Food and Agriculture Organization
of the United Nations

Food Balance Sheets

FBS component: Tourist Food

2017

Learning Objectives

At the end of this session, the audience will know:

a) Different data sources for tourist food

b) Recommended approach for estimating tourist food

Outline

1. Introduction (Concepts and Definitions)
2. Data sources
3. Imputation and Estimation

1. Introduction

DEFINITIONS

Tourist Food = food that is consumed by non-resident visitors to a given country during the course of their stay.

- This variable is expressed in **net terms** in the FBS (= consumption of incoming tourists minus consumption of residents as tourists in other countries).

- Countries with negligible numbers of visitors may choose not to estimate Tourist Food as a separate FBS component (and Tourist Food can be captured in other residual uses).

1. Introduction

Why tourist food as separate category?

- Estimating Tourist Food independently is encouraged for two reasons.

1. It is possible to more specifically account for Tourist Food in their food balance sheets, as data on tourist arrivals is widely accessible

2. For some countries (particularly Small Island States) large quantities of tourists relative to the resident population have the potential to substantially alter the balance sheet landscape.

1. Introduction

NOTE THAT:

- Estimating tourist food should be done in *net* terms.
  - days that a country's residents spend abroad should not be counted in domestic food availability.
- Net tourist food is calculated as [amount of food available to inbound visitors] – [food that would otherwise be available to a country's outbound travelers]
  - input data for the imputation: numbers of visitors, visit lengths, and the amount of calories historically available in the home and destination countries.
- How temporary migrants populations are classified ?
  - if an FBS compiling country's outgoing migrants are counted as part of the resident population in their country of origin, then the number of visitor-days spent outside the country should be subtracted from tourist food,
  - but if outgoing migrants are counted as non-residents in their country of origin, then any days they spend back in their country of origin should be added to tourist food.

2. Data Sources

Official data sources

a) Immigration authorities

a) National tourism offices → should publish the most detailed information available on visitor arrivals and departures:

- data differentiated by country of origin,
- numbers of both day visitors and overnight visitors,
- the average length of stay for overnight visitors.

c) Surveys on tourist food consumption patterns.

2. Data Sources

Alternative data sources

a) Reports from the UN World Tourism Organization (UNWTO)

http://www.e-unwto.org/toc/unwtotfb/current.

- This organization compiles and publishes member country-provided data on the number of visitors, average length of stay, and country of origin, as well as estimates on outbound tourism.

a) Industry groups and/or resort areas

3. Imputation and estimation

NOTE THAT:

Net Tourist Food is the amount of food consumed by incoming tourists minus the amount of food that would have been consumed by residents had they been present in the country:

$$\begin{aligned} &NetTF \\ &= [\#Incoming\ visitor\ days * Daily\ food\ availability\ for\ visitors] \\ &- [\#Outgoing\ traveler\ days * Daily\ food\ availability\ for\ residents] \end{aligned}$$

For each commodity, this amount can be calculated by

- first multiplying the number of tourist days by the average amount of that commodity consumed daily,
- and then subtracting from this value the product of the number of outgoing tourist days and the average amount of that commodity consumed daily.

3. Imputation and estimation

ASSUMPTION:

Incoming visitors follow the consumption pattern of the local population, but they continue to expect the same overall amount of calorie availability as in their home country.

- This is done simply by scaling quantities of an individual commodity by the ratio of overall food availability in the two countries.

Example:

if food availability in Country A is 30% greater than in Country B, all quantities of food available for consumption for visitors from Country A to Country B would be scaled up by 30% when compared to food available for the local population.

NOTE THAT:

If country-level compilers cannot access data on visitor country-of-origin, but still wish to account for "Tourist Food" in their FBS, they can just assume that visitors experience the same food availability for each commodity as does a resident.

→ This approach may underestimate total "Tourist Food".

