutrition

The program provided financial, technical and venture coaching support to the four innovations over the course of 6 months, beginning in June 2024, and lasting until early December 2024, comprising a scoping, acceleration and closure phase.

The country cases presented in this report provide a detailed examination of the project's context, innovation overview, and the specific challenges addressed. The cases also highlight the implementation process, the next steps and potential for scalability of the innovations in their respective settings.

[1] https://www.cgiar.org/initiative/fragility-conflict-and-migration/

[2] https://www.iwmi.cgiar.org/Publications/Other/PDF/ecosystem_assessment_of_food_land_and_water_actors_in_the_humanitarian_development_and_peace_nexus.pdf

Methodology

The report is based on a mixed-methods approach, integrating both qualitative and quantitative analysis to assess the progress and outcomes of the innovations supported under the SAPA Program. This methodology enables a comprehensive evaluation of the initiatives, considering both quantitative data and observations from the field.

Primary data collection involved feedback from innovators, which captured key milestones achieved, challenges encountered, and lessons learned throughout the phases of the Sprint Program[3]. This feedback provided valuable input into the performance and evolution of each innovation. Additionally, secondary data sources, such as program applications and partner reports, were used to establish the baseline and objectives for each innovation, offering contextual understanding of project results.

Stakeholder engagement played a crucial role in enriching the analysis. The report incorporated insights gained from multi-stakeholder workshops and in-depth consultations with program partners, including CGIAR and WFP country teams. These interactions helped ensure findings were aligned with the realities on the ground, offering a more accurate reflection of the innovation progress.

The synthesis of case studies was the main component of the report, with each country's case developed to highlight the innovation's implementation process, potential outcomes and scalability. These case studies provide a well-rounded view of the technical performance and development of the innovations over the 6-month pilot period. This structured approach allowed for a comprehensive understanding of each innovation's journey, emphasizing their contributions to addressing the multi-layered challenges faced by communities in FCA contexts.

[3] https://innovation.wfp.org/projects#project-type-61

Country Case Studies

Case 1: Aquaporo in Jordan

A. Jordan Country Context

Jordan, a lower-middle-income country with a population of 11.6 million, with 63 percent of its population under 30[4], faces significant resource challenges. The country has limited agricultural land, dwindling water and energy supplies, and a dependence on food imports. Jordan also hosts the world's second-highest number of refugees per capita, with 3.5 million refugees living within its borders, including 628,000 Syrians and 70,000 from other nations, as reported by United Nations High Commission for Refugees (UNHCR) in July 2024. This large refugee population places unprecedented strain on Jordan's budget, natural resources, infrastructure, and labor market. Despite these challenges, Jordan has taken a progressive approach to refugee hosting, integrating this effort into its broader national goals.

Jordan has demonstrated remarkable resilience in maintaining stability amid regional and global crises. Even though economic shocks have directly affected key sectors, the country has sustained an average growth rate of 2.5 percent over the past decade, thanks to its strategic geopolitical location and recent political reforms that have strengthened its economy. However, there remains a pressing need for job creation, particularly for its youth and women. The unemployment rate stood at 21.4 percent in the first quarter of 2024, with women comprising 35 percent of the unemployed. However, women's overall participation in the formal labor force in Jordan is relatively low compared to men and thus also those seeking jobs and those unemployed. The overall figure remains well above the pre-COVID unemployment rate of 15 percent, highlighting the ongoing economic challenges Jordan faces.

B. Innovation Overview

AquaPoro[5] is an innovative solution designed to address water scarcity in Jordan, a country grappling with severe droughts, over-extraction, and pollution exacerbated by climate change and refugee influxes. This state-of-the-art residential and commercial appliance generates clean, drinkable water directly from the air, making it adaptable to any climate or environment. AquaPoro's team is led by a materials scientist who developed the patented material used to absorb water from the air, supported by team members with expertise in mechanical engineering and commercialization. The original product, Droplet[6], has ability to produce 15 to 20 liters per day at a cost of just USD 0.06 per liter, thus offering an affordable and sustainable alternative to other commercial water sources. SAPA supported AquaPoro to develop and test Stream[7], a larger product with daily water production of 500 liters. With

[4] WFP Jordan Country Brief. July 2024.
[5] https://www.aquaporo.com/
[6] https://www.aquaporo.com/residential
[7] https://www.aquaporo.com/commercial

this product, AquaPoro plans to deliver over 13,500 units by 2027, benefiting more than 75,000 people and producing over 694,664 cubic meters of clean water in three years. By partnering with local banks, AquaPoro ensures accessibility through flexible loan repayment plans, driving resilience and sustainable livelihoods in refugee and host communities.

C. Implementation

The Stream product, formerly known as Mega-WaHa[8], aims to address critical water scarcity challenges by leveraging cutting-edge technology to produce clean, sustainable water solutions. Designed for deployment in real-world conditions, the development and testing of Stream integrates advanced material science, mechanical engineering, and data-driven machine learning to optimize water production. The following milestones outline the progress made in rebranding, construction, piloting, and market analysis to bring this innovative solution closer to practical application and scalability.

Milestone 1: Rebranding and Construction of Stream

The team rebranded the Mega-WaHa device as "Stream" to better reflect its purpose and vision. Using established scientific principles, they reconfigured the device's design to engineer an enhanced prototype. However, challenges in importing specific technical components delayed the construction timeline, slowing product development until November 2024. Despite these setbacks, the team completed the construction of the Stream device, preparing it for deployment (Figure 1).

