

# The Cool Farm Tool's New Beta Food Loss and Waste Metric

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**Each year, approximately 1.3 billion tonnes of food is lost or wasted globally, equivalent to one third of all food produced for human consumption.**

To help address this issue, [The Cool Farm Alliance](#) has made available a new [Food Loss and Waste \(FLW\) metric](#) (in beta) available through the Cool Farm Tool. The new FLW metric enables companies to track food loss and waste in order to start reducing these losses at the farm level. Reduced food loss and waste, especially at source, translates into reductions in costs, GHG emissions, water use, land, energy and other natural resources.

## What do we mean by beta?

Beta software refers to computer software that is undergoing testing and has not yet been officially released.

The Cool Farm Tool FLW metric is based on the pioneering Food Loss and Waste Standard<sup>1</sup>, a reporting methodology developed by World Resources Institute. [WRAP](#) was part of the collaboration to deliver the new CFT module and provided expertise on the interpretation of food loss and waste in primary production. The module was developed with funding from the [Rockefeller Foundation](#). The metric development came out of the Sustainable Food Lab's [Food Loss and Waste initiative](#) which focuses on helping companies identify and implement high leverage solutions to food loss and waste in their smallholder farm supply chains.

## What is the Food Loss and Waste Standard?

The Food Loss and Waste Accounting and Reporting Standard is used to provide requirements and guidance for quantifying and reporting on the weight of food and/or associated inedible parts. The standard has been developed through the Food Loss and Waste Protocol, a multi-stakeholder partnership convened of WRAP, the WBCSD, Consumer Goods Forum, FAO, EU-funded FUSIONS project and UNEP.

Tracking and understanding where food loss and waste occurs along the supply chain is the first step. The Cool Farm Tool FLW module asks farmers about losses at each stage of on-farm production: harvesting, on-farm processing, transport, storage and other on-farm post harvest operations. For every entry, the tool asks users about the fate of the food loss and waste, the reasons why it occurred, and the quality of the data provided.

Building this module into a tool that is designed to also collect farm management information for GHG emissions estimates means that supply chain actors can tackle multiple sustainability objectives at once.

In alignment with the World Resources Institute's Food Loss and Waste Accounting and Reporting Standard, agri-food company Olam has started measuring crop and product losses in their managed farms, processing and logistics operations and in third-party supply chains where they have an influence<sup>2</sup>. Using the Cool Farm Tool FLW metric allows for targeted crop and product loss, which can be a way to bring more product volumes to market without increasing the area of land cultivated and inputs used, directly benefiting farmers and the environment.

William McManus of WRAP said: "Tracking and understanding where food loss and waste occurs in companies' supply chain is crucial to mitigating impact. After 12 months of hard work, the new food loss and waste metrics functionality is a welcome addition to the Cool Farm Tool greenhouse gas, biodiversity and water calculator."

1. Hanson, C., Lipinski, B., Robertson, K., Dias, D., Gavilan, I., Gréverath, P., Ritter, S., Fonseca, J., van Otterdijk, R., Timmermans, T., Lomax, J., O'Connor, C., Dawe, A., Swannell, R., Berger, V., Reddy, M., Somogyi, D., Tran, B., Leach, B., Quedsted, T., 2016. Food Loss and Waste Accounting and Reporting Standard 160.

2 [https://docs.wbcsd.org/2019/07/WBCSD-Case-study\\_OLAM.pdf](https://docs.wbcsd.org/2019/07/WBCSD-Case-study_OLAM.pdf)

## Technical Details

### Definition of ‘food’

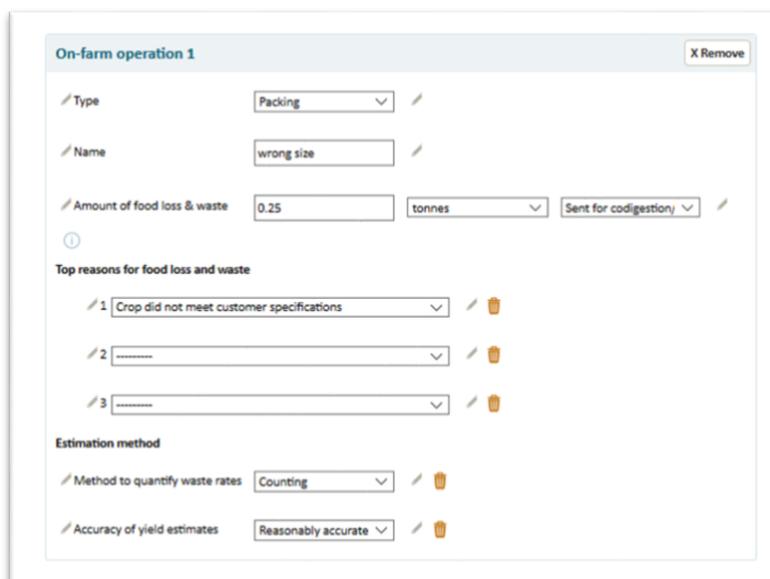
A crop is defined as ‘food’ at the point that it becomes ready for human consumption. Unripe produce and yield intended for animal feed are not considered food, just as parts of a crop that are not usually harvested don’t need to be included in the measurements. If the aim however, is to improve crop utilization by increasing the proportion of a plant that is gathered, this could be included in the quantification.