Appendix

Convention of the notation

Calculation of the number of tourist days, ***N***, for travelers originating from country ***l*** and visiting country ***j***:

$$\boldsymbol{N_{lj} = N_{Dlj} + N_{Olj} * \overline{D}}$$

Where:

N_{Dlj} = the number of day visitors from l to j

N_{Olj} = the number of overnight visitors from l to j

$\overline{D}$ = the average number of days an overnight visitor stayed

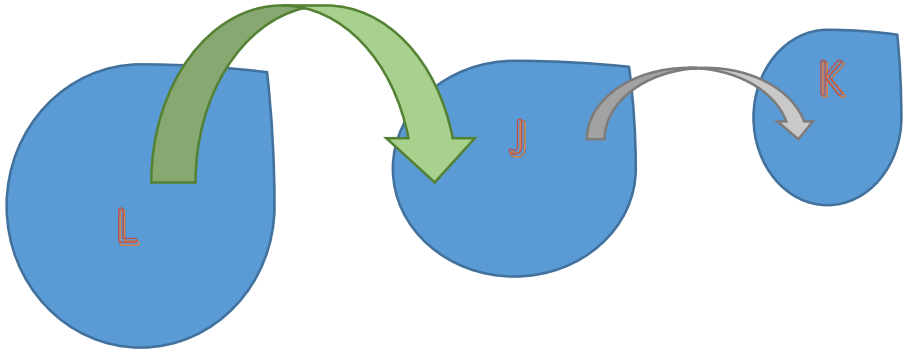
Appendix

Calculation: example

Goal: estimate net tourist food for country *j*.

- Every year, thousands of visitors travel from country *l* visit country *j*.
  - These flows are denoted as N_{lj} (green arrow).

- At the same time, hundreds of country *j*'s residents travel abroad as well to visit country *k*.
  - These flows can be denoted as N_{jk} (orange arrow).



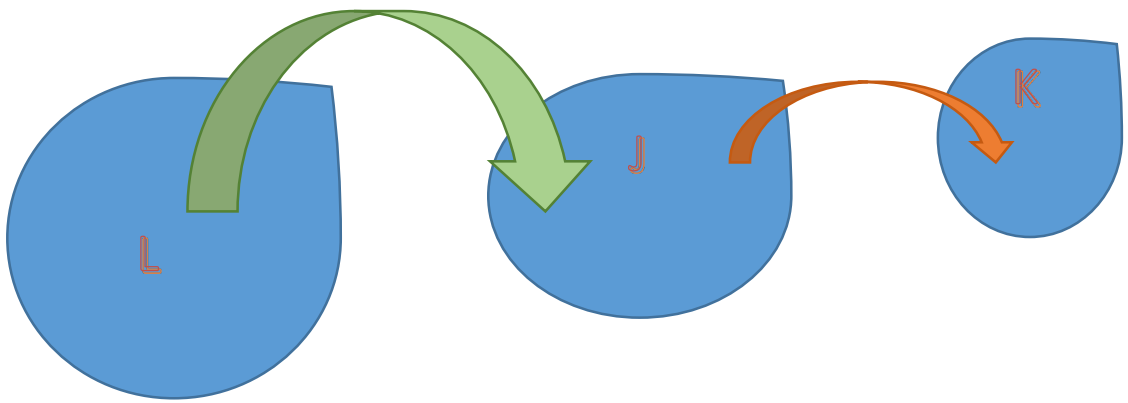
Appendix

Calculation: example

Goal: estimate net tourist food for country *j*.

Flow of tourists from country l visit country j, $\boldsymbol{N_{lj}}$

Flow of country j's residents travel to visit country k, $\boldsymbol{N_{jk}}$



How to calculate net tourism food in this three-country scenario?

Appendix

For any individual commodity ***i***, net Tourist Food for country ***j*** (NetTCij) is given by:

$$\boxed{\boldsymbol{NetTF_{ij} = Food_{ilj} - Food_{ijk}}}$$

Where:

$\boldsymbol{Food_{ilj}}$ = the amounts of food (in MT) consumed by tourists for incoming tourists

$\boldsymbol{Food_{ijk}}$ = the amounts of food (in MT) consumed by tourists for outgoing tourists

How to calculate $Food_{ilj}$ and $Food_{ijk}$?

3. Imputation and estimation

How to calculate $Food_{ilj}$ and $Food_{ijk}$?