Milestone 2: Securing Piloting Site and Preparing for Deployment

The team successfully secured a farm in Jordan for piloting, marking a critical step in transitioning operations from a controlled laboratory environment to real-world conditions. During the piloting phase, data will be collected on key performance metrics such as water production, energy consumption, water quality, and ease of use. This data will enable the refinement of its machine learning based operational model to optimize performance and efficiency.

Milestone 3: Market Analysis and Feasibility Assessment

The team conducted some initial market analysis to understand water usage patterns across various market segments and identify potential users whose needs align with Stream's capabilities. Farmers, as key stakeholders, were engaged through surveys to gather insights on water and energy costs, usage rates, and other relevant data. Additionally, a multi-stakeholder workshop was organized in collaboration with the WFP Accelerator and the IWMI team to validate the willingness to purchase the AquaPoro product and invest in its innovation. The outcomes of this workshop will be detailed in the following sessions to guide the next steps in the market strategy.

[8] WaHa means "Oasis" in Arabic but is also an acronym for WAter HArvesting

Figure 1: Venture visits in Amman, Jordan

D. Progress and Achievements

The main achievements of AquaPoro are twofold, focusing on product development for stream (formerly known as Mega-WaHa) and the commercialization of their product. Despite facing significant import challenges in sourcing all the required components, the team successfully finalized the product's construction. Additionally, they secured a piloting site and, remarkably, had a committed buyer even before the product's full development.

This strong demand for their innovation, particularly at such an early stage, was emphasized during a multistakeholder roundtable meeting with the Jordan WFP Country Office, IRC, angel investors, the Jordan Royal Court, and CGIAR IWMI. The team successfully secured a commitment through a signed pro forma, marking significant progress. This achievement is particularly noteworthy given the relatively high unit cost of USD 20,000.

E. Next Steps and Scalability

The team's next main steps are to finalize the construction of the system and fully deploy it for testing at a farmer's site. This testing will enable collection of operational data to optimize the product for commercialization. To achieve this, the team is actively raising funds through venture capital funding, and all participants in the previously mentioned multi-stakeholder roundtable expressed their willingness to support the team in their fundraising efforts. Furthermore, the team has been invited to pitch their innovation in an effort to secure additional venture capital from funders the United States.

Case 2: iPlant in Jordan

A. Innovation Overview: The Carousel Rotating Vertical Farming Unit

iPlant, a Jordanian Agritech startup, aims to transform underutilized urban landscapes into agricultural hubs using state-of-the-art vertical farming solutions. The Carousel Rotating Vertical Farming Unit represents an innovative approach to urban agriculture, leveraging a unique rotating mechanism to maximize the use of natural sunlight. This design significantly enhances crop yields while reducing energy consumption by minimizing dependence on artificial lighting. By integrating vertical farming with optimized natural sunlight exposure, this innovation offers a sustainable solution for urban food production. It enables higher crop efficiency, lowers operational costs, and promotes environmentally friendly practices in urban farming. This innovation not only supports sustainable agriculture but also addresses the growing demand for energy-efficient and space-saving farming methods in urban areas, making it a critical advancement in the pursuit of greener cities.

B. Implementation

Milestone 1: Project Setup and Initial Installation

The team launched the project by setting up the infrastructure and installing the Carousel Rotating Vertical Farming Unit (GreenSpin) on a designated urban rooftop. This phase involved securing all necessary mechanical and electronic components and establishing baseline data. Despite initial challenges, the team successfully sourced the required parts to construct the unit and conducted an initial functionality test of the machine. Additionally, they secured a piloting site at the National Agriculture Research Center (NARC) in Amman, with the support of IWMI focal point in Jordan.

Milestone 2: Data Collection and System Optimization

The team faced challenges in sourcing all the required components to build the machine, which caused delays in its installation and initial functionality tests. The team met with the director and other staff at of NARC to discuss the piloting of the GreenSpin at their premises (Figure 2). Discussions also explored the potential for comparative research to assess the innovation’s efficiency in crop productivity compared to other greenhouse projects at the center.

Milestone 3: Performance Evaluation and Community Engagement

The final phase will only be possible after the successful setup of the Carousel Rotating Vertical Farming Unit (GreenSpin). It involves evaluating the unit's performance through research conducted in collaboration with NARC. This research will focus on optimizing the innovation by assessing its performance under varying environmental conditions and parameters, such as plant growth and resource usage. Key metrics, including light exposure, temperature, humidity, water usage, and nutrient levels, will be collected during this phase. Insights from the research will drive further optimization of the system, ensuring enhanced efficiency and effectiveness for future applications.

Figure 2: Site visits to venture premises and NARC, Amma-Jordan

C. Progress and Achievements

The main outcome of iPlant's efforts was the successful development of its innovation, the GreenSpin, and the securing of a piloting site at the largest agricultural research center in Amman. This milestone will not only enable the iPlant team to pilot and assess the functionality and efficiency of their innovation but also facilitate the transfer of the team's expertise to other researchers and staff at the center. The partnership with NARC promises to foster valuable knowledge-sharing and strengthen innovation in agricultural research.

D. Next Steps and Scalability

iPlant team is in the process of formalizing their collaboration with NARC through a Memorandum of Understanding. The team is currently preparing to set up the GreenSpin, which will need to be assembled from scratch, part by part, at the site. Following the setup, iPlant will work with NARC researchers to select specific crops for testing purposes and operate the GreenSpin.

