

New Data Efforts

FAO Workshop on: Monitoring SDG 12.3.1 Global Food Loss Index

April 26-27 2018



Food and Agriculture
Organization of the
United Nations



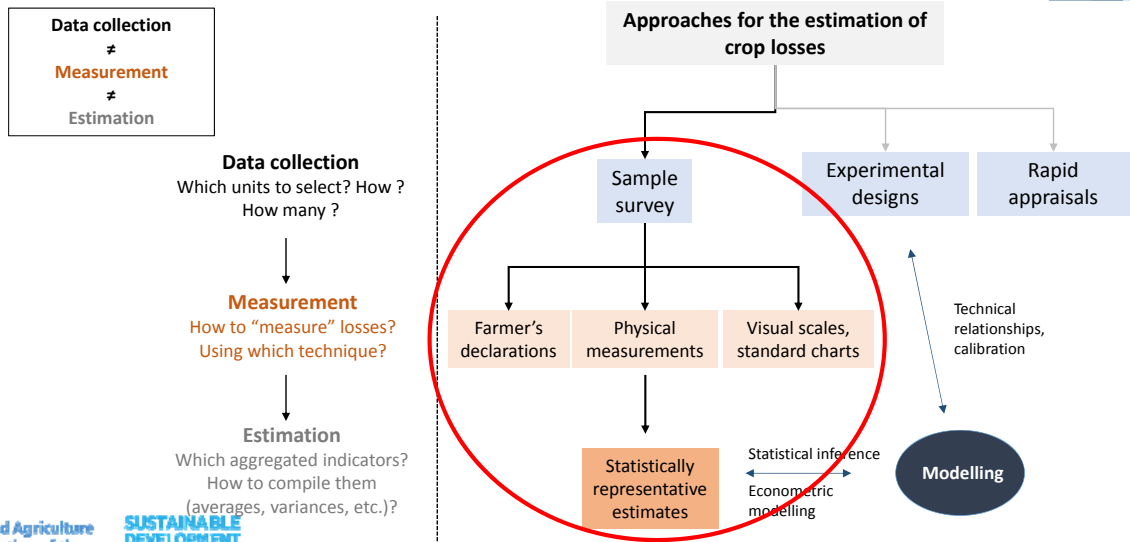
Presenters:

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FAO Statistics Division

Outline

- New Data Collection: Surveys
 - Importance of administrative data
 - Sampling frames and representativeness
 - What to do if there are different types of sampling for each instrument
 - Using Sample Weights to get to a National Number
 - Guidelines for measurement
- New Data Collection:
 - Experimental Designs
 - Modeling (briefly)

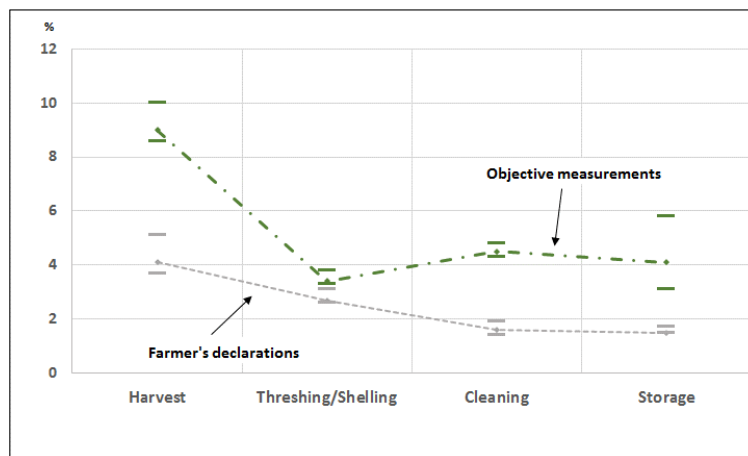
Guidelines for tools to use in new data collection



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Measurement methods: objective vs subjective

4



Farmer's declarations < Objective measurements

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Guidelines on Measurement

- Grains & Pulses; Fruits & Vegetables; Milk and Meat Products; Fish and Fish Products



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Supply Chain coverage by the Guidelines

6



- Nationally Representative Loss Estimates
- Where does the information come from
 - How to think about layering information to keep this cost-effective
 - **Cost-effective measurement guidelines**



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Guidelines on the measurement of harvest and postharvest losses