- The amounts of food consumed by tourists in MT ($Food_{ilj}$ or $Food_{ijk}$) is calculated as the product of the amount of tourist-days *N* and the number of calories consumed daily, divided by the amount of calories per MT for commodity *I*

- But according to assumptions relative to incoming tourists ,formula of $Food_{ilj}$ or $Food_{ijk}$ differ

Imputation and estimation

Calculation of $Food_{ilj}$

Assumptions:

Tourists will eat local foods, but at a scale that accounts for their own typical daily caloric consumption

Tourists are limited in their food choices to what is on offer locally

Tourists are likely to consume the same overall amount of food that they would eat at home

3. Imputation and estimation

Calculation of $Food_{ilj}$

$$Food_{ilj} = \frac{\left[N_{lj} * \left(f_{ij} * \frac{\sum_i f_{il}}{\sum_i f_{ij}}\right)\right]}{\frac{cal_i}{MT}}$$

N_{lj} = the number of tourist-days for tourists traveling from country *l* to country *j*,

f_{ij} = the amount of calories of commodity *i* consumed in country *j*,

$\frac{\sum_i f_{il}}{\sum_i f_{ij}}$ = relative amount of total calories consumed historically in country *l* compared to country *j*,

$\frac{cal_i}{MT}$ = the number of calories contained in one MT of commodity *i.*

3. Imputation and estimation

Calculation of $Food_{ijk}$

- purpose of accounting for outbound tourists is to subtract what they would have eaten at home…not to detail exactly what they will eat while abroad
- No scaling factor $\frac{\sum_i f_{il}}{\sum_i f_{ij}}$

$$\boldsymbol{Food_{ijk} = \frac{(N_{jk} * f_{ij})}{\frac{cal_i}{MT}}}$$

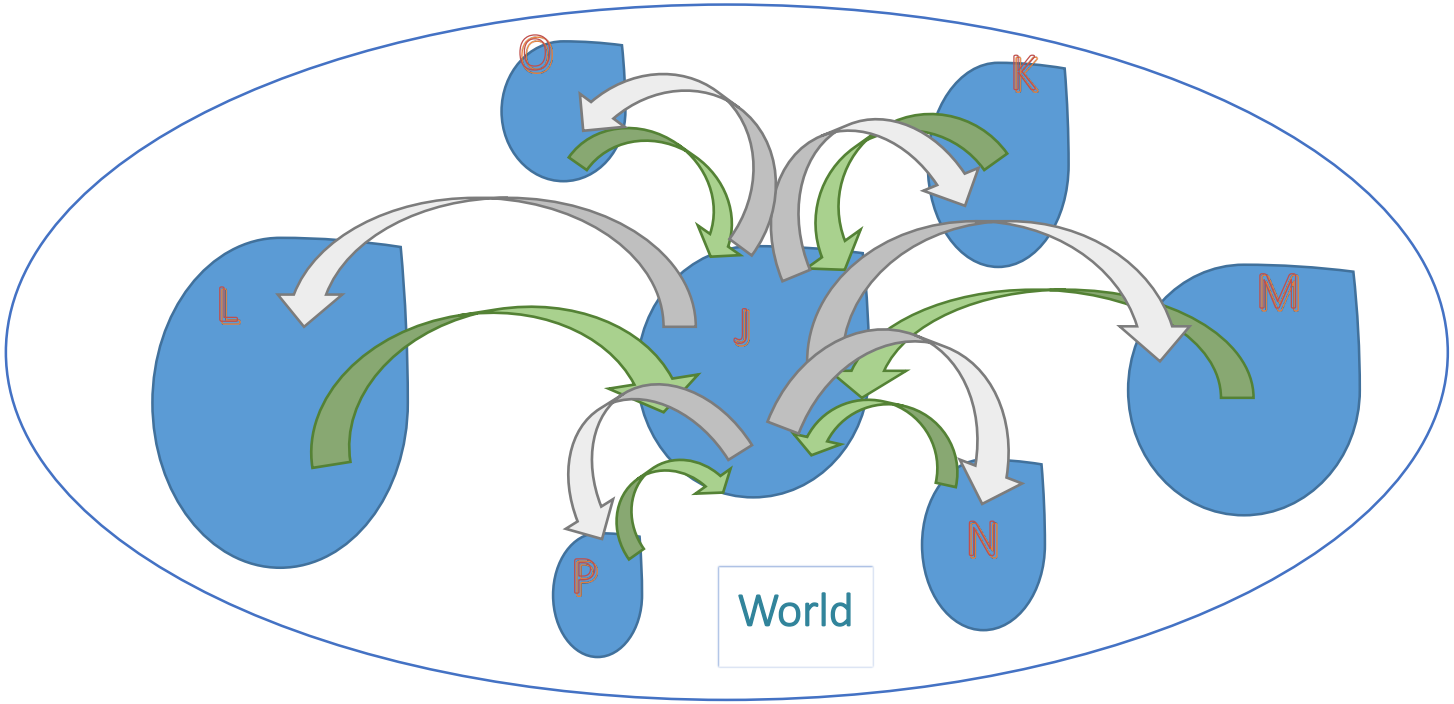
Njk = the number of tourist-days for country j's residents travel to visit country k,