Case 3: Koolboks in Nigeria

A. Nigeria Country Context

Nigeria, Africa's most populous nation and the sixth largest globally, faces widespread multidimensional poverty, particularly in the northern regions, where 65% of the population resides. Once known for surplus food production, these northern states now struggle with poverty, ongoing conflict, and a severe humanitarian crisis. Over 2.3 million people in the Northeast and an additional 1.3 million in the Northwest and North-central regions are internally displaced. Agricultural disruptions, combined with escalating costs of food, fuel, and essentials, have deepened the crisis, pushing many into precarious survival strategies amid significant security risks[9].

The economic and security shocks have driven up the cost of living, with the price of a healthy diet more than doubling by May 2024 compared to the previous year. As the lean season intensifies from June to August 2024, food insecurity is projected to peak. According to the March 2024 Cadre Harmonisé[10], an estimated 31.8 million Nigerians are expected to face hunger at crisis or emergency levels, highlighting the urgency of coordinated humanitarian and developmental interventions. The Northeastern states of Borno, Adamawa, and Yobe (BAY) face acute food insecurity, driven by conflict, economic instability, and climate-related shocks such as flooding. These factors disrupt food availability, limit access, and significantly raise the costs of food and essential commodities. Addressing these challenges requires long-term efforts in building resilient food systems to mitigate the region's vulnerabilities and improve food security sustainably.

B. Innovation Overview

The African refrigeration market faces significant underdevelopment, with only 17% of households having access to refrigeration. This issue is compounded by climate change, energy instability, and the rising cost of essential goods. In regions lacking reliable electricity, food preservation and other critical refrigeration needs remain unmet, severely impacting livelihoods and health.

Koolboks addresses this challenge with innovative, solar-powered refrigeration solutions designed for off-grid environments. By leveraging solar energy and innovative ice battery technology, their products ensure reliable cooling for up to seven days without consistent electricity. These solutions support essential needs such as food preservation, small-scale commerce, and vaccine storage while reducing reliance on costly, unsustainable energy sources. The integration of additional features like USB charging ports, LED lights, and pay-as-you-go (PAYG) options further enhances usability and accessibility.

Koolboks adopts a flexible business model with its PAYG system which allows users to purchase refrigeration products incrementally, ensuring affordability. The company also offers ongoing customer support to address technical issues, provide maintenance assistance, and respond to inquiries promptly, through multiple communication channels such as phone, email, and online platforms. While the management team primarily operates in France, the in-country team in Nigeria, including project managers and IoT engineers, is responsible for project implementation.

C. Implementation

Koolboks is partnering with the International Institute of Tropical Agriculture (IITA) team based in Yola, Adamawa State, Nigeria to assist with introductions to prospective customers and provide on-site support. The key milestones achieved are summarized below:

[9] WFP Nigeria Country Brief. June 2024.
[10] https://www.ipcinfo.org/ch/

Milestone 1: Manufacturing of Units and IoT Integration

The first milestone focused on manufacturing units and integrating IoT technology into Koolboks refrigeration systems. Ten pilot units were successfully manufactured, and the integration plan for the IoT temperature monitoring system was developed and finalized. Initial testing of the integrated IoT system was conducted in controlled environments to assess functionality and performance.

A key objective of this phase was to incorporate IoT technology to enable remote monitoring, diagnostics, and troubleshooting. This integration is designed to enhance the efficiency and reliability of the units while minimizing downtime. Some technical challenges were encountered with the IoT devices by the Koolboks engineering team, causing delays for unit delivery.

Milestone 2: Product Deployment

The second milestone emphasized the deployment of pilot units in crisis-affected areas. After the Bootcamp and Inception Workshop, deployment locations were finalized in collaboration with local stakeholders and IITA. IITA selected 10–20 prospective customer profiles based on user profiles designed during the Bootcamp. These profiles considered factors such as customer motivation, ability to pay, location, and the nature of their businesses. However, the telesales process faced challenges, as some customers were unresponsive to calls. Besides the language barriers, as the team members do not speak Hausa which is the dominant language spoken in Yola, the lack of in-person presence also presented obstacles.

For the 10 piloted units, Koolboks leveraged IITA's focal points to facilitate the introduction to new customers. While these prospective customers are not entirely familiar with Koolboks' brand name, this introduction facilitated the trust building process. Know Your Customer (KYC) verification and credit assessments were conducted for the identified customers, and those who did not pass the KYC process were replaced with alternative candidates to ensure viability. Logistics for the deployment were finalized by Koolboks' Logistics Manager. Once the units arrived, they were installed by Koolboks' partners at selected customer locations. Due to the long transportation routes and varying road conditions, challenges arose during delivery, as some units that were tested in the warehouse were disconnected upon arrival in Yola.

Milestone 3: Data Monitoring and Analysis

The IoT engineer, in partnership with IITA, tracked freezer performance using back-end systems to monitor temperature fluctuations and ensure system reliability. Customer managers proactively addressed any issues identified through IoT monitoring, minimizing the risk of breakdowns and maintaining continuous functionality. To evaluate the program's impact, collected data was analyzed to determine reductions in food spoilage rates among beneficiaries. At the project's conclusion, Koolboks conducted a follow-up survey to systematically gather insights on key impact metrics, focusing on the

effects of the freezers on food preservation and energy savings for business owners.

