



Innovations for Resilience Convening

Innovation Descriptions

Global Resilience Partnership

BANGLADESH and ETHIOPIA | Roads to the Rescue

Problem: Nearly 20% of the global land surface is within one kilometer of a road. From 2010 to 2050, nearly 25 million paved road lane-kilometers and 335,000 rail track kilometers will be added, costing \$45 Trillion USD. Roads are key conduits to promote social cohesion and connectivity and are critical to meeting the challenge of the SDGs in trade, education, health and jobs.

Apart from this prime transport function, roads have a major impact on landscapes and surface hydrology. Road infrastructure acts as drains or embankments. The effect of this now often is negative: road bodies cause erosion, trigger sedimentation and cause local flooding. Yet this can be turned around and roads can become instruments of climate resilience.

Innovative Solution: MetaMeta supports the systematic use of roads for flood resilience and water management and is beginning to upscale this opportunity for wider use in the coastal regions of Bangladesh and the highlands of Ethiopia. This project is finding way to make use of roads as flood shelters, improved road surface to strengthen embankments, regulate water levels for production (Bangladesh) or harvest and stock water for dry periods and increase groundwater levels (Ethiopia). This is done by documenting innovative solutions and bringing together government authorities, water and climate experts, and roadside communities – including women and the poor. The aims is to go for triple wins: less damage to the areas around the road, less damage to the road bodies and importantly more productive livelihoods, by making beneficial use of the road water in spite of recurring flooding and high water conditions.

Next Steps: To introduce the systematic use of roads for beneficial water management and climate resilience in 50% of the countries in Sub Saharan Africa and 25% of the countries in Asia and achieve inclusive win-wins. We believe that making use of the massive investments in road infrastructure in the next ten years an enormous benefit in improved climate resilience and water security can be achieved and that not less than 300 million people can be reached. The on-going programs are already showing these impacts at scale.

Potential Partners: Important potential partners include infrastructure funders, climate resilience investors, water managers, agricultural agencies, and enlightened builders.

HORN OF AFRICA | Satellite Technologies, Innovative and Smart Financing for Food Security (SATISFy)

Problem: Weather related shocks are one of the major barriers to productive and sustainable agricultural production in the Horn of Africa. Such severe shocks cannot be financed by the government and donor community alone. On the other hand, lack of capital and perceived risks limit



farmers' ability to purchase agricultural inputs and access credit, contributing to low agricultural productivity. And yet banks are still resistant to providing loans to the agricultural sector.

Innovative Solution: We developed a market-based innovative risk management solution in the form of Risk-Contingent Credit (RCC), a social safety net that mitigates drought risks for the rural poor and improves farm productivity and livelihoods. RCC is a linked financial product that embeds within its structure insurance protection which, when triggered, offsets loan payments due to the lender. RCC seeks to address the challenge that lenders are reluctant to lend to farmers because of the financial risks associated with crop failure or radical decreases in market prices. Because RCC targets downside business risk, it simultaneously reduces financial risk and exposure. This risk balancing effect encourages increased supply of and access to credit but also encourages risk-rationed farmers to increase the use of credit. Vegetation health and soil moisture from satellites are used to monitor the impact of drought on the ground.

Next Steps: We are currently piloting RCC in Machakos County in Kenya. It has high potential for scaling up to other regions of Kenya and other countries such as Tanzania, Malawi, Ethiopia, Mali, Ghana in Sub-Sahara Africa. We'd like more innovations of enhancing uptake of RCC, and reducing basis risk by using latest operational satellite dataset on soil moisture, reducing transaction cost of RCC delivery by using mobile-based technology for information dissemination and banking. Along with local partners, we would like special effort to financial education and extension with farmers. RCC structures provides the proper incentives not only to entice banks to increase the supply of credit but also to attract farmers to the credit market. We understand that the long-run commercial sustainability will depend on effective assessment of social and economic benefits of RCC. Thus, we would set up a sound experimental design to capture the cost and benefit of RCC.

Potential Partners: Particularly valuable partners include banks, insurance companies, agri- and food-businesses, and others in the private sector.