fij = the amount of calories of commodity i consumed in country j,

$\frac{\mathrm{cal_i}}{\mathrm{MT}}$ = the number of calories contained in one MT of commodity i

3. Imputation and estimation

Comprehensive representation of net tourism flows for country J



3. Imputation and estimation

Net Tourist Food for country *j* (*NetTC*$_{ij}$) for any individual commodity *i*

$$\boxed{NetTF_{ij} = \frac{\sum_{l=1,l\neq j}^{x}\left[N_{lj} * \left(f_{ij} * \frac{\sum_i f_{il}}{\sum_i f_{ij}}\right)\right]}{\frac{cal_i}{MT}} - \frac{\left(\sum_{k=1,k\neq j}^{x} N_{jk}\right) * f_{ij}}{\frac{cal_i}{MT}}}$$

Food consumed by incoming tourists

Food consumed by outgoing tourists

3. Imputation and estimation

Exercise:

FBS compilers in country *j* are estimating inbound Tourist Food of beer of barley.

Let's assume that :

- country *j* is the relatively poorer country with daily DES of 2,000 kcal/cap/day ($\sum_i f_{ij}$), and
- country *l* is the wealthy country where DES ($\sum_i f_{il}$) is 3,500 kcal/cap/day.
- Tourists from Country *l* spend 50,000 tourist-days in country *j* in the reference period.
- In addition, in country *j*, daily consumption of beer of barley, *f*, is 25 kcal/cap/day, and
- consulting a calorie conversion table, they find that there are approximately 430 calories per kilogram of beer of barley—equivalent to 430,000 calories per MT of beer of barley.

Using this information, compute the daily calories of beer of barley consumed by tourists from country *l* to country *j* ?

3. Imputation and estimation

Correction : Calculation of $Food_{ilj}$

Formula

$$Food_{ilj} = \frac{\left[N_{lj} * \left(f_{ij} * \frac{\sum_i f_{il}}{\sum_i f_{ij}}\right)\right]}{\frac{cal_i}{MT}}$$

N_{lj} = the number of tourist-days for tourists traveling from country *l* to country *j*,

f_{ij} = the amount of calories of commodity *i* consumed in country *j*,

$\frac{\sum_i f_{il}}{\sum_i f_{ij}}$ = relative amount of total calories consumed historically in country *l* compared to country *j*,

$\frac{cal_i}{MT}$ = the number of calories contained in one MT of commodity *i.*

3. Imputation and estimation

Correction

- $\sum_i f_{ij}$ = 2,000 kcal/cap/day
- $\sum_i f_{il}$ = 3,500 kcal/cap/day.
- N_{lj} = 50,000
- f_{ij} = 25 kcal/cap/day
- $\frac{cal_i}{MT}$ = 430,000

- $$Food_{beerlj} = \frac{\left[N_{lj}*\left(f_{beerj}*\frac{\sum_i f_{il}}{\sum_i f_{ij}}\right)\right]}{\frac{cal_{beer}}{MT}}$$

- $$Food_{beerlj} = \frac{\left[50{,}000*\left(25*\frac{3500}{2000}\right)\right] calories}{430{,}000\,\frac{calories}{MT}}$$

-$Food_{beerlj}$ = **5.09 MT/Year**

References

Global Strategy to improve agricultural and rural statistics, 2017. *Handbook of Food Balance Sheet*, Rome, Italy, chapter 3.5, section 3.5.8

Thank You