Milestone 4: Feedback and Pilot Evaluation

In November 2024, the project team, including representatives from IITA, the WFP Innovation Consultant, and the Koolboks team, conducted site visits to 6 locations in Jimeta-Yola to interview beneficiaries and gather feedback (Figure 3). Users emphasized the need for customized Koolboks refrigerators, particularly those with larger storage capacities to accommodate businesses with high-volume demands. The team observed strong interest and demand for Koolboks refrigerators, largely attributed to their expected reliable performance in providing consistent refrigeration despite frequent power outages from the national grid. However, key challenges remain, particularly affordability and limited user awareness. Some customers expressed the need for further education on the system's usage to fully realize its potential.

Figure 3: Koolboks' office in Jimeta-Yola and freezer units

Progress and Achievements

By the project's closure date, 9 out of 10 freezer units produced were successfully deployed in Jimeta and Michika town in Adamawa State of Nigeria, with the remaining 1 unit scheduled for deployment (Figure 4). While these freezers were sold to early adopters through the Koolboks pay-as-you-go (PAYG) business model, the purchases may not reflect ability to pay at scale. In an assessment that followed the deployment, 65% of respondents indicated that the absence of financing options will constitute a problem in making the purchase decision - a finding that also emerged from the IPSR workshop. Among the initial customers onboarded in Jimeta-Yola, 50% are female business owners. Most customers reported increased profits due to several factors:

- **Reduction in energy costs**: Switching from the national grid or diesel generators to solar-

powered freezers has significantly lowered electricity bills for businesses. The average monthly electricity cost in Yola is USD 50, and it is estimated that customers save about 90% of these costs by using Koolboks' solar-powered units. This demonstrates the potential of Koolboks to drive profitability in energy-insecure regions.

- **Increase in income**: The additional operating hours enabled by the solar-powered freezers, particularly in areas with frequent power outages, have allowed businesses to generate more revenue.
- **Reduction in financial losses**: Reliable refrigeration has minimized spoilage of perishable goods and nutritious beverages, leading to fewer financial losses from unsellable products.

Additionally, the extended three-year installment plan and the product trial period has significantly lowered barriers for users in Yola, making it easier for them to access the freezers. This flexible payment option has enabled more businesses to benefit without the burden of a large upfront cost.

Figure 4: Customer Site Visits in Jimeta-Yola, Adamawa (Agropedia Nutritious Cold Drinks and Bfoncy's Restaurant)

D. Next Steps and Scalability

During the Sprint, Koolboks Nigeria has established a new business unit in Yola and completed the hiring of a Business Unit Head for the Northeast region. As next steps, the northeast team will continue hiring an engineer and business support staff. This strategic investment underscores the company's commitment to expanding its market presence and ensuring the sustainability of the project.

Koolboks has successfully sold 15 additional freezers of various sizes through customer referrals. Additionally, through introductions facilitated by IITA, 30 more leads have expressed interest in purchasing Koolboks products. This organic growth indicates a growing recognition of Koolboks as a reliable solution in the local market, highlighting the increasing demand. By expanding its product offerings (such as ice makers), building on referrals, and leveraging partnerships with IITA, Koolboks is positioning itself for sustained growth.

Based on insights from the pilot, Koolboks plans to develop targeted programs for women entrepreneurs, who were the primary users of the Koolboks refrigerators in the community. These programs will include tailored financing solutions and training initiatives to increase adoption rates and empower women to fully benefit from the products.

While the next steps are still being finalized, the Adamawa State Agricultural Development Program (ADAS-P) has proposed to integrate the solar-powered freezers into a community-based program, which will include financing options through cooperatives and community-based enterprises at low interest rates[11]. In addition, IITA is exploring the inclusion of Koolboks products in its Northwest program, further expanding its reach.

Case 4: Conflict Forecast in Kenya

A. Kenya Country Context

Kenya is a country of remarkable diversity, strategic importance, and vibrant growth. It presently has a population of approximately 54.9 million people, according to statistics from the Kenya Bureau of Statistics. Kenya is also a lower-middle-income economy with social and economic inequalities. More than one third of Kenyans grapple with multidimensional poverty. The agricultural sector remains central to Kenya's economy and provides livelihoods for more than 80 percent of the population, especially in rural areas. However, 80 percent of Kenya's landmass is either arid or semi-arid. Rapid population growth, climate shocks, underperforming food systems, gender inequalities and insecurity are the most significant challenges to food and nutrition security. The most severe living conditions exist in the eight arid and semi-arid (ASAL) counties: Turkana, Marsabit, Samburu, Isiolo, Wajir, Mandera, Garissa and Tana River, which are underdeveloped, drought-prone and affected by frequent tribal and resource-based conflicts. The number of people in need of food assistance was in July 2024 about 1 million, an improvement from the 2 million people in February of 2024.

Kenya is experiencing increasing levels of low-intensity violence around the country, with most of the violence linked with al-Shabaab militants, pastoralist militias, and mob violence. The 2022 Kenyan general election was characterized by highly contested party nominations and a violent campaign period. Reported fatalities were highest in Turkana, with almost 70 reported fatalities, where Pokot militias attacked civilians and clashed with state forces. Lamu followed with 68 reported fatalities, mostly due to clashes between al-Shabaab militants, and police and military forces.

In 2023 alone, a WFP delivered food assistance to over 641,000 refugees and asylum seekers in Dadaab, Kakuma, and Kalobeyei. Covering overall 1 million people in need of assistance In the event of potential conflict or rising riots, the humanitarian assistance programs are often disturbed, with supply chains breaking down leading to lack of access to the people in need of support. Here is where Early warning

[11] A baseline survey and Koolboks IPSR workshop gave an indication that the interest rates for the Koolboks innovation were high

systems derived from evidence-based analyses and risk assessments for conflict, natural or economic hazards which may affect ongoing operations or create new humanitarian needs, inform decisions on resource allocation and operational readiness. This allows for Early action, emergency preparedness and contingency planning allowing for humanitarian coordinators to continue supporting over 1 million people in need[12].

