



Food Waste Measurement

Multi stakeholder conference, Berlin

5/31/2017

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REFRESH is funded by the Horizon 2020 Framework Programme of the European Union under Grant Agreement no. 641933. The contents of this document are the sole responsibility of REFRESH and can in no way be taken to reflect the views of the European Union



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For quality of life



Food waste measurement

- 🥬 Measurement and monitoring is a main challenge
- 🥬 FUSIONS and World Resources Institute (WRI): Harmonized definition
- 🥬 Focus here:
In-home Household Food Waste



How can we measure food waste?

Papers, reports, expert interviews:

- 🥬 Food waste diary
- 🥬 Self-reports (survey)
- 🥬 In-home observation
- 🥬 Waste composition analysis
- 🥬 Self-collection (kitchen caddies)



Evaluation criteria

- 🥦 Degree of bias in estimates
- 🥦 Effort required of participants
- 🥦 Effort and cost for researcher
- 🥦 Ability to provide information at a detailed level (food type, stages)



Diary

- Commonly used
- Participants report amount, type, reason of food waste



- Increases awareness
 - Behaviour change
- Effortful (pps & researcher)
 - Tapering of enthusiasm
 - Risk of self-selection

Geef per product het gewicht in grammen, in welke fase u het weggegoede product valt. Als u iets niet in de afvalbak gooit maar b.v. iets aan huisdieren geeft. En vul in dat u het niet in de afvalbak gooit.

Datum	Gewicht (in gram)	Fase (nummer)	Categorie (nummer)	Heeft normaal geconsumeerd
Maandag 13 juni				
Maandag 13 juni				
Maandag 13 juni				
Maandag 13 juni				
Maandag 13 juni				
Maandag 13 juni				
Maandag 13 juni				



Self-report

- Proportional (%) or non-proportional (amount / frequency)
- Easy for participants
- Low costs for researcher
- Draw upon memory
- Social desirable answering
- Experts think it is not accurate



In-home observation

- 🥬 Video-recording, trashcan camera and/or automatic electronic weighing in trashcan
- 🥬 Time, money, effort limitations
- 🥬 Privacy concerns



Waste composition analysis

- 🍆 Food waste is collected, separated, weighed, and categorized
- 🍆 Specific knowledge required
- 🍆 Costly and time-consuming for researcher
- 🍆 Less bias vs. underestimation due to neglect of liquids and composting
- 🍆 No possibility to differentiate phases



Kitchen caddy

- Self-collection of in-home food waste
- Less experience with this method
- Effortful for researcher and pps
- Experts generally positive





Coding photographs

- 🥬 Consumers make photos and hand these to researcher
- 🥬 Experts are sceptical
- 🥬 Coders are uncertain

Let's see...



Photo study



- 🥦 Before bothering participants, let's see if it makes sense
- 🥦 "Ideal" conditions
 - 🥕 104 constructed photos
 - 🥕 Varying in category, volume, density, container size
 - 🥕 Clear photos (placemat), correct weights, online resources
 - 🥕 Two coders



Results



- 🥦 Coded and actual weight: strong correlation (.93)
- 🥦 Lower accuracy for
 - 🥔 Large volumes
 - 🥔 Differences in density
- 🥦 Photo coding has potential

