Application Link: food-data-exploration.appspot.com

Goals of the application

Use data to communicate the problem of food waste.
Build a narrative to better communicate the urgency of the problem.
Help people understand and engage with the problem better.
Use visual design and interactive techniques to build a better narrative.

Although all of the above has been individually attempted in some form by various agencies both government and private. We are trying to connect a user's action to the global picture of food waste.

The target audience is relatively younger urban residents who are unaware of the scale of the problem and impact of their actions. Between 15-30 years of age.

Approach

We leveraged the techniques and concepts we used in Byte 1, 2, 3 and 4 to build narratives with the data. We first understood the problem (Process Knowledge) and the nature of the data available (The 4 Cs). Then we thought of building a narrative to explain the problem. There is a lot of process knowledge involved in the understanding of the food waste problem. The scale is clearly huge and the problem has multiple-levels with scope of improvement at every level. It was also important to show connections between these levels thus our choice of visualization was illustrations with animations that show the entire process. This approach is in line with a lot of previous work done in this area for example documentaries like *Taste the waste* or *Just eat it* that show each and every stage of the supply chain.

The primary mode for collection of food wastage data is estimation based on surveys or inventory data. The food flowing through every stage in its cycle can be thought of in terms of food inflow and food outflow. The estimation techniques label the difference between inflow and outflow at each stage as the food wasted at those stages. For our purposes, we narrowed down to analysing agro-based foods and followed the widespread convention of breaking down the food production-consumption process into the following broad stages. We chose the case of fruits and vegetables as it is more relatable for our target audience, we found substantial relevant data and most importantly because, fruits and vegetables go through unique wastage points at each stage that make their analysis more compelling while building this narrative.

Stage in Food Cycle	Food Inflow	Food Outflow	Typical Causes of Wastage
Agricultural Production	Domestic produce	Hand-picked or selected 'good' produce	The look and feel of some fruits and vegetables isn't deemed 'marketable'
Post-Harvest Handling and Storage	Hand-picked or selected 'good' produce +	Undamaged Produce	Storage may also spoil the look and feel of

	Imports		some of the produce + a minor amount always leaks off within the transportation mechanisms
Processing and Packaging	Undamaged Produce + Imports	Processed and packaged food items + Exports	In North America and Oceania, this is comparatively less and happens only via minor leaks within the processing and packaging mechanisms.
Distribution	Processed and packaged food items + Imports	Off-shelf purchases	Expiry Dates are often false negatives and dissuade consumers from purchasing + Grocery stores have to overload shelves to attract more consumers
Consumption	Off-shelf purchases	Personal consumption	People often purchase unnecessarily, in excess and for convenience.

Another major challenge in estimating food wastage comes because of heterogeneity in the real life scenario of the food cycle. By this, we mean that there is no uniform set of sources that can account for food inflow and destinations outflow at every stage. For example, in some cases looking at domestic production as a source of inflow would suffice. However, in some other cases, we may also have to consider imports to avoid achieving falsely positive estimates on wastage. Analogously, while looking at data about the food that travelled from harvest to processing, or processing to distribution, we cannot ignore other destinations such as exports, that may reduce the outflow values and give a false negative in terms of indicating more wastage than is actually the case.

Thus the data for the problem we selected tends to be extremely unorganized as discussed above. From a practical perspective, the data is not complete, correct or even reliable. It is not complete because data on the use of natural resources in the farm or the data on the food wastage at various stages of the supply chain are all estimates and most of the times the data lacks key information regarding the questions that interests us. Most of the data is either too elaborate to be of any value to app developers (for example, 20 varieties of almonds in the FAO dataset) or coded in units that don't address the question of wastage directly (for example: Data on food availability mentions calories which is useless for the end user). As app developers we needed information that is directly relatable to everyday user experience like quantity in pieces or pounds and what it means in terms of wastage.

The data is also not correct because the method of collection of the data is inherently inaccurate. There is no unified supply chain management tool that keeps track of food from farmer to the consumer. Thus a lot of the data is estimated and this estimation is often influenced by the vested interest of the parties involved in the estimation. For example: Two separate reports on Orange plantation give vastly different estimates on how many oranges can be grown on an orange tree (ranging from 300 to 1200) based on planation strategy

or crop pattern. An environmentalist might pick the worst case scenario to show maximum wastage while a producer might pick the best case scenario to show minimum impact. Across most produce categories, there are often such number games where the estimates given by industry tend to be different from that of an activist or a farmer.

Keeping in mind such factors related to food waste data, we felt that a more appropriate goal for the project will be engage the user at an actionable level. We first draw an aggregate level picture and engage the audience in a narrative that shows them the entire supply chain. Some techniques we are using to achieve this are: Interactive scrolling, CSS Animations, Illustrations and Data Simulations. We also extend the idea of the narration and build a small interactive element to connect an everyday action of the user to the global picture of food waste. We hope that this would create a compelling enough narrative for the user to engage with the problem, reflect and subsequently take a step forward in the right direction.

References

Research (Papers, Articles, Related Work):
[1] The World Consumes More Than 11 Million Pounds Of Food Every Minute Of Everyday
   http://www.huffingtonpost.com/2014/03/18/world-food-consumption_n_4978947.html
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   a. http://www.wri.org/sites/default/files/reducing_food_loss_and_waste.pdf
[3] A Food Waste Story: http://zumvo.so/watch-just-eat-it-a-food-waste-story-2014-7440
[4] http://www.unep.org/newscentre/videos/shortfilms/MASTER99.mp4
[5] Story of Stuff: http://storyofstuff.org/movies/
[6] Horizontal Scrolling Example
   a. http://iimc-carpediem.com/2016alpha/#!/
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   a. http://www.endfoodwastenow.org/
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[9] Lundqvist, J., de Fraiture, C., & Molden, D. (2008). Saving water: from field to fork: curbing losses and wastage in the food chain.
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[11] USDA and FAO reports - Toolkit: reducing food wastage footprint, Food waste footprint: Impact on natural resources
[12] http://www.treeplantation.com/citrus-trees.html
[13] http://faitc.org/
[14] Taste the waste: https://www.youtube.com/watch?v=Ci0HsPELE2o
[15] Food Waste Journalism: https://www.youtube.com/watch?v=i8xwLWb0lLY
[16] TEDx Talk : https://www.youtube.com/watch?v=w96osGZaS74

Data Sources

[DS1]   World Data Atlas http://knoema.com/atlas/topics/Food-Security

[DS2]   FAOSTAT: http://faostat3.fao.org/download/FB/FBS/E

[DS3]   Statista.com

[DS4]   LAFA - Loss adjusted food availability