B. Innovation Overview

EconAI is a non-profit organisation that works on a range of projects, including Conflict Forecast. The team specializes in conflict forecasting, prevention and decision-making support. Forecasting humanitarian demand is essentially a small data problem that requires careful data collection and feature engineering to utilise machine learning methods. The team has recently expanded their work to include data institutional disruptions such as coups d'état and term limit evasions as well as flows of refugees and internally displaced people (IDPs). The team also has been collaborating with INNODEMS in Kenya who have experience in developing applications and platforms targeted at the African market. EconAI also supports the African Data Initiative (ADI) and have co-developed the open-source project Climsoft, a software suite for securely storing and flexibly accessing climatic data in a secure and flexible manner and for extracting useful information from the data.

Jointly the team is building a tried and tested forecasting model for conflict and mapping highly granular data to develop a platform that highlights potential "hotspots for disruption of access to critical infrastructure and services in the context of conflict" in Kenya and East African region with monthly updates to the data which allows for both early preparedness as well as building on the confidence of the forecast closer to the event. It is important to note that the solution has the potential to forecast data at a global scale. By understanding the causes of access disruption and its relation to effects of conflict showing where they are likely to occur and cross-referencing this with diverse data sources customized to the location/context under review, the Conflict Forecast team has been designing the solution to contextualise and also operationally customize their offering to various organisations' response framework. This allows the end user to evaluate scenarios meaningfully and set thresholds that are customized and relevant, making the organisation's emergency preparedness and early warning systems more efficient and effective. Conflict Forecast is training two models aimed to; (i) predict the probability of having a riots, and (ii) predict the number of fatalities. Currently, end-users can use the App to filter and view the locations of predictions based on a particular range of predicted probability (in case of riots) or predicted number of fatalities. Additionally, an alert table has been introduced where users can sort predictions based on raw predictions values (probabilities or counts), changes in predictions in comparison to the previous month, or predicted risk (binned predictions).

[12] WFP Kenya Country Brief. July 2024.

C. Implementation

The Solution targeted Emergency Response organizations in the East African region, centered around Kenya.

Milestone 1: User Research, Onboarding and Customization:

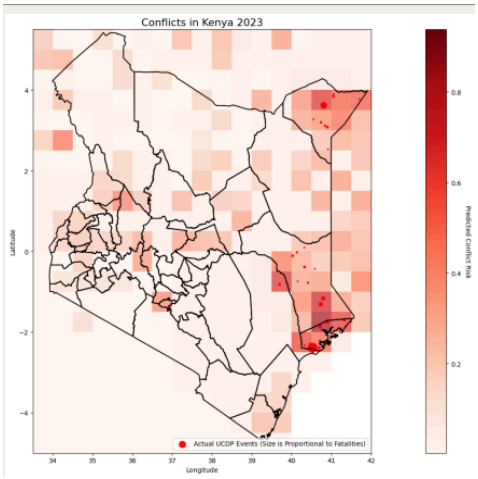
To fulfil milestone 1, the team worked along with the WFP, IMWI and CIAT advisors on mapping out the ecosystem of users while also completing user interviews and feedback. Through the IPSR workshop organized and facilitated by IMWI, the team also carried out surveys and design feedback loops in order to identify the clear value proposition that would support the organization's plan and response functions. These initial interviews supported the Conflict Forecast team in identifying 2 key stakeholders who could benefit from the solution including the Kenya Red Cross Society (KRSC) and World Food Programme regional team for the East African region. For both of these identified customers, the context of emergency preparedness and conflict forecasting to monitor potential disruption to access is of great value. A disruption to operations for either of these agencies or disruption for communities' access to critical facilities could affect these responders in providing effective support to the people in need leading to disruption of the local ecosystem, operational disruption of support as well as loss of funds. Having a forecast to not just predict conflict hotspots but also its implications on access and the local ecosystem would allow these teams to plan weeks in advance making the entire operations more resource efficient as well as have resilient plans in place to support those in need.

Post identification of these potential customers, the team also engaged with these users in order to get feedback on the potential integration and user interface design. This allowed the INNODEMS (implementing partners) to customize the platform to meet the needs as well as build a sharp user experience for decision makers.

Milestone 2: Data Collection:

The team worked on extensive data collection and analysis in order to produce and contextualize Conflict Forecast (Figure 5). The team also worked with the end users extensively to select indicators and KPIs that would be presented as part of the analysis that would make the tool operationally relevant. Some of the data features include:

- Risk: the probability (0 to 1) of a conflict event occurring in particular location
- Geospatial granularity: 55x55 km grid cell
- Update frequency: every month
- Flexible forecast horizon: predict events occurring within the next months
- Event type: Armed Conflict Location and Event Data (ACLED) defined conflict events (riots, protests, fatalities).
- The model's performance also scores high: globally it achieves a ROC-AUC score of 0.93 for incidence and 0.9 for onset (1 is perfect accuracy and 0.5 - a random guess).