7

Grains

Published and tested



Draft Annexes on Fruits and Vegetables, Milk and Meat, Fish and products



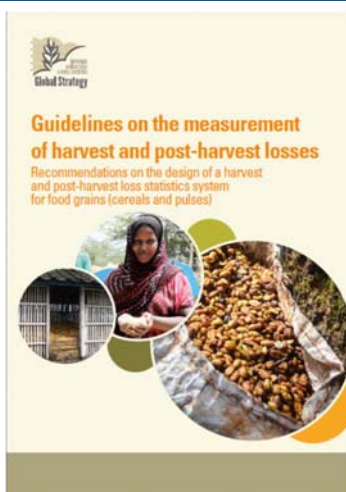
- All along the supply chain
- No one-size-fits all (surveys, administrative data, experimental design)
- Integrated in the national statistics systems
- Partnerships with the private sector
- Strategic documents on integrating sources will be added



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Global Strategy Guidelines for Grains

8



The guidelines and on-line training are now available on the Global Strategy website, www.gsars.org

Training Course on Post-Harvest Losses – English



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Guidelines for Other Products

9

- Joint FAO project with ICAR-Indian Agricultural Statistics Research Institute (ICAR-IASRI)
- Includes how to do sampling for all the stages: On- and Off- Farm markets, including in Transportation, Storage, Packaging and Wholesale (and Retail)
- Includes definitions, boundaries, delineation of a basic supply chain, sampling framework (including sample units, strata, weighting methods) and basic questionnaires to build on to with the rapid assessment



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Guidelines for Other Products

10

- Each commodity is different in terms of market structure and how sampling will need to be stratified.
- For example, meat has a geographic sampling unit that is more relevant than potentially what can be gained by delineating by village
- Some stages may not be relevant for each commodity

Grains (cereals and pulses)
Fruits and Vegetables
Orchards/Tree crops
Horticulture Crops
Animal and Animal products
Milk
Meat (at the point of slaughter)
Eggs
Fish and Fish Products
Aquaculture and Open Water Fisheries



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Data collection frequency – in country

11

- PHL : Baseline survey for 2-3 Years
- Survey frequency: every 3-5 Years
- Incorporating lower level data in the in-between years
 - Causal factors and explanatory variables to estimate losses with models



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Pilots on the Measurement Guidelines

12

- Need to use a base set of questions
 - Tailoring in options needs to be done for relevance in the country
 - Include sections on different types of operations (harvest, storage, transport, market)
 - Expansion to relevant stages for the country
 - Causes that are useful to track widely
- Capacity Building is needed
 - to make sure that the common definition of losses is applied
 - Losses are measured where they occur and causes are collected with the quantities (e.g. 6 tons of bananas were lost at the farm because the supplier sorted out the ones that couldn't be sold at the farm)
 - Address different types of complexities in the value chain and how/where to collect the information
- Secondary data maybe needed
 - In the survey we have dates and GPS – which means that weather can be added later
 - Pre-arrangement with some farms may improve outcomes



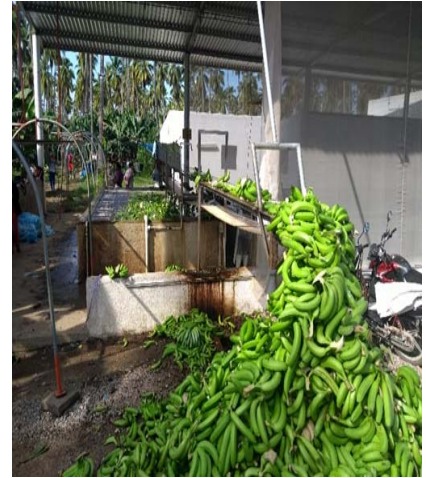
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Pilots on the Measurement Guidelines

- Recommend to use CAPI
 - Allows for logical validations
 - Skips unnecessary sections
 - Quicker results and GPS capabilities

Questionnaire application times from the pilot on Fruits and Vegetables

- Survey to producers (without actual measurement), average 10 to 15 minutes.
- Survey with actual measurement to producers, average 1 hour.
- Cold warehouses and wholesalers, average 2 hours, includes actual measurement.
- Retailers average 15 minutes only with survey and 30 with actual measurement.



