



**Cooling as a Service**  
Refresh the planet

## Case Study



### Transforming rural livelihoods with accessible cold storage

*Koel Fresh in partnership with the local council Rourkela Municipal Corporation (RMC) is implementing solar-powered cold rooms at farm-gates and market-yards operated by local women's federations. Koel Fresh is supported by BASE and Empa's Your Virtual Cold-Chain Assistant (Your VCCA) initiative, using the Coldtivate mobile application to facilitate inventory management, post-harvest and market intelligence, and a Cooling-as-a-Service business model.*

**Region**

Rourkela, Sundargarh, Odisha, India

**Sector**

Agri-tech

**Retrofit or new**

Retrofit and new (mix)

**Project size**

5 Cold rooms, 30 MT storage each

**Technology**

Fixed Solar-powered cold rooms

**Partners**



## The Need

Crop loss and wastage is a global issue. India, one of the world's largest food producers, faces this problem on a large scale. Due to the lack of proper refrigeration and market access, around 35% or 40 million tons of fresh produce in India is wasted annually, amounting to approximately 13 billion USD per annum. Based on an initial survey on post-harvest refrigeration in the Sundargarh district of Odisha state, Koel Fresh identified multiple issues:

- Limited or no decentralised storage options
- Limited grid power access
- High investment requirement and operating costs
- Limited information on suitable locations for cold storage
- Lack of sustainable operating models, leading to stranded assets

Existing cold rooms or storage facilities are often non-operational, or have low-capacity and utilisation. The lack of post-harvest refrigeration has notable impacts. Farmers, small vendors, and street hawkers resort to 'distress selling', selling goods at reduced prices before spoilage and to make up costs like transport, which leads to low incomes. Koel Fresh identified that 30%-40% of vendors can be classed as vulnerable, with the elderly or women from scheduled tribes facing this problem in

Rourkela. Other issues were also identified such as the lack of sustainable business opportunities for the local women's federation in Rourkela stemming from limited technology, training, market access, and business acumen.

In addition, members of the local community with mobility issues such as the elderly or people with disabilities face challenges accessing and purchasing goods. Koel Fresh also identified that getting goods to local consumers and institutions can be done in a more environmentally friendly way through the introduction and use of electric vehicles. Currently there is a lack of electric vehicle uptake in Rourkela where around 7000 diesel vehicles are in use.

## The Solution

The solution proposed in the 2021 Global Mayors Challenge involves setting up digitised cluster-based solar-powered cold rooms at selected farm gates or market yards of Rourkela to support farmers, small vendors, and street hawkers in storing their fruits and vegetables. A cluster-based approach refers to the strategic placement of smaller sized cold rooms (5-30MT) rather than one large common storage (e.g., 5000MT), to provide cooling across multiple farm gates and market yards which are spread across major areas in Rourkela (Rourkela smart city in India is amongst 15 prize winners of the 2021 Global Mayors Challenge (GMC 2021), the Bloomberg Philanthropies' competition supporting innovative ideas for cities).



The operators of the cold rooms are hired from the local communities, helping with the transfer of skills and generating alternative income streams beyond agriculture. The cold rooms are made available to local communities through a pay-per-use approach, providing accessible and affordable cooling and removing the barrier of required upfront investment in cooling technologies.

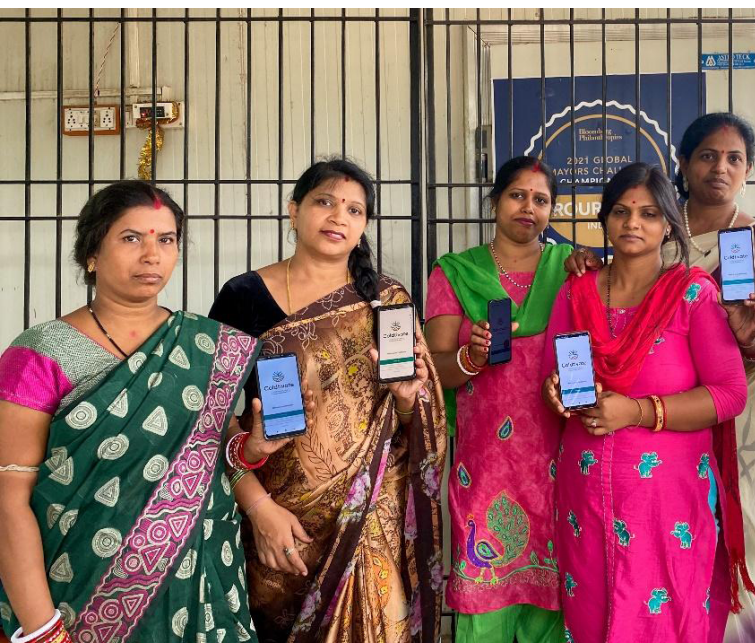
### Market linkage

The cold room operators market the stored crops, and facilitate online ordering of items by using their in-house app. Electric vehicles are also used to distribute goods to different consumer groups; this is all embedded into the pay-per-use price of storage. The Koel Fresh solution uses the Coldtivate mobile app, developed by BASE and Empa through the [Your VCCA](#) program. The app has been designed to ease operations and management of the cold room, and contains various features to enhance the benefits of using the cold rooms, such as a digital inventory of the crops stored, physics-based models to predict the remaining storage life of the produce in storage based on real-time temperature sensor data, and a module that forecasts the market prices of the crops across Indian markets, which can be shared with farmers, small vendors and street hawkers.