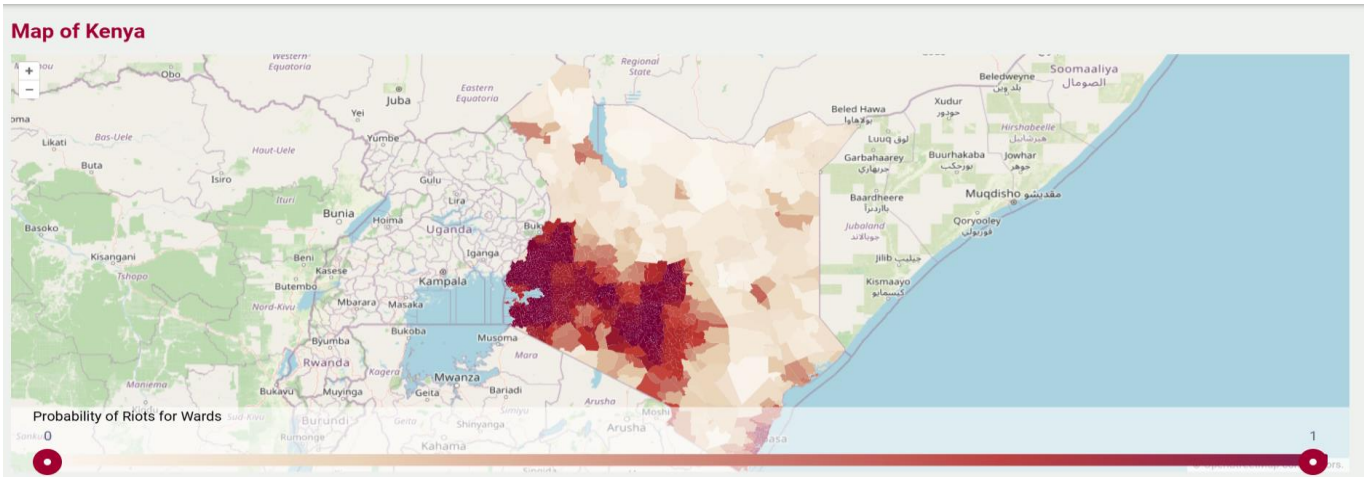


Figure 5: Predicted probabilities of riots in Kenyan wards from October 2024 to January 2025

The team used machine learning, specifically panel forecasting, which allows the model to learn from other parts of the world. A time series forecast only learns from the history of the same location, i.e. will struggle to predict something that hasn't happened there before. The model is also robust and brings in unique propositions through natural language processing - using news text from ~6 million articles as a predicting feature.

Milestone 3: App development

The team has the support of their implementing partners in Kenya, INNODEMS who were responsible for developing the user-friendly web application. For this particular use case, the team had to work on converting the back-end analysis and generated maps into an interactive front end that provides the users with a multidimensional view of the various analysis information. Some of these features include, disruption to road networks on a risk scale of 1-10, and disruption to air traffic showcasing key areas around airports and potential activity around these areas.

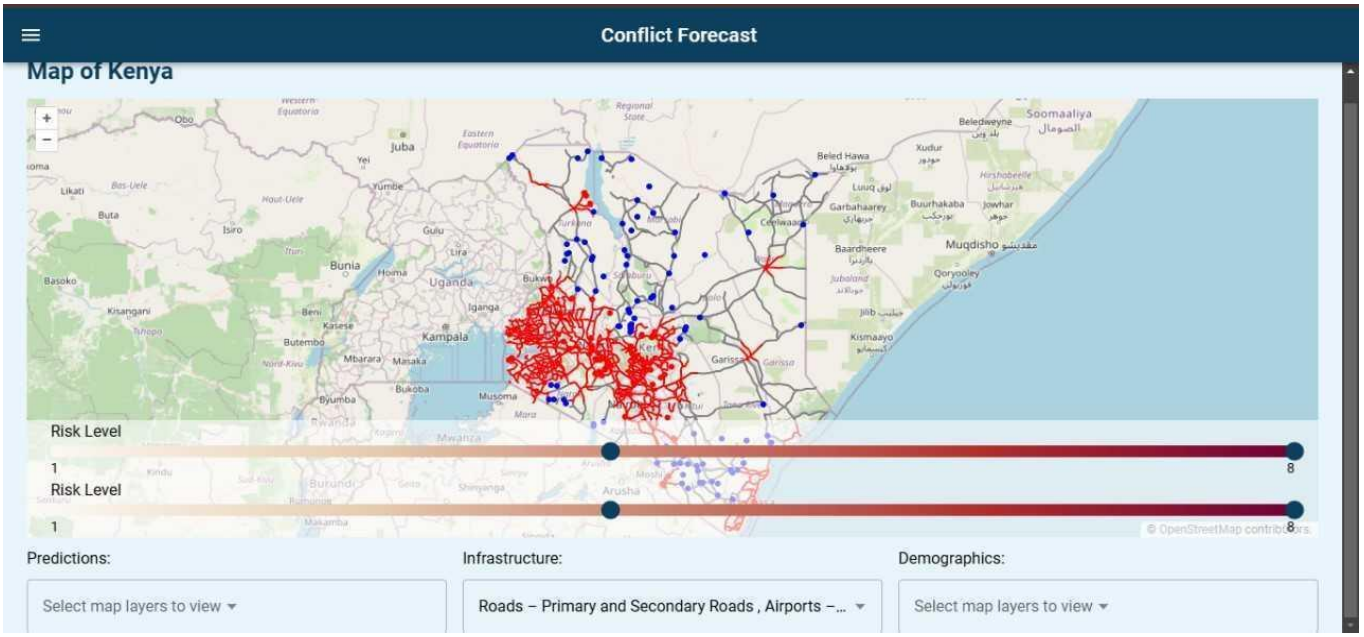


Figure 6: Conflict Forecast App

The team also built user logins, dashboard view, lists/alert view, tech support page, documentation page and subscription offerings. These features together make up a comprehensive offering for the end user. Especially in the dashboard view, the team worked on interactivity and retention of information granularity transferred from raw data into the front end which is also intuitive and easy to interpret for any end user type. The dashboard also provides features which allow toggle between countries and features, zooming options, a map of access to critical services and disruption to them under the forecast (Figure 6). This web app was presented to potential users to gather insightful information including color grading, clarified data for objective interpretation, standardization of information and ensuring a smooth user experience.