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Food Loss Measurement challenge –country differences

Storage



Transport

Waste?

Losses



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Recommendations by stage



Guidelines prescriptions – At Harvest

- Harvest losses - Crop-cutting surveys
 - Different yield, different definition of production
- Questions are included to measure what is mature and left in the field
 - Measured and inquiry based
 - Data can be included outside of the Agricultural Production Questionnaires
- For relevant Commodities, questions on conversion factors are also included (e.g. livestock to meat ratios)



Guidelines prescriptions – Farm level

17

- Post-harvest losses – Sample surveys
 - Relevant when there are very many small actors
 - May cover on-farm storage, on farm transportation
 - Can be complemented by experimental design or two-stage sampling on farm practices
 - Cover all activities after the commodity is harvested on-farm
 - Sorting and Grading
 - Storage
 - Transport, etc.
- Post-harvest losses – complete enumeration
 - Large commercial farms that keep accounting records (few)



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Guidelines prescriptions – Storage level

18

Losses and quantities stored:

- Model or experimental design
 - Inventory of storage facilities with their characteristics
 - Controlled experiment of the various products, length and storage conditions
- Business records data
 - Very large storage facilities
 - Accurate accounts and records
- Farm sample survey
 - Smallholder farms (large population, small quantities)

Auxiliary data - Administrative data

- Weather at harvest
- Monthly Prices



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Guidelines prescriptions – transport

19

- Sample survey of the trucks: Losses and quantities
 - Measuring a sample of product at destination
 - Consider indirect sampling
- Partnership with the transport companies
- Will be tested in the guidelines for horticulture crops
 - Pilot countries?



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Guidelines prescriptions – Wholesale markets

20

- Agreement with the private sector
 - Quantities sold through the market, discarded product
- Sample or retailers in the wholesale markets
- Will be tested in the guidelines



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Guidelines prescriptions - Processing

21

- Agreement with the private sector
 - Companies accounting records
 - Complete enumeration or experimental design or sample survey



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Open issues

22

- Accounting for conversion factors during processing:
 - Partnership with the private sector (formal businesses)
 - Sample survey in informal businesses (oil crushing)
- Accounting for weight loss of moisture content:
 - Treated in the guidelines
- Compiling loss percentages of imported & export goods
 - Entry point: wholesale market
 - Need clarification on how to incorporate imported goods in the denominator