*“Climate change solutions, women empowerment, social inclusion have been the core themes of this project and are the driving forces toward strengthening the local economy during COVID and the post-COVID scenario. We are very hopeful that our solution will be scaled up in various parts of India and that Rourkela city will act as a role model for many other cities.”*

**- Dibyajyoti Parida, IAS. Hon. Commissioner, Municipal Corporation and CEO Rourkela Smart City**



**Members of the Maa Tarini Self-Help Group, a progressive women federation that operates and manages the cold room are trained in using the Coldtivate mobile app**

### Pilot implementation

A 5MT cold room was installed at the local Veer Surendra Sai (VSS) market, Chhend, Rourkela. A women’s federation, Maa Tarini Self-Help Group (SHG), was onboarded and trained on how to operate and maintain the cold room, with materials designed by Koel Fresh. In addition, as part of the Your VCCA project, digital training was provided on how to use the Coldtivate mobile app for inventory management as well as how to deploy the servitisation business model. A survey was carried out to understand important information regarding farmers, vendors, and street hawkers on the supply side, and retail customers on the demand side. A Cold room ambassador programme was developed to raise awareness and provide specific support to farmers



**Mr. Prabodh Ranjan Padhee, author & former Chief General Manager at Rourkela Steel Plant, Steel Authority of India Limited (SAIL), and also lead advisor to Koel Fresh, talking about leadership to Maa Tarini SHG as a part of their capacity building**

in using the cold room and to disseminate the benefits of cold storage to other farmers through peer-to-peer learning. The cooling service was promoted on social media and offline promotion was carried out at appropriate locations.

## Benefits

### Socio-economic impact:

- Preventing farmers, vendors and street hawkers from distress selling
- Reducing crop spoilage leads to higher potential profitability from selling
- Enhancing the livelihood of farmers, vendors, street hawkers, and women's federations through better business models and other opportunities.

### Environmental impact:

- Mitigate climate change due to the usage of low-carbon technologies.
- Adaptation to climate change through appropriate cooling technologies.

Koel Fresh also observed that the cold room initiative created a place for meaningful dialogue and exchange, where farmers interacted with the cold room operators (SHG members) and shared problems such as issues related to pest attacks in farming leading to the use of expensive chemical pesticides, as well as the effects of unreliable electricity supply to their daily activities and children's studies.

The SHG, in collaboration with partners, provided chemical-free non-toxic pesticides and also microbial mixtures for plant growth, and solar lighting systems to the farmers at affordable rates. The cold room becomes a hub for new businesses to be plugged-in that can further improve the incomes of SHG members.

Working with SHGs is an innovative, community-based approach to servitisation, wherein women help aggregate crops and connect farmers with wholesale retailers.

The involvement of the community and skill transfer makes servitisation sustainable in the long run.

## What's Next?

The piloted cold room in Rourkela benefitted around 300+ farmers and a SHG. GMC 2021 is part of a 3-year-long project in which 5 solar-powered cold rooms totalling 150 Metric Tons will be installed in 2023, with the intention to scale up in the coming years. The whole project has the potential to impact more than 2'500 farmers and 10 SHGs in Rourkela, and is replicable and scalable to other cities in India. This project also includes using the Coldtivate app to its full potential.

The Koel Fresh initiative KF Cool is a specialised division committed to the establishment of robust and sustainable cold chains in both rural and urban regions. The team offers end-to-end solutions that encompass site analysis, DPR preparations, custom designs, procurement and installation support, farmers survey and analytics, capacity building of women SHG and FPO towards operation and management of cold rooms, and market linkages to cold room units. The team strives to effectively implement government schemes at the state (e.g., 1000 cold rooms under the Govt. of Odisha Panchayat scheme) and national level, by ensuring successful execution of projects on the ground.

## COLDTIVATE

Coldtivate is a free-to-use, data-science-based mobile application that enables technology providers to remotely monitor the utilisation and finances of their cooling units and operators to digitalise inventory management. But its primary benefit lies in empowering farmers to make informed decisions about how to minimise post-harvest loss and maximise their income from the sales of their crops. Using real-time sensor data, Coldtivate enables farmers to monitor the remaining storage life of their produce in storage, which, when coupled with market price predictions, helps farmers decide when and where to sell their crops to secure the best possible price.

Coldtivate facilitates smallholder access to cooling to maximise their income, while minimising food loss and spoilage. The app can be downloaded on Android and iOS on the following link : <https://yourvcca.org/india/the-app/> and is available in English, Hindi, and Odia.

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