Milestone 4: User testing & Operationalization

Figure 7: Presentation of minimum viable product

The team presented their Minimum Viable Product throughout the development phase to multiple

potential stakeholders and end users in order to get feedback as well as modify the end product accordingly (Figure 7). Through active user testing, the user interface was refined.

D. Progress and Achievements

By the end of 2024, Conflict Forecast and INNODEMS aimed to develop and implement a digital tool that will be adopted by at least one customer, fully integrated into their institutional workflows and information systems, in Kenya and potentially across the East African region.

In this context, the solution was presented already to two humanitarian agencies, World Food Programme, Regional office for East Africa and the Kenya Red Cross Society (KRCS). Of these two users, the adoption by KRCS is under proposal building stage and the use case for World Food Programme has been completed with a proposal to work with the WFP headquarters team on the offering as well as working with the Burundi team on further exploration of specific context use case for 2025.

E. Next Steps and Scalability

The model built by the team is applicable as a global model. Hence this allows for rapid scaling into other countries, agencies as well as usage by the headquarters team of these agencies in order to have a global overview. The team will proceed to build the solution and front end to be integrated within KRCS infrastructure for their early warning and preparedness bi-annual overview. The team has also submitted proposals for review with the World Food Programme at a global scale and the country level with the Burundi team. Following this, the team will also be showcasing these solutions to their future users so that the developed tool can be used as a comprehensive solution for all humanitarian agencies in the future.

Cross-cutting Insights

Complementary Consultation Enhances Holistic Innovation:

Innovation is most effective when it addresses both the user's needs and the financial sustainability of the innovations developed. Through their collaboration, WFP and CGIAR provide tailored support in these two critical areas, ensuring that projects are not only technically sound but also financially viable and scalable. This comprehensive approach bridges the gap between ideation and implementation, accelerating the journey toward solutions that are practical, impactful, and sustainable. Such a holistic approach to supporting innovations ensures that projects can be sustained beyond pilot phases and successfully replicated and adapted to diverse settings.

Multi-Stakeholder Engagement Drives Acceptance and Adaptability:

Successful innovation thrives on the collective input of diverse stakeholders, including community members, industry experts, government entities, and researchers. By actively engaging these stakeholders, WFP and CGIAR fostered adaptability, ensuring that innovations are better suited to the

complexities of real-world challenges. This collaborative approach enhances ownership and acceptance, reduces resistance to change, and facilitates smoother implementation. Furthermore, it creates a platform for knowledge exchange, enabling continuous learning and improvement throughout the project lifecycle.

In-Field Missions foster collaboration paves way for success:

The collaboration between WFP and CGIAR leverages human-centered design in its in-field missions to deeply understand and respond to community-specific needs. By directly engaging with the end users and operating within the target environment, the teams ensure that solutions are highly relevant and improve the efficiency of the project deployment. This hands-on approach enables the identification of context-specific challenges, leading to the creation of interventions that are both practical and impactful. The result is streamlined support that maximizes resource utilization and delivers tangible benefits to the communities served.

These insights underline the importance of integrating technical, collaborative, and user-focused approaches to deliver innovative solutions that are both effective and sustainable in addressing global challenges.

Conclusions and Recommendations

Conclusion

The Stability and Peace Accelerator Program has underscored the transformative potential of innovation in addressing the pressing challenges faced by Fragile and Conflict-Affected Settings (FCAs). Through the collaborative efforts of WFP, CGIAR, and regional partners, the program successfully identified, supported, and piloted high-impact innovations tailored to the unique needs of communities in Jordan, Kenya, and Nigeria. These innovations, ranging from water resilience and climate security solutions to food systems and nutrition, have demonstrated the potential to drive tangible outcomes while fostering stability and resilience in fragile contexts.

Building on the success of this program, several key lessons and opportunities have emerged to guide future efforts. Strengthening local expertise, prioritizing contextually relevant solutions, and ensuring sustainable scaling through follow-up investments are critical to maximizing the impact of these innovations. The following recommendations outline actionable strategies to ensure that these insights are leveraged to expand the reach and effectiveness of the program's outcomes, enabling greater resilience and fostering long-term peace and stability in FCA settings.

Recommendations

Ensure the local presence of CGIAR and WFP teams in the field:

The success of the innovations and their acceptance by local partners were greatly supported by the strong local expertise and presence of both the WFP and CGIAR teams in the field. To maintain and

enhance this progress, it is highly recommended to have at least one focal point in each country where an innovation is being piloted or localized. This dedicated local presence can significantly shorten the scaling time by leveraging the existing networks of WFP and CGIAR, opening a wide range of partnership opportunities and fostering deeper engagement with stakeholders. Such a strategy ensures smoother implementation, stronger collaboration, and greater alignment with local needs and contexts.

