## Food

The basic idea behind the Food Balance Sheets has always been to derive food as the balancing item between supply and all other forms of utilization. This is still a valid approach and FBS compilers are encouraged to continue this approach, as long as certain conditions are met. Initial estimates[[1]](#footnote-2) for food as a balancing item can still be produced for products where food use is the only or at least the only major form of utilization. This is the case, for instance, for meats or eggs. It is also the case, albeit to a lesser extent, for milk and dairy products. Even where products such as skim or whole milk powder (SMP/WMP) are used for feed, FBS compilers will often have access to reliable information on feed use of these products. This will still allow them to arrive at a reliable food use estimate as a balancing item. Second, where all other variables of a balance are measured (rather than imputed) and where this is done with great accuracy, food as a balancing item would also provide a good basis for a reliable food estimate.

However, obtaining reliable food estimates from balances where non-food uses play an important role and in particular where many variables are imputed, an estimate based on a balancing approach is unlikely to render reliable results. Given the fact that food as a balancing item will have to absorb all measurement errors, the resulting time series is likely to exhibit considerable fluctuations and would thus run counter to economic theory which suggests that consumers will try to smooth consumption, at least for the total food basket, and that they will adjust other forms of utilization such as stocks and feed use to achieve a smooth consumption path.

### Defining FBS food use

Food use, in the definition of the FAO food balance sheets, covers food *availability* up to the retail level for a given reference period, i.e. typically one calendar year. This means that the FBS food variable is equivalent to the amount of food available for consumption at the retail level, rather than the amount consumed. It is typically considerably higher than actual consumption; in fact it exceeds consumption through food waste and losses at the retail and household level, i.e. food that ends up as table scraps, pet food, or is simply thrown away.

The FBS food consumption variable refers to the food available to the resident population of a country. The estimates for population come from the United Nations Population Division (UNPD) and include, to the extent known, also migrants, guest workers and refugees. However, they do not include tourists. This means that food consumed by tourists, or rather, food available to them, should not be included in food consumption. In the past, an ad hoc allowance of food consumed by tourists was included in other uses. The new approach makes this more transparent, as it estimates this directly and presents it as a separate variable. The methodology applied to estimate food available to tourists is presented separately in this document.

### Estimates of food use

#### Harvesting and harnessing actual data

As for all FBS variables, estimates of food use should come from measured information. In the case of food, actual estimates are not only difficult to come by, but the empirically measured observations typically refer to a different definition. Most empirical estimates come from household surveys, and the majority of them come from household income and expenditure surveys (HIES). The information contained therein requires many steps of adjustment and even a comprehensive set of adjustments will not render a fully compatible definition. As the FBS cover all food disappearance in a country, they also include food consumption/disappearance in public households such as hospitals, prisons, the military, and so on. To make allowances for consumption in these entities is challenging, particularly when the adjustments go beyond the overall average levels, i.e. breaking consumption down for the more than 60 individual commodities contained in the FBS. If adjustments are made, they should include:

* Adjustment of the reporting period to a calendar year
* Adjustments of expenditures to quantities (applying appropriate prices)
* Intra-household distribution of consumption
* Inclusion, of food consumed in public/collective households such as hospitals, prisons, the military, schools, and so on.
* Inclusion, where necessary, of food consumed in non-collective households outside home, i.e. food consumed in restaurants, cafeterias, street food, etc.
* Adjustments for waste at the retail level

#### Information from food processors

FBS-compatible food consumption information may also be available from food processors, at least under certain circumstances. If, for instance, the flour milling industry of a country keeps a good record of total flour produced in a year and a given country (which is the case in many developed countries) and if the flour milling industry is the main source of flour production, this estimate can serve as a basis to estimate total flour produced in a country. Adding flour imports and deducting flour exports as well as stock changes then allows us to arrive at flour availability for food. As flour is only destined for food use, applying an appropriate extraction rate (also available from the flour milling industry) allows us to produce an accurate and FBS-consistent primary wheat food estimate. As emphasized, this requires an industrialized flour milling sector. Where flour milling takes place at household level or is done in an artisanal milling environment with low reporting levels, such estimates would inevitably underestimate consumption levels of the primary product. But where first level processors (flour millers, oilseed crushers, abattoirs, sugar refinery/factories, dairies, etc.) represent a large share of domestic processing (bottleneck), processing statistics can serve as an excellent basis to generate FBS compatible food estimates[[2]](#footnote-3).

#### Creating expected values for time t

The basic idea of the previous FBS methodology was to derive food availability from the intersection of supply and utilization, i.e. food as a residual/balancing item. As outlined above, this will not, or at least not always, render plausible results in practice. In fact it may lead to unintuitive and implausible results, inter alia, visible through large year-to-year fluctuations in per capita food consumption levels. At the same time, it is not always straightforward to derive FBS compatible food estimates from HH surveys; likewise, estimates from the food processing industry may not always reliable or may only be available sporadically. In these cases, there is a need to generate estimates through an imputation method.

This suggests that there are two main motivations for the new FBS food estimation procedure. First, food consumption should evolve gradually, ideally along economic variables such as changes in incomes and consumption patterns. Second, the FSB food classification seems to provide a good basis for such an economic approach; the example of distinguishing butter from solids-non-fat is a good point in case.

The approach proposed here to impute values for food consumption is rather straightforward. It rolls out food consumption in year t as a function of a known level of food consumption in the past, adjusted for changes due to income and other factors (captured by a trend factor). Such other factors reflect things such as changing preferences or known, sudden supply disruptions. In a stylized form, imputed food consumption is