

Virtual Cold Chain Assistant for Smallholder Farms

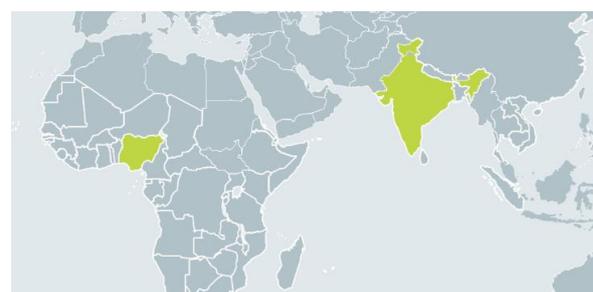
Implemented by *Fund for the Promotion of Innovation in Agriculture (i4Ag)*
As part of the special initiative *Transformation of Agricultural and Food Systems*

The Challenge

Reducing post-harvest losses by enabling access to sustainable cooling and to market information

Agriculture plays a vital role in the economies of Nigeria and India. In Nigeria, 70 % of the total workforce is engaged in agriculture; more than 40 % is in India. Yet agriculture's contribution to GDP is low and the agricultural sector in both countries faces significant risks, in part due to a lack of access to cooling. Only 6 % of food produced in India currently moves through the cold chain; in Nigeria, 40 % of the produce is lost or wasted. Besides the reduction in income caused by food loss, farmers face further income losses when they have to sell their produce directly after harvesting at a low price. Though climate friendly (e.g., solar-powered) local cooling systems are available for smallholders, their deployment has been limited by a lack of reliable access to energy, high upfront costs, unavailability of proper maintenance as well as limited financing options and know-how. Local cooling service providers likewise face the challenge of ensuring the utilisation of their systems. The ability to scale up businesses is additionally limited by the mainly manual registration of customers.

Name of the Project	Virtual Cold Chain Assistant for Smallholder Farms
Name of the Global Fund	Fund for the Promotion of Innovation in Agriculture (i4Ag)
Commissioned by	Federal Ministry for Economic Cooperation and Development (BMZ)
Project Region	Nigeria, India, global
Implementing Partners	The Basel Agency for Sustainable Energy (BASE), The Swiss Federal Labs for Materials Science and Technology (EMPA)
Duration	08/2021 – 08/2023



L.: Concept of the Digital Cold Chain Assistant; R.: Project Region

The Innovation

Pay-per-use sustainable cooling and data-driven decision-making via open-source app

An open-source, data-driven mobile application known as *Coldtivate* is being developed and rolled out to digitise servitisation business models for cooling processes. With this model, farmers gain access to efficient, reliable, and sustainable cooling while only paying for the food they store (pay per kg per day). Service providers own and maintain the cooling facilities, thereby covering the operational costs. This long-term commitment is an incentive for providers to install the most energy-efficient equipment and perform high-quality maintenance. Within this business model, *Coldtivate* serves as a decision-making tool for both smallholders and cooling service providers:

- The app informs **smallholders** about the availability of - environment friendly cooling services for their produce, enabling them to keep track of their crop's quality and expected shelf-life in the cold rooms digitally. Farmers' decisions are further supported by information on market prices. Knowing the remaining life of the produce and the forecast market prices, smallholders can make informed decisions about when and where to sell.
- Digitising cold storage operations simplifies the scaling and monitoring for **clean cooling service providers**. Other decision-making tools, such as an interactive open-source map, supports them in optimising the positioning of new cold rooms. To reach customers without a smartphone, the app will enable cooling providers to send updates via SMS notifications.

The Main Objective

Reduce post-harvest losses and increase smallholder incomes while mitigating negative climate impacts

- + 15 % income for smallholder farmers
- + 10 % turnover for cooling providers
- 50 % CO₂ emissions
- 20 % post-harvest losses for smallholder farmers

The project contributes to the achievement of these Sustainable Development Goals:



Methodological Approach and Innovation Partnership

The project, in cooperation with *The Basel Agency for Sustainable Energy* (BASE) and *The Swiss Federal Labs for Materials Science and Technology* (Empa), pilots the use of a virtual cold chain assistant in Nigeria. It scales the innovation in cooperation with GIZ's *Green Innovation Centres for the Agriculture and Food Sector* (GIAE) in India (amongst others).

BASE provides in-house experience and its expertise with the development of innovative business models, financial mechanisms and data science to drive the adoption of climate smart solutions. Empa provides its knowledge in the analysis of post-harvest losses

along the agricultural supply chain and the development of models such as those used to monitor crop shelf life based on sensor data and predict fruits' quality based on computer vision. The central implementation partners for pilot testing on the ground are local SMEs such as *ColdHubs* in Nigeria. In addition, the project builds on cooperation with international cooling alliances such as the *Cooling-as-a-Service (CaaS) Alliance* and *The Cool Coalition*.

An accompanying gender strategy, which is developed and implemented by the partners, ensures that women are strengthened in their position as producers, employees, or entrepreneurs.

Important Activities

- Developing and rolling out the virtual cold chain assistant in two regions of Nigeria, tailoring it to the local needs of smallholders and cold storage providers
- Conducting capacity development activities for smallholders with regards to the benefits and availability of cold storage as well as to the use of the app
- Establishing a business incubator for selecting, advising and supporting further clean cooling providers in rolling out the pay-per-use model and scaling the digital approach
- Collecting open-source data and mapping it into an interactive multi-layered map
- Surveying activities to monitor the impact in terms of post-harvest losses and increased income
- Launch of a digital information platform and implementation of digital event formats

Sustainability and Scaling Strategy

Through a supra-regional incubator, selected promising medium-sized enterprises offering sustainable cooling solutions will be advised and supported in tailoring their business model to local needs. They will be assisted in digitising key processes to facilitate scale-up of the solution.

Lessons learned from all locations will enable a sustainable scaling of the approach. Through the globally scalable, locally adapted concept, further cooling providers across countries can engage with the solution and address the challenge of post-harvest losses for smallholder farmers.

Published by

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH
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As at

January 2023

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