

PROJECT SUMMARY & NEXT STEPS

DATATHON DOCUMENTATION

DATATHON - STOP FOOD LOSS AND WASTE!



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INTRODUCTION

The datathon produced an array of diverse ideas on how to approach the problem of food loss and waste. In this document, we give a short overview of the projects and discuss the projects on a number of key points. These points include location, supply chain stage, and crop type. We also discuss whether the projects are aimed at generating new data, or at utilizing existing data. Lastly, we write a short note on the technical realization of the projects.

PROJECT OVERVIEW

A total of nine teams participated in the datathon. Each team came with their own innovative and data-driven solution to address food loss and waste. Below you will find a short description of each project, including links to their reports and presentations (PDFs).

More information on individual projects is available in the form of code, and a video recording of their pitch (this information is available separately at Xomnia).

CoolShare (first place)

CoolShare is a platform for sharing cooling storage capacity in India, directly addressing the loss of perishable crops. The platform allows users to offer their overcapacity to other users for a fee, or for farmers to rent available capacity for a price. Not only does this address losses during the storage process, it also optimizes the transport process and generates reliable food loss data through user data and possibly sensor data.

- [CoolShare report](#)
- [CoolShare presentation](#)

WeHarvest (second place)

WeHarvest is an SMS service for farmers that tells them the optimal time to harvest their crops. The farmer simply texts the date of sowing, the nearest city, and the crop he/she is growing. The model predicts the optimal time to harvest, based on historical weather data and data on crop growing and drying times. The platform can increase yield and help farmers reduce losses by reducing storage time and optimizing storage conditions.

- [WeHarvest report](#)
- [WeHarvest presentation](#)

wasted. (third place)

wasted. is an app that helps consumers reduce the food they waste by encouraging them to log their food waste and providing clear visualizations of their waste statistics. The app is easy to use, tracking groceries by linking it with supermarket customer cards. Food waste is logged by a swiping system and gamification approach, and can provide an incentive for the user in the form of discounts on groceries. The app can play a great role in raising consumer awareness of their personal food waste and may help consumers make better, less wasteful decisions.

- [wasted. report](#)
- [wasted. presentation](#)

CasSaba

The CasSaba project addresses cassava waste in Nigeria. The team created an app which advises farmers on where and when to sell their crops, based on expected food loss estimates which take into account distances and weather conditions. The app would also allow farmers to communicate their harvesting times and thus minimize food waste among participating parties.

- [CasSaba report](#)
- [CasSaba presentation](#)

Finding the Pattern of food waste

This project is purely a data modelling solution, relying on existing data sources to predict food loss numbers for areas or crops that do not have food loss statistics available. The model predicts food loss percentages with a mean error of about one percentage point, making it a reliable way to determine areas and crops with high loss. This information may help indicate where intervention would be most effective.

- [Finding the Pattern of food waste report](#)
- [Finding the Pattern of food waste presentation](#)

FooDB

FooDB is a visualization tool to analyze the FAOSTAT databases. The tool offers a dashboard that provides insight into existing statistics on food and agriculture around the world. It also provides functionality for making clustering analyses. The tool addresses the issue that current data sources are hard to triangulate and properly interpret. FooDB offers visualization options and can help researchers be more effective.

- [FooDB report](#)
- [FooDB presentation](#)

GeoCroP

The GeoCroP (Geographical Crop Placement) tool utilizes existing data sources, including loss statistics, weather, and satellite data. This data is combined into a model that predicts food loss for fine-grained geographical regions and specific crops. This information can be used to help farmers select the optimal crop to farm, or to select the optimal location to farm the crop of their choice.

- [GeoCroP report](#)
- [GeoCroP presentation](#)

Midas

Midas is web service that produces relevant information on optimal package sizes for individual food products and age demographics. It addresses food waste at the consumer level, by advising retailers on package sizes. Recommendations are based on customer demographic information, consumption data, and data on expiration dates and current package sizes. The service could play a great role in aligning retailer and consumer interests and subsequently reduce food waste.

- [Midas report](#)
- [Midas presentation](#)

Potatotator

The Potatotator is a knowledge sharing platform to help farmers get the information they need. The platform specifically focuses on potato farmers in regions of the world that are not experienced in potato farming yet, like Asia or South America. Using satellite images and various analysis methods, crop health and soil moisture can be determined. The platform can subsequently give advice to farmers on, for example, proper pesticide usage, leading to lower on-farm losses.

- [Potatotator report](#)
- [Potatotator presentation](#)

LOCATION

All projects are in essence generic solutions that may be applied to any country in the world. As an example: the wasted. app could be installed by any person with a mobile phone. The solution is developed, however, with a Western audience in mind, since consumer food waste is most problematic in developed countries. Midas would fall into the same category.