### Stages of on-farm production

Following the FLW Standard, the new CFT module collects data on food loss and waste across the following stages of production:

1. In-field activities:
  - a. Crop left unharvested: This accounts for crops that are ready for harvest but, for example, are ploughed back in.
  - b. Crop rejected at harvest and left in the field.
2. Grading and packing (where this occurs on-farm).
3. Storage (where this occurs on-farm).
4. Other post-harvest operations (where this occurs on-farm).
5. Loading and transport:
  - a. This accounts for all transportation methods in the farm’s control, from the farm-gate to beyond. If the aim is to assess an entire supply chain of a product, it is necessary to consult other stakeholders responsible for logistics to avoid duplication and ensure representation.
6. Rejections and product unsold at market.
  - a. Where possible, rejected and unsold products should be considered. Despite these two elements occurring off-farm, they have been included in the module as this produce typically remains in the ownership of the grower.

For each of these stages, the tool collects the amount of food loss and waste, its fate, the reasons for food loss and waste and details on the methodology used to provide the estimation (Fig. 1).



The screenshot shows a web-based form titled "On-farm operation 1" with a "Remove" button. The form contains several sections:

- Type:** A dropdown menu set to "Packing".
- Name:** A text input field containing "wrong size".
- Amount of food loss & waste:** A text input field with "0.25", a unit dropdown set to "tonnes", and a dropdown for "Sent for codigestion".
- Top reasons for food loss and waste:** A section with three numbered dropdown menus. The first is "Crop did not meet customer specifications".
- Estimation method:** A section with two dropdown menus: "Method to quantify waste rates" set to "Counting" and "Accuracy of yield estimates" set to "Reasonably accurate".

Figure 1: Required input for all sources of food loss and waste along the production chain: amount, direction, reason for food loss and waste and information on the estimation method.

## Food Loss and Waste Destinations

Each of the food loss and waste destinations available to the user are based on internationally recognized standards and encompass the following options:

Donated ( $LW_{donate}$ )	Animal feed ( $LW_{feed}$ )	Bio-processing ( $LW_{bio_{proc}}$ )
Anerobic Digester ( $LW_{AE}$ )	Composted ( $LW_{comp}$ )	Controlled Combustion ( $LW_{land}$ )
Applied to land ( $LW_{land}$ )	Not harvested/ ploughed in ( $LW_{non_{harv}}$ )	Sent to landfill ( $LW_{landfill}$ )
Abandoned ( $LW_{abond}$ )	Sewer ( $LW_{sewer}$ )	Other ( $LW_{other}$ )

## Metrics – how the module works

The module determines the percent of waste based on the total production, including non-harvested production. Food loss and waste is displayed by source and destination on the results page (Fig. 2). Donations (“Donated food”) are treated separately to all other destinations, so are not accumulated under the total loss and waste:

$$F_{LW_{total}} = \left( \frac{\sum LW_{feed} + \sum LW_{bio_{proc}} + \sum LW_{AE} + \sum LW_{comp} + \sum LW_{c_{comb}} + \sum LW_{land} + \sum LW_{non_{harv}} + \sum LW_{landfill} + \sum LW_{abond} + \sum LW_{sewer} + \sum LW_{other}}{(P_{harvest} + P_{non-harvest})} \right)$$

## Where

$P_{harvest}$  harvested Production

$P_{non-harvest}$  not harvested production

Each sum  $\sum LW$  represents the total loss for a certain destination across all sources considered in the module.

$$F_{LW_{donate}} = \frac{\sum LW_{donate}}{P_{harvest} + P_{non-harvest}}$$

All donations are assumed to be used for human consumption, so are not aggregated under the total loss and waste.

In the results displayed in Figure 2, the farmer produces 500 tonnes of agricultural product. One tonne is left unharvested in the field. Losses include:

- one quarter of a tonne during storage;
- one half a tonne during grading and
- 0.03 of a tonne during loading and transport.

Thus, the total losses are 1.77 tonnes which calculates to **0.35 percent** of 501 tonnes as displayed. Additionally, 5 tonnes of product are harvested and immediately rejected in the field and 0.1 tonnes are rejected by the customer. These are both donated for human consumption, so the total amount donated as a percent of the harvested and unharvested food is **1.02 percent** as displayed.