International Federation of Red Cross and Red Crescent Societies

NEW ZEALAND | Business Preparedness Initiative (BPI)

Problem: Small businesses play a critical role in their communities, providing essential local services and employment and contributing to wider supply chains. Yet they are also very vulnerable to the effects of natural hazards and climate change. Loss of staff, physical damage, disruption to supply chains, and changes in consumer patterns during a crisis can all affect small businesses' abilities to continue providing services to local communities and reliable livelihoods to their owners and employees. These impacts can be mitigated by actively preparing staff, strengthening network connections, and reviewing operational processes to ensure they are prepared and ready to contribute to response activities in the community.

Innovative Solution: The Global Disaster Preparedness Center (GDPC), a reference center within the Red Cross Red Crescent (RCRC) network, has created BPI to strengthen and prepare small businesses by providing free and size-appropriate tools and services to help them understand and take steps to



mitigate their vulnerability to business disruptions. The program includes an interactive mobile application (Atlas: Ready for Business) that small business owners and managers can use to increase their level of preparedness and other support tools and resources for implementing partners (such as RCRC national societies, business association or chambers of commerce) to plan and organize related activities.

Next Steps: BPI is currently being tested in English in New Zealand and will be rolled out in more languages and countries where there is partner interest. Once piloting is complete, the challenge for BPI lies in supporting translation into a wide variety of languages and significantly increasing outreach channels through business associations, chambers and related networks to reach wider numbers of small businesses around the world. For more details, see

<http://preparecenter.org/activities/business-preparedness-initiative>

Potential Partners: Potential partners include business networks, private sector support to protect supply and value chains, and international organizations and NGOs working to protect local livelihoods.

BANGLADESH and TOGO | Forecast-based Financing (FbF)

Problem: There are often disaster forecasts available but no humanitarian organization resourced to act before the crisis onset of the disaster, especially when there is no certainty and a risk of acting in vain.

Innovative Solution: The German government and German Red Cross, together with WFP and other partners, have spearheaded the establishment of flexible preparedness funds triggered automatically by forecasts, enabling pre-crisis response actions specified in standard operating procedures. The day before Tropical Cyclone Mora hit in May 2017, the Bangladesh Red Crescent activated its FbF mechanism, providing a grant of 5,000 taka (60 euros) to nearly 2,300 households. The grant allowed families to meet immediate needs when the cyclone hit – rather than having to wait for humanitarian assistance afterwards – increasing the sense of dignity and empowerment among the communities at risk. More recently, the Togolese Red Cross distributed emergency shelter items with the FbF method as heavy monsoon rain threatened villages on the Mono river downstream from the Nangbeto dam. The distribution was triggered by alerts from dam operators using a prediction system refined with the help of the Red Cross, highlighting the value of innovative local collaboration between dam operators, disaster managers, and scientists. For more details, see <https://www.drk.de/en/forecast-based-financing>

Next Steps: The challenge for FbF is in further strengthening the evidence base, expanding integration into innovative financing services supported by a wider range of partners – including the establishment of a sustainable funding mechanism, and expanding the set of feasible triggers to effectively cover a wider range of risks.

Potential Partners: International organizations interested in strengthening safety nets and/or supporting anticipatory approaches, as well as private sector partners interested in social impact opportunity, are particularly valuable potential partners.



United Nations Development Programme

MALDIVES | Drones for improved disaster preparation and response

Problem: The Maldives is one of the countries most vulnerable to risks from climate change – 80% of its 160+ inhabited islands are just one meter above sea level. Flooding due to rising sea levels threatens the livelihoods of almost all 409,000 Maldivians. Creating risk maps of these islands is a big challenge, as it usually takes about a year to map 11 islands. Risk maps are an important source of data, as they can help identify changes to physical vulnerability and provide vital evidence for planning, mitigation, response and recovery initiatives.

Innovative Solution: In late May 2016, UNDP Maldives collaborated with leading drone company DJI, and robotics solutions provider WeRobotics, as well as nearly two dozen Maldivian government, private sector and nongovernmental organizations, to carry out a scoping mission exploring how aerial robotics technology can improve environmental management and enhance resilience to natural disasters. A few months later, the team used a drone to map an entire island in one day. The Government of Maldives and the island communities have been engaged to integrate drones into their disaster preparedness and response operations.