Note: ideal circumstances



Comparing measurement methods

Survey

-  General questions on overall food waste
-  Amount wasted in the past week

Diary

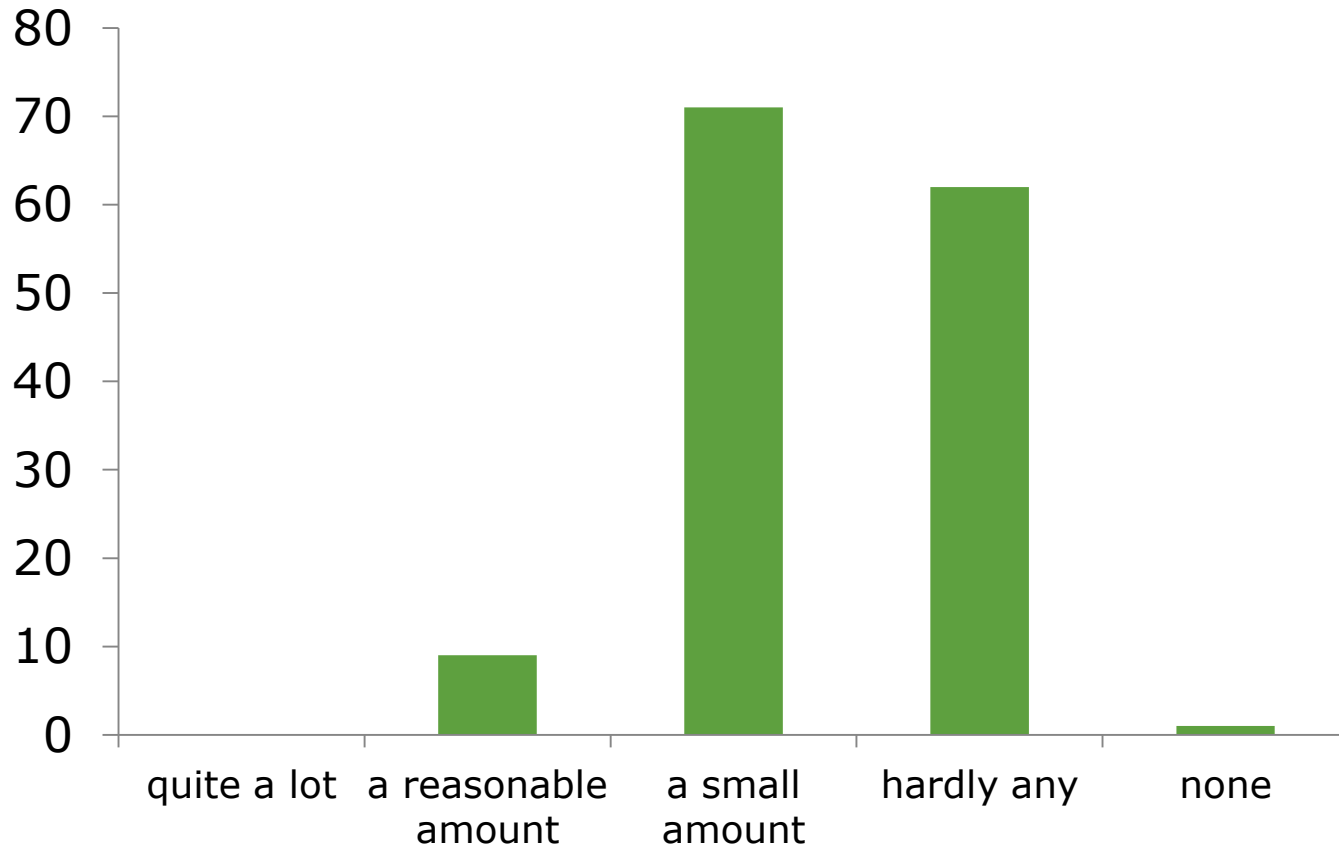
Kitchen caddy

Photographs

143 Dutch households



Results – Survey: overall waste





Is there really little variance?

- 🥦 Survey (discarded in the past week)
 - 🥔 638.5 grams on average
 - 🥔 Range between 0 and 4170 grams

- 🥦 Diary
 - 🥔 1122 grams on average
 - 🥔 Range between 14 and 7213 grams



Survey: the general questions

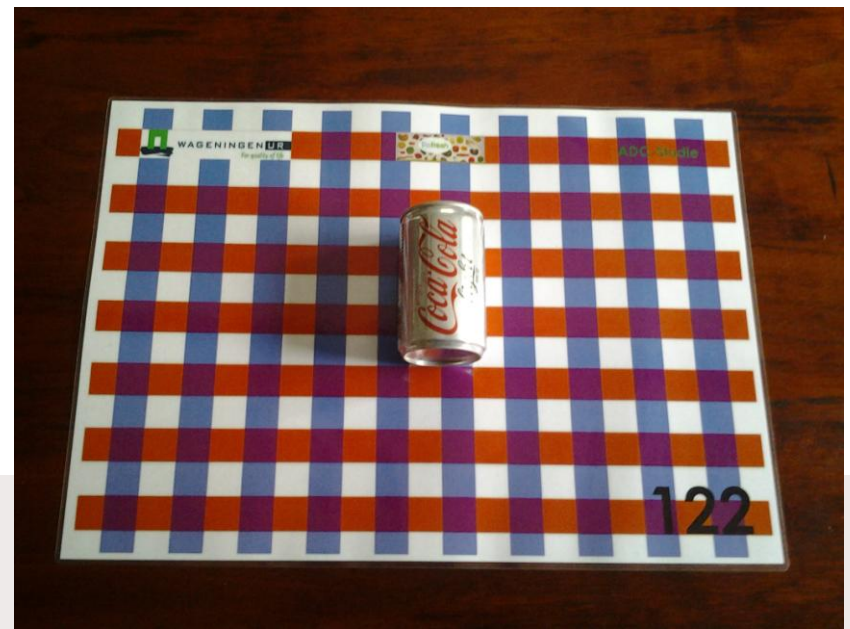
General questions on amount, frequency, proportion

- 🥔 Low levels of reported waste
- 🥔 Low variance in reported waste across households
- 🥔 Weakly related to other measures