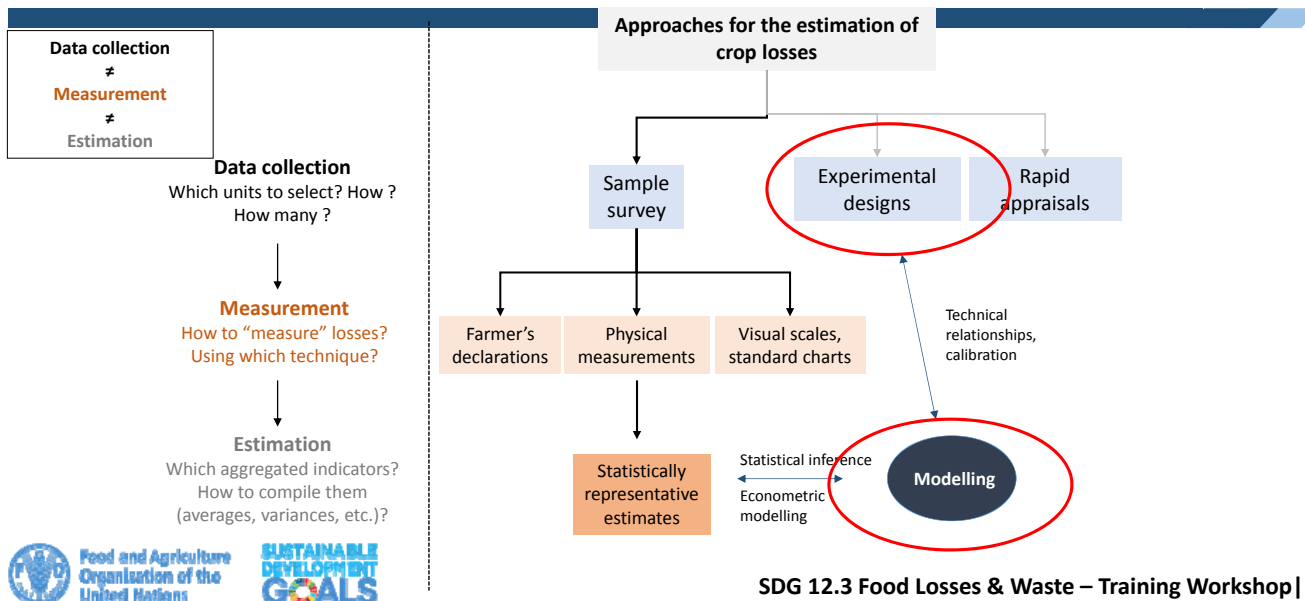


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Other Tools for Estimation

Experimental Design
Modeling

Guidelines for tools to use in data collection



Experimental Designs

25

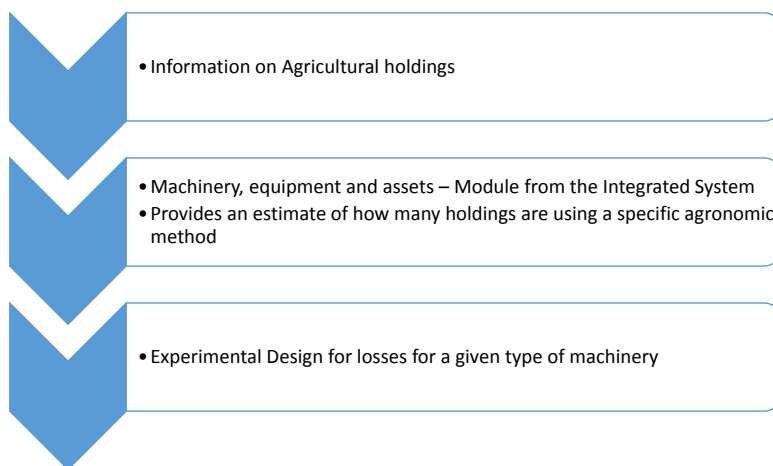
- Used to compare the losses occurring with traditional and improved agronomic practices
- May be conducted for:
 - Equipment testing
 - Storage simulation at research stations
 - Evaluation of post-production practices effects on the level of losses at farm level
- Very important to pay attention to have the basic structure of an experiment:
 - The treatments included in the study
 - The experimental units included in the study
 - The rules and procedures used to assign treatments to experimental units (or vice versa)
 - The measurements made on the experimental units after treatments have been administered



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Administrative Data & Experimental Designs

26



Specific examples can be found in the Global Strategy **Guidelines on the measurement of post-production losses**



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Representability and Scalability

27

- One of the key areas is how to move from survey estimates, field trials/experimental designs to national numbers
 - In the case of survey estimates, how the survey frame was constructed will give the appropriate weights to multiply estimates by the statistical units up to the higher level estimates.
 - Assess the appropriate selection of sampling units based on stage and the strata defined by the administrative data and objectives of the instrument.
 - In the case of experimental designs (e.g. manual harvest vs. mechanical) will depend on the administrative data available on how many firms/actors are using that farm/stage practice.
 - Links to administrative data



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Modelling approach

28

- Model-based estimates are the second best for estimating food losses at the national level.
- Estimation models can be used in missing years, to add detail or add scope
- Models can explore other loss dimensions; water foot print, carbon foot print, economic losses, qualitative losses, etc.
- The advantage is that models can use all available information from any source

(Model based approach will be discussed more in depth in the second day)



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Modelling approach

29

- Country-specific models developed by FAO can be turned into national models (where data is available) with some technical assistance
 - Improve the predictive power of the independent variables by selecting an appropriate set of variables at the supply stage connected to policies and preliminary findings (e.g. focusing on road quality indicators and petrol prices if transport losses are significant)
- Models can be used to estimate losses at the different stages or at the national level, but much of the capability depends
 - on what data exists,
 - at what scale
 - and for what time period.



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Modelling approach

30

- Data Resolution and Integration - Levels of Modeling
 - National
 - Stage of value chain
 - Strata within stages
- Representability/Causes/Correlation with losses
- Types of data collected/needed
 - Disaggregation/Aggregation
 - Appropriate Model Selection (Parameterized Models, ANOVA, Ordinary Least Squares)



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