Next Steps: At least 20 islands in the Maldives will be equipped with drones, and local emergency officials will receive training from professional first responders on how to use them. Information captured by drones will help the Maldives prepare for extreme weather intensified by ongoing shifts in climate. It will enable locals to create their own maps and compare images over time to better understand how their local environment is changing.

Potential Partners: Companies with cutting-edge expertise in data visualization and designing systems to inform decision-making, as well as those with expertise in data analytics, artificial intelligence, and predictive modelling would be highly valuable.

NEPAL | Community rebuilding app

Problem: Nepalese homes and economies face immense risks from the threat of massive earthquakes, such as the 7.8 magnitude earthquake that struck in 2015. The challenge of preparing from such a devastating earthquake, and rebuilding in the aftermath of the earthquake, is significant.

Innovative Solution: UNDP partnered with Microsoft to develop a smartphone application that monitors reconstruction efforts in real time, and ensures that poor families in the cash for-work program are paid accurately and on time. The app—the first of its kind in the world—enabled better handling of large-scale crisis-response; it could manage the entire project, recording workers' attendance, preparing their payrolls, measuring GPS locations of quake-damaged houses to calculating the costs of clearing debris. This information improved efforts to demolish and remove debris from over 3,000 houses; employed over 3,500 local people; and benefited some 17,000 community members.



Next Steps: While UNDP and Microsoft are working with the Nepalese Government on further institutionalizing the system and roll it out to ensure improved preparedness for future disasters, UNDP and partners are scoping opportunities to adapt the system to other country contexts.

Potential Partners: Companies with cutting-edge expertise in designing and testing mobile payment and/or banking systems for hard-to-reach populations, as well as companies with expertise in data analytics, artificial intelligence, and predictive modelling would be valuable partners.

World Food Programme

ALGERIA | Hydro Sahrawi

Problem Statement: For the last 40 years, the lack of nutritious food for the Sahrawi refugee population in Algeria has been a major concern. The semi-nomadic Sahrawi refugees greatly value livestock for milk and meat (60% of Sahrawi refugee households have livestock—around 3 sheep/goats per family). However, due to the Algerian desert’s arid climate, agriculture is extremely poor: the animals are mostly fed with food scraps, leftovers, and often only plastic or cartons. The poor feeding practices have significant consequences for the health of the animals, impacting milk and meat production, which consequently impacts the food and nutrition of the refugees.

Innovative Solution: WFP Algeria is using low-tech hydroponic containers to support the daily local production of green animal fodder. In only 7 days, fresh green barley fodder can be produced from seeds, using minimal quantities of water and no fertilizer, with a daily harvest of up to 60kg per unit. One unit can feed up to 20 animals, supporting approximately 7 families. During the pilot project, WFP tested different units, seeds and water to identify the most appropriate combination for this particular context: a locally produced unit powered by solar energy with locally-available barley seeds and untreated ground water. Barley is grown in a partially controlled environment (hydroponic unit) in 7-day cycles and one unit can feed up to 20 animals a day. The low-tech, self-sustainable method of hydroponics permits a scalable solution that may be replicated in numerous communities: in light of Algeria’s extreme temperatures, sun, and winds, a solution that works in Algeria can work anywhere.

Next Steps: WFP Algeria has three short-term priorities. First, it will scale up the number of units of the solution within refugee camps to increase the availability and access of fresh fodder. Second, it will diversify crops beyond barley (which was initially chosen because it does not require any additional nutrients to grow) by working closely with a local engineer to create nutrients locally in order to grow different types of crops, including vegetables. Third, it will introduce aquaponics: mineral-rich water from a fish pond will be used to water crops and, once purified by the plants, the water returns to the pond (this method will require specialized training).

Potential Partners: The success of the first two phases of the project was largely due to the excellent collaboration with the Sahrawi Red Crescent and the Algerian Red Crescent. OXFAM has strong expertise in this specific context and excellent relations with the Sahrawi refugee community that results in high levels of trust. Algerian authorities, particularly the Ministry of Agriculture, offer great



value through two research centers ITELV (Technical Institute of Breeding) and CNRDPA (National Research Center on Fishing and Aquaculture).