Other solutions are tailored to developing countries. Examples are CasSaba, CoolShare, WeHarvest, GeoCroP and Potatotator. These projects were set up using data from developing countries, some even focusing on single countries as a proof of concepts. Specifically Kenya (WeHarvest, GeoCroP), Nigeria (CasSaba), and India (CoolShare) were used as example countries. Pattern offers a visualization solution based on data of sub-Saharan Africa. All these solutions can, however, be easily extended to use data for other countries.

FoodB is uniquely based on global data, using FOASTAT data from countries all over the world. It should be noted, however, that while most projects chose a single country as a proof of concept, each of these projects are easily extended should data be available for other locations.

SUPPLY CHAIN

Every stage of the supply chain has been dealt with in the projects proposed during the datathon, with the exception of the retail stage.

wasted. and Midas focus on food losses during the consumption stage, with wasted. aiming to raise awareness with consumers, and Midas advising retailers.

A lot of other projects aim to reduce food losses during the beginning of the supply chain, by optimizing farming and harvest practices. GeoCroP is probably the project that comes into play earliest in the supply chain, giving advice to farmers what crops to grow and where to grow them. Potatotator similarly comes into play before harvesting, giving advice to farmers on things like pesticide usage.

WeHarvest, CasSaba, and CoolShare focus specifically on reducing transportation and storage losses. WeShare and CasSaba by optimizing harvest times to account for weather condition and distance to market, while CoolShare provides a platform to share refrigeration resources.

FooDB and Pattern do not focus on a specific stage in the supply chain, but rather offer insight into the whole supply chain, from start to finish.

CROP TYPES

When it comes to food loss and waste, a clear distinction can be made between staple and perishable crops. In general, perishable crops are associated with higher loss, as these crops spoil more quickly, especially in the absence of proper cooling facilities. CoolShare specifically deals with this problem, aiming at providing cooling facilities for farmers that require it. CasSaba focuses on cassava specifically, optimizing harvesting times to deal with the short shelf life of the crop. Potatotator focuses on helping farmers by providing knowledge about potato farming practices.

Perishable crops are also more susceptible to food waste on the consumer side: people buying products containing perishables and letting them spoil. Midas and wasted. focus on reducing food waste in this area.

Other projects focus on staple crops. WeHarvest focuses on maize specifically, while GeoCroP compares estimated losses across cereal crops. Pattern also bases their visualization tool on cereal crop data.

Again FooDB does not focus on a specific type of crop; rather it provides visualization of crop information, be it perishable or staple.

DATA USAGE

A distinction can be made between projects that utilize existing data, and projects that can be used to generate new data on food loss and waste.

On the 'data utilization' side, FooDB and Pattern are pure data science and data visualization solutions. These do not provide the opportunity to gather new data, but do offer the possibility to generate new insights based on existing data.

Other projects are pure 'data generation' solutions, like CoolShare and wasted. These solutions offer utility to their users that is based on this user data itself. As the platform builds a user base, these platforms can become an incredible source of high quality data on food loss and waste.

The other projects are a balance between data usage and data generation. These are platforms that require existing data to function, such as satellite data (Potatotator), weather data (CasSaba, WeHarvest) or food loss data (GeoCroP). However, as the platforms gain users, they will in turn generate new agricultural data that may be used to reduce food loss and waste.

TECHNICAL REALIZATION

During the datathon, the teams not only came up with concepts and ideas, but also made an effort in realizing them. The extent to which their ideas could be realized was of course limited, as the teams only had 24 hours to come up with their idea, code it, and pitch it. In the end, the degree to which each team realized their solution varies greatly. Some teams came quite close to realizing and showing a working prototype (GeoCrop), while other teams remained mostly on the conceptual level (wasted.).

The code written by the teams is available and provided as part of the documentation of the individual projects. It should, however, be noted that this should be viewed just as context for the concept itself: the code was written to generate a prototype within 24 hours, and will not function as a solid base for a fully realized solution.

NEXT STEPS

The aim of the datathon was to generate ideas and concrete avenues of approach to the food loss and waste problem from a data perspective. And the results are there: a diverse array of projects representing various ideas and techniques.

The projects described in this document are still in their starting phase: the concepts have been thought out and partially implemented in a *proof of concept* kind of way. The next step for the World Bank would be to select projects that sound promising, and pursue the further realization of these projects. This can be done either internally at the World Bank, or in collaboration with partners for whom the project may be interesting.

The CoolShare project, winner of the datathon, has a direct relevance to local World Bank investments in India. The CoolShare team has been brought into contact with the local World Bank representatives, and this marks the first step in the possible realization of the CoolShare platform.

Other projects have not found a home yet, but some projects touch upon work that is already being done at the World Bank. It may be valuable for the teams currently working on those projects to read the reports of the related datathon projects. These might add new insight on possibilities regarding technical realization, or provide ideas for additional applications.

All in all, the concept of datathon has proven to be a great source for generating new, creative ideas around a theme. The need for data-driven solutions extends beyond the theme of food loss and waste, and as such a datathon might be a viable way to explore solutions for other themes relevant to the World Bank.