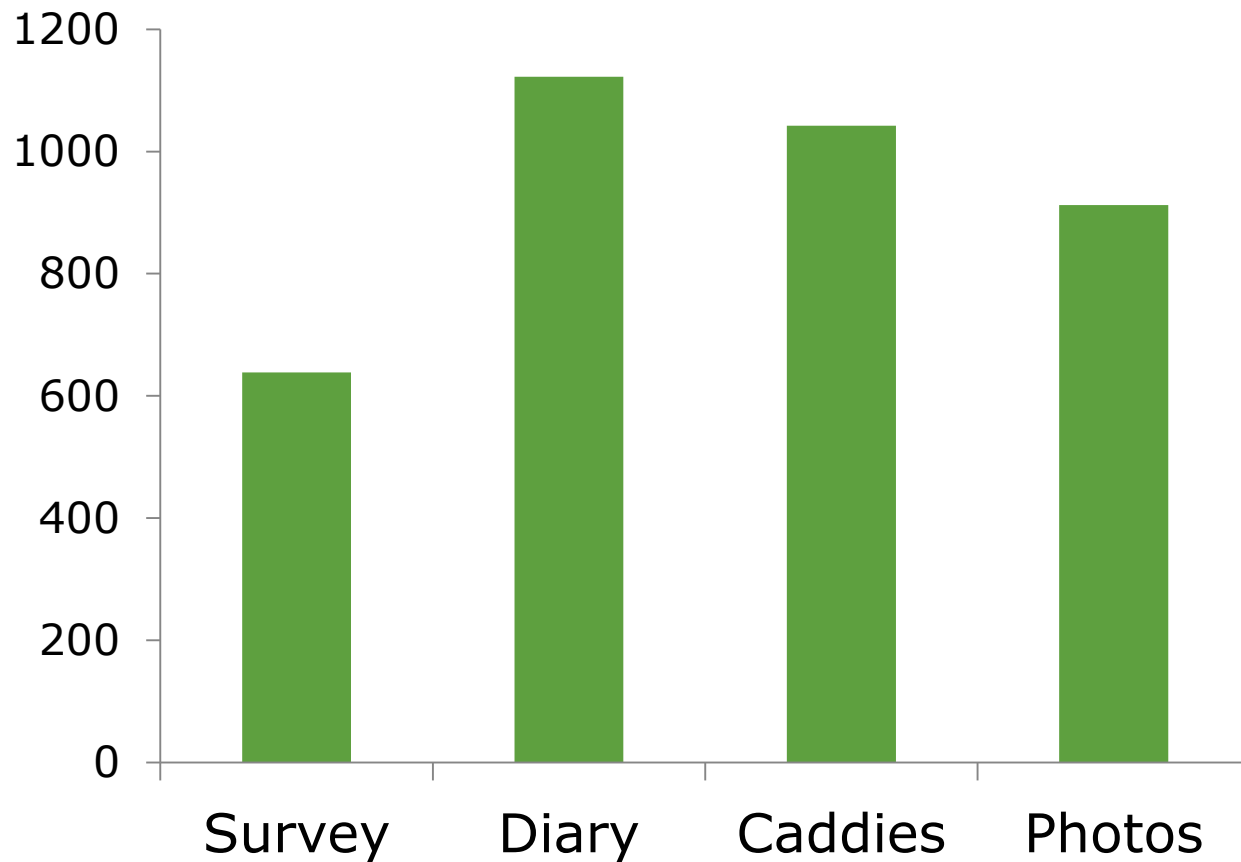
Photos

- 🥦 Good intercoder reliability ($r = .73$)
- 🥦 Difficulties in coding some of the photos





How much is wasted (grams per week per household)





Method comparison

Method	Conclusion
Survey: overall	Not very useful
Diary	Highest reported waste levels Good correlation with caddy, photo, week survey
Survey: week	Lowest reported waste levels (underreporting) Good correlation with diary (.71)
Photos	Takes time & effort Good correlation with diary (.79)
Kitchen caddies	Differences across households in amount / proportion not thrown in the bin High correlation with diary (.86)



Conclusion

- High correspondence across weeks for all measures
- Week-based survey measure seems appropriate, especially in large samples
 - Systematic underreporting
- Kitchen caddies and photo coding are good alternatives in smaller samples
- Self-reports on amount, frequency, or proportion of food waste in general are not advisable



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Best practice measurement

- 🥦 Pre-announcement
- 🥦 Tick product categories in which food waste occurred in the past week
- 🥦 For each category that is ticked:
 - 🥔 Amount (in appropriate units: serving spoons, pieces, portions, etc)
 - 🥔 Phase (completely unused, partly used, meal leftover, leftover after storing)
 - 🥔 With explanation related to the category
- 🥦 Calculation into grams