ZAMBIA | Maano Virtual Farmers Market

Problem Statement: More than one million farmers in Zambia, and 800 million smallholder farmers in the developing world, lack accurate, reliable, real-time market information and connectivity with other market players. Without such information and connectivity, these farmers cannot make informed decisions about where and to who they should sell their produce, and they remain effectively invisible to traders who may be willing to pay them a better price. Lack of equitable market access is a crucial element of a problem preventing hundreds of millions of smallholder farmers from breaking cycles of poverty and building better lives.

Innovative Solution: The Maano - Virtual Farmers Market is an app-based e-commerce platform that helps rural smallholder farmers at risk of climatic shocks increase their visibility to new buyers, which strengthens competition for farmers' produce and reduces transaction costs for both buyers and farmers, thereby increasing the profitability and scale of trade for both sides. Maano achieves this by (a) making information on farmers' supply and buyers' demand, identity and location visible to the other through a smartphone application (b) facilitating farmer-buyer discussions and price negotiation, and (c) facilitating the sale of farmers' produce through an escrow payment system. In the first three months of transactions (June, July, August, 2017), smallholder farmers in 28 rural communities have sold more than 120 metric tons of their produce (four truckloads), worth more than US\$42,000 through 80 transactions.

Next Steps: By 2019, Maano plans to be the first-to-mind choice of 25,000 rural Zambian smallholder farmers when they want to sell their produce. To achieve this, Maano must increase the number of traders buying through the app to a critical mass of users, and then continue to increase the number of users (farmers and traders) until it gains market dominance. By 2022, with sufficient funding and successful partnerships, Maano will provide more than two million rural smallholders at risk of climatic shocks, with improved equitable market access and higher sales

Potential Partners: The Zambian Ministry of Agriculture and Ministry of Education are key partners that can help with market price monitoring and scale-up planning, as well as the Home-Grown School Meals program, respectively. For app development, TorchBox and Sandra Batista of University of South Carolina have been identified. Regarding mobile money and internet provision, Airtel Zambia and MTN Zambia may play key roles. For AgriFin service development, Mercy Corps has excellent human-centered design expertise.

CAMBODIA | Platforms for Real-time Information Systems (PRISM)

Problem: Early warning and disaster information is often fragmented and not readily available, leaving the humanitarian community and governments unable to prepare for and respond to disasters, which endangers lives and livelihoods. Additionally, poor emergency preparedness and response (EPR) can erase fragile developmental gains. Cambodia is affected by chronic seasonal



flooding, causing knock-on impacts such as increased indebtedness and negative coping strategies amongst the most vulnerable.

Innovative Solution: Platforms for Real-time Information Systems (PRISM) is an end-to-end suite of tools, including mobile data collection applications and data integration, management and visualization tools, serving as the foundation for an integrated emergency information system. It provides inter-stakeholder data sharing capabilities, disaster/risk projections, real-time reporting and decision support dashboards that aid preparedness and response. PRISM incorporates early warnings from river gauges and weather forecast data before a disaster occurs, triggering geo-referenced alerts based on historical hazard data that warn communities before a flood. Vulnerability assessments and reports help track ongoing disasters daily, making it possible to monitor and target aid to vulnerable households and assess impacts on infrastructure and agriculture, with pre- and post-disaster data visualized on an interactive map.

Next Steps: PRISM is currently operational in four provinces, with commitment to a minimum of seven provinces by the end of 2017, and with plans for nationwide expansion by the end of 2018. Although PRISM links and visualizes key EPR data, funding would make it possible to not only visualize and manage this data, but also offer needs-based humanitarian response analytics computed by sector, such as the amount of food or cash needed based on conditions on the ground, providing governments the ability to more effectively mobilize resources and coordinate stakeholders for preparedness and response. Additionally, WFP would continue to work alongside government to develop the PRISM dashboard to ensure it meets their needs, as well as to continue to train government officials in its use for coordination.

Potential Partners: The National Committee for Disaster Management equipped WFP with equipment (TVs, desktops, and tablets) to simulate disasters, which are followed up with coordination meetings based on data provided through PRISM. This includes trainings at district and national level for capacity strengthening EPR through PRISM. WFP's platform links with People in Need (PIN)'s early warning system, comprised of river gauges that alert members of communities downstream before floods reach their homes. Integration of GIZ's IDPoor information into Hub/Government systems enables targeting with data from a poverty registry.