

Allocation of Food to Food Banks

- A network of Food Banks learned to feed more people by embracing the free market..

Canice Prendergast

(presented by Nidhi Shah)

Food Supply and Demand

Needy people



Local food distributors



Regional Food Banks



Large Not-for-profit organization



Food Suppliers

Food Manufacturers



Food Distributors



Feeding America

- Third largest Not-for-profit organization
- Previous name - America's Second Harvest
- Mission: *"To feed America's hungry through a nationwide network of member food banks"*
- Source donations from - large food manufacturers, distributors and also smaller grocery stores
- Facilitates two types of donations:
 - Mediating donations from a particular donor to a particular food bank - (Called Blue pounds) 
 - Many donors give directly to Feeding America, who then allocates to food banks - (Called Yellow pounds) 
- Should ensure -
 - Food ends up with whose need is greatest
 - Taking transportation costs, spoilage and storage issues into account

Challenges

Note that, the difficulty is not in estimating a measure of aggregate need in a “service area”. Data on population residing, income levels and usage of food pantries and soup kitchen can reflect reasonably well aggregate food needs.

- Food Banks receive 20% food from Feeding America, rest 80% - Feeding America knows nothing about
- Transitory variation (eg. got eggs from local produce, won't need eggs FA is offering that week)
- “Food richness” (food banks having close ties with local manufacturers/distributors)
- Regional Diets vary - causing variation in demands
- Some foods are more valuable than others to food banks (e.g. frozen meat vs. potato chips)
- How to trade-off quantity vs. quality in allocations

How to solve this allocation problem?

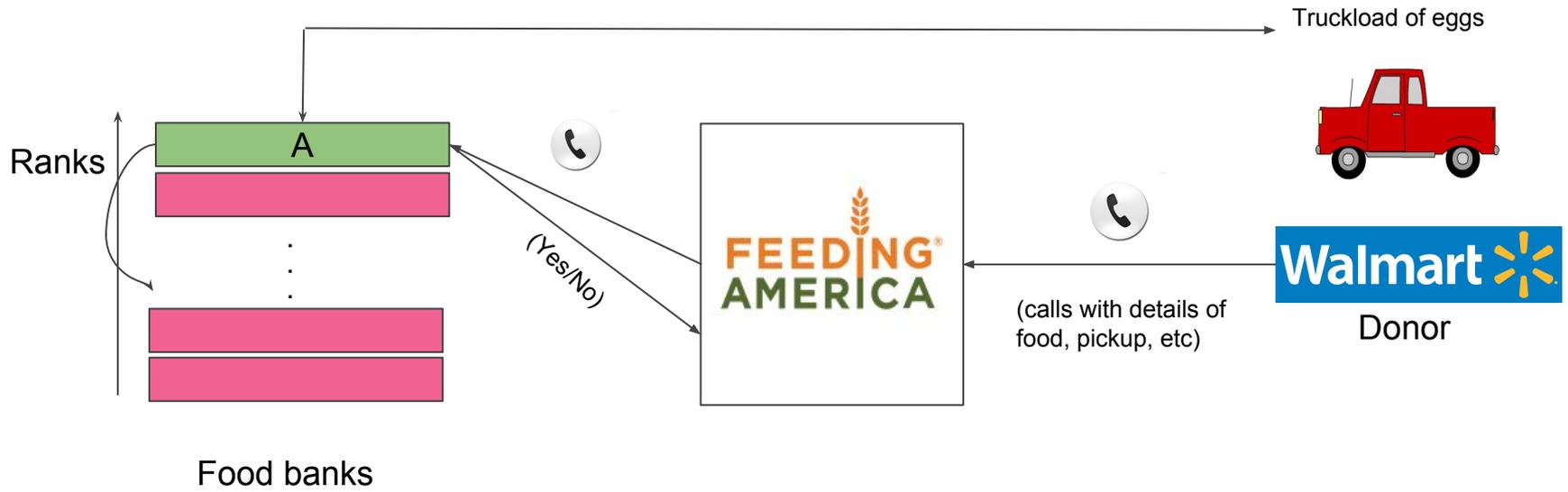
1. Incorporating idiosyncratic food bank demand factors
2. Areas with greatest needs receive the most food

Feeding America's pre-2005 setup

- Centralized assignment of food
- On assignment of a load from donor, feeding America calls a food bank (next in-line) with details such as pick up date, donor address etc.
- Food bank can either accept or deny donation
- Food banks are liable for transportation costs
- Fresh produce is typically offered to the nearest food bank to the donor because of spoilage issues.
- Which food bank is next in-line for new load is decided by a metric of need called goal factors

Feeding America's pre-2005 setup

- *Goal Factor* is a weighted measure of
 1. Relative poverty of food bank's service area compared to the nation
 2. Relative population of food bank's service area
- "Goal Pounds" - total number of pounds of food that a food bank should receive
- Ranking - food banks ranked on goal pounds relative to pounds received i.e. a food bank who is furthest below its goal pounds will be ranked highest
- Food is offered to one with the highest rank
- "pounds offered" gets counted towards pounds received instead of "pounds delivered"



Drawbacks of centralized assignment

- “Pounds offered” considered over “pound delivered” 
- Misallocation - Some food banks always got undesirable load (e.g. Idaho bank was offered potatoes even when it had warehouse full of them)
- No demands at food bank side indicators involved in allocation process
- Assignment system treats all food equally (potato chips vs meat)
- Food that spoils and goes to trash - (e.g. not enough storage facilities at small food banks when assigned the whole truck load)
- Feeding America turns down donations when it feels it cannot place them..Less food for hungry people 

Is pricing a solution?