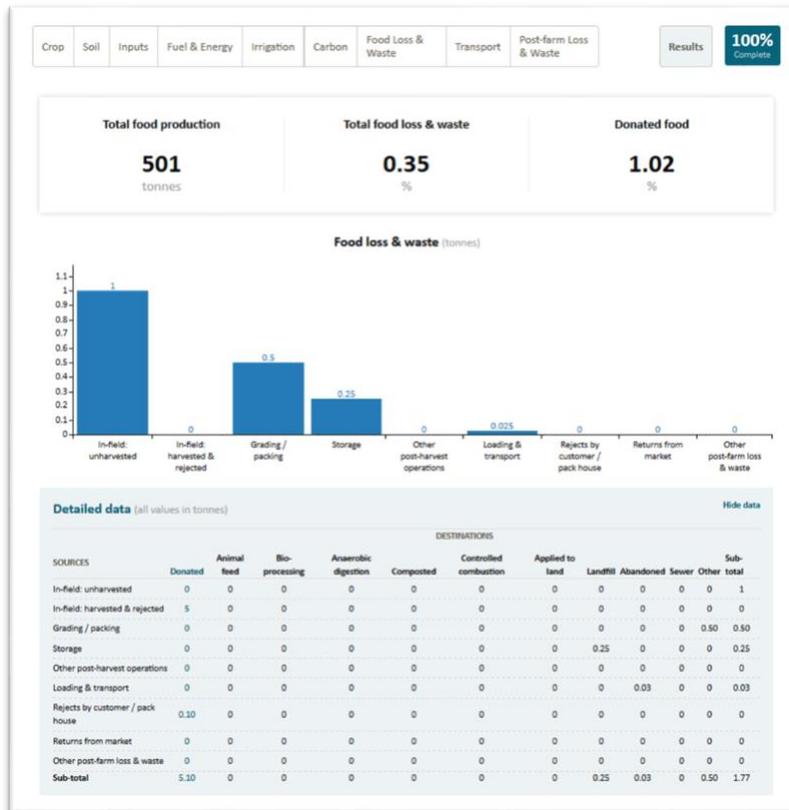


Figure 2: Results page of the food loss and waste metrics in the Cool Farm Tool

### 7. Food Loss & Waste

Please indicate which operations you undertake on-farm.

**On-farm operation 1** X Remove

Type: Storage

Name: Storage

Amount of food loss & waste: 2.4 tonnes

**Top reasons for food loss and waste**

- No market/buyer for the crop
- Crop did not meet customer specifications
- Not known

**Estimation method**

Method to quantify waste rates: Direct weighing

Accuracy of yield estimates: Reasonably accurate

+ Add operation

- Donated to people in need
- Used as animal feed
- Sent for biomaterial processing
- Sent for codigestion/anaerobic digestion
- Composted
- Sent for controlled combustion
- Applied to land
- Not harvested
- Sent to landfill
- Abandoned as refuse/discards
- Sent to sewer
- Other

Figure 3: Storage entry in the Cool Farm Tool food loss and waste module showing drop down list of available destinations

Crop name	<input type="text" value="Rice"/>	<input type="button" value="i"/>
Harvest year	<input type="text" value="2018"/>	
Crop area	<input type="text" value="100"/>	<input type="text" value="hectares"/> <input type="button" value="i"/>
Gross yield	<input type="text" value="100"/>	<input type="text" value="tonnes"/> <input type="button" value="i"/>
Amount rejected at harvest	<input type="text" value="1"/>	<input type="text" value="tonnes"/> <input type="text" value="Used as animal feed"/> <input type="button" value="i"/> <input type="button" value="trash"/>
Net yield	<input type="text" value="100"/>	<input type="text" value="tonnes"/> <input type="button" value="i"/>
Amount of unharvested crops	<input type="text" value="10"/>	<input type="text" value="tonnes"/> <input type="button" value="i"/> <input type="button" value="trash"/>
Assessment name	<input type="text" value="Rice FLW"/>	<input type="button" value="i"/>
<b>Top reasons for unharvested crops</b> <input type="button" value="trash"/>		
1	<input type="text" value="Crop suffered pest, disease or weather damage after it"/>	<input type="button" value="i"/> <input type="button" value="trash"/>
2	<input type="text" value="Crop too small/large to be cost effective"/>	<input type="button" value="trash"/>
3	<input type="text" value="....."/>	<input type="button" value="trash"/>
<b>Estimation method</b> <input type="button" value="trash"/>		
Method to quantify waste rates	<input type="text" value="Estimates based on instinct"/>	<input type="button" value="i"/> <input type="button" value="trash"/>
Accuracy of yield estimates	<input type="text" value="Somewhat accurate (e.g. 11-"/>	<input type="button" value="i"/> <input type="button" value="trash"/>

Figure 4: Crop tab in the Cool Farm Tool food loss and waste module

### What's next for the module?

With the FLW metric in beta, the Cool Farm Alliance is opening the module to a wider audience for feedback and performance testing. During this time CFA will be developing the associated technical guidance documentation for the module and fundraising for language translations, API, aggregation and other associated services.