Prioritize Sourcing Local Innovations or Contextually Proven Innovations:

It is essential to prioritize sourcing innovations that are either locally developed or have demonstrated successful operation in similar local contexts. Such innovations are more likely to align with the unique environmental, cultural, and socio-economic conditions of the target region, increasing the likelihood of successful implementation and adoption. Leveraging local innovations also fosters ownership among community stakeholders and reduces the need for extensive adaptation, saving time and resources. By drawing on solutions that have already proven effective in comparable settings, WFP and CGIAR can enhance the scalability and sustainability of their interventions.

Facilitate Follow-Up Investments to Support Scaling:

Facilitating follow-up investments and funding is essential to enable the successful scaling of innovations beyond the piloting phase. While initial funding supports development and testing, ongoing financial backing is necessary to transition innovations into broader implementation and long-term impact. By creating pathways for subsequent funding, such as connecting innovators with investors, government programs, and development funds, WFP and CGIAR can empower teams to refine their solutions, adapt to emerging challenges, and establish the infrastructure needed for large-scale deployment.

Annexes: In-Country Mission ToRs

Aquaporo Mission

Location: Amman

Day	Morning Session	Afternoon Session	Attendees	Location
October 27, Sunday	Travel Day			Amman
October 28, Monday	WFP Briefing: Meeting with WFP CO Jordan management and partnership team to discuss Sprint project and country innovation agenda, and innovation gaps.		WFP INN, and WFP Jordan CO	
October 29, Tuesday	Meet with the Aquaporo team: - Grounding exercise - Review project status, blocks, work plan, and KPIs	Site visit: Visit the piloting site with the team and other stakeholders	WFP INN, IMWI, and WFP Jordan CO (optional)	
October 30, Wednesday	Workshop with Aquaporo and IWMI: - Business model review - Ecosystem mapping	Scaling pathways elaboration: Review the IWMI program and gaps	WFP INN, IMWI, and WFP Jordan CO (optional)	
October 31, Thursday	Closing with Aquaporo: - Prepare for pitch event - Final reminders on deadlines	Private sector review: Bring in private sector partners to review progress and support scaling	WFP INN, IMWI, and WFP Jordan CO (optional)	

iPlant Mission

Location: Amman

Day	Morning Session	Afternoon Session	Attendees	Location
November 3, Sunday	Meet with the iPlant team: - Grounding exercise - Review project status, blocks, work plan, and KPIs	Site visit: Visit the piloting site with the team and other stakeholders	WFP INN, IMWI, and WFP Jordan CO (optional)	Amman
November 4, Monday	Workshop with IPlant and IWMI: - Business model review - Ecosystem mapping	Scaling pathways elaboration: Review the IWMI program and gaps	WFP INN, IMWI, and WFP Jordan CO (optional)	

November 5, Tuesday	Closing with iPlant: - Prepare for pitch event - Final reminders on deadlines	Private sector review: Bring in private sector partners to review progress and support scaling	WFP INN, IMWI, WFP Jordan CO (optional)	
November 6, Wednesday	Mission debrief with WFP Jordan	Departure	WFP INN, and WFP Jordan CO	

Conflict Forecast Mission

Location: Nairobi

Day	Morning Session	Afternoon Session	Attendees	Location
Nov 11, Monday	Project presentation with Regional Bureau of Nairobi - Conflict and Access team	Project presentation with the innovation and emergency preparedness & Anticipatory action team	WFP INNA - Keerthana Karunakaran WFP RBN - Kwesi Sansculotte, Maurine Ambani, Samuel Weyama Conflict Forecast - Margherita Philipp INNODEMS	Nairobi
Nov 12, Tuesday	Technical discussion & user testing 1 with end users	Presentation to Kenyan Red Cross	WFP INNA - Keerthana Karunakaran Conflict Forecast - Margherita Philipp INNODEMS Representatives from Kenyan Red Cross	
Nov 13, Wednesday	Technical discussion & user testing 2	Sprint check-in, status report, closure report preparation		
Nov 14, Thursday	Innovation coaching sessions: business model review and ecosystem mapping	Scaling pathway discussion with stakeholders		
Nov 15, Friday	Meeting with IITA to discuss project closure, scaling next steps, incorporation to CGIAR programme	Departure	WFP INNA - Keerthana Karunakaran IITA representative	

			Conflict Forecast - Margherita Philipp INNODEMS	

Koolboks Mission

Location: Yola, Adamawa State, Nigeria

Day	Morning Session	Afternoon Session	Attendees	Location
November 17, Sunday	Departure from Munich, Germany to Abuja, Nigeria		Zehui Qiu (WFP INNA)	Abuja
November 18, Monday	Meeting with WFP Security Team Koolboks Sprint debrief with WFP Nigeria		Zehui Qiu (WFP INNA)	Abuja
November 19, Tuesday	Travel to Yola, Adamawa State		Zehui Qiu (WFP INNA)	Yola
November 20, Wednesday	Visit to Koolboks Northeast team: office and freezer unit demonstration room	Sites visit: interviews with onboarded customers	Koolboks, Quadri Shakiru (IITA), Sini Luwa (IITA), Zehui Qiu (WFP INNA)	Bekaji, opposite Unity Bank Jimeta-Yola
November 21, Thursday	Meeting with Northeast stakeholders: discussion about innovation scaling and partnerships	Sites visit debrief and Sprint closure discussion Departure to Abuja	Koolboks, ADAS-P, Quadri Shakiru (IITA), Sini Luwa (IITA), Zehui Qiu (WFP INNA)	IITA Office and ADAS-P, Jimeta-Yola
November 22, Friday	Departure to Munich		Zehui (WFP INNA)	Abuja