- In 2004, 14 people including Canice Prendergast came together to evaluate and improve allocation mechanism
- There were four academics from Univ. of Chicago, three from senior staff at Feeding America and rest were directors of member food banks
- To incorporate unknown food bank preferences and constraints - consumer choice i.e. “willingness to pay” can solve the problem
- Through some mechanism, budget needs to be created for consumer choice to be informative
- Food banks with greatest need must have the biggest budget. How to ensure that???
- Centralized allocation fails to incorporate food banks demands, while Pricing with real money fails to offer budgets based on needs

Funny Money - *Shares*

Working of The Choice System

1. Shares can be used to bid only on “Yellow pounds”
2. Shares can not be traded for real money or for anything other than auction market
3. Shares are initially allocated to food banks based on its *goal factors* - neediest receives highest budget
4. There is a website where feeding America posts all the donations offers it has received with details like pickup location, pickup date, etc)
5. Food banks uses its shares to bid on any offering lot that they wished and could afford
6. Winner of auction is the highest bidder and it pays the price of highest bid. That number of shares get subtracted from their budget
7. Any items that did not sell would be carried over next day for more bidding
8. All shares that were spent on a given day are re-distributed at midnight (rebalancing using goal factors)

“I am a socialist. That’s why I run food bank. I don’t believe in markets.”

- John Arnold, West Michigan food bank

In committee discussions, the concerns were not about who got how many shares, but rather other potential inequalities could result in a playing field which might favor some food banks over others

Bidding and Prices

- **Bidding:**
 - Occurs twice a day (noon and 4pm) with sealed bids
 - Winner pays #shares as per winning bid
 - All food for each bidding cycle is posted at least 2 hours before
 - Helps small food banks who may not have manpower to be online for continuous bidding
- **Joint Bidding:**
 - Food banks can bid jointly on items by choosing fractional bids and pay accordingly if they win
 - Helps small food banks when they cannot take whole offered share
- **Delegated bidding:**
 - Food banks can delegate bidding to Feeding America by explaining their needs, Feeding America bids on their behalf
 - Helps small food banks who may not have infrastructure to have computers or internet connection

Bidding and Prices

- **Credit:**
 - Food banks with greatest needs can access credit.
 - They can increase their balance to estimated cost of highly desired item
 - There is no interest rate on these debts
 - Future credits cannot be attained until debts are paid
 - Helps small food banks to compete against larger food bank when highly desirable but rare item shows up in listing
- **Clusters:**
 - Some food banks have chosen to join together for allocation processes. They continue to bid as clusters

Hard-To-Move Product and Negative prices

- Allows negative prices for goods from second day, if they did not sell on first day.
 - On the first day of offering, lowest bid possible was 0
 - From second day, good is assigned to the food bank that offers the smallest number of negative shares
 - On winning such bid, food bank gets “bonus shares”, where shares gets credited for buying that “hard-to-move” product
 - Offering “bonus shares” created win-win situation for both - Feeding America can maintain donor relations, and Food banks earn shares for buying food!
- Again, this feature of not giving negative shares on first day was offered to help “small food banks”. If they did not check offers everyday, they might miss an opportunity to get bonus shares.

Maroon Pounds

- Maroon Pounds are foods that are added on auction market by food banks
- This happens when -
 - A food bank already has some food, perhaps from other source for which it may not be the highest value user
 - Sometimes, food banks already has something, but wants something else. (e.g. some food bank may want quantity over quality, sells high value fish for larger supply of pasta)
 - Food bank has food that will spoil before it could use it
- Ability to resell food may make a food bank accept donation when they cannot use themselves, but someone else can
- Maroon pounds are not eligible for bonus shares
- They are taxed - 10%. What it implied was, if a food bank is putting food onto market, they probably had more than enough for themselves. Imposing tax in some way was leveling “food rich” food bank’s budget.

System Rollout

Technology:

- Before it went live, food banks had played a demonstration version for over 3 months and were familiar with it
- Bidding continues to occur online in a simple and timely fashion
- Technology has allowed food banks to search based on geographical location or specific food/category
- Simple click also reveals history of prices of similar items - guides food banks in not overbidding any item
- Results of bidding are emailed within 5 mins of closing of the market

Convincing Food Banks Directors:

- This work was done by staff members at Feeding America and directors in the committee.
- John Arnold went from being its chief skeptic to one of its most enthusiastic users and supporter!



Outcomes

- **Engagement:** All food banks quickly engaged in the bidding process. Within first 7 months, 97% food banks won at least one load
- No food bank chose to delegate bidding to Feeding America except on temporary basis (e.g. director is out of town)
- **Transparency:** Everyone has fair chance to bid on anything they like, no favoritism!
- The “**Little guys**”: There is general acceptance now that smaller food banks have done especially well from the changeover. Much of this was possible because of Joint bidding and credit shares
- Increase in food quantity in the market - #pounds of food on the system rose by 50 million in first seven months!
- From 2006 to 2012, 15 million on avg. maroon pounds were sold

There aren't any robust methods to estimate merits of choice system. But, staff at Feeding America and all member food banks speak very well of the new system. That in itself, speaks a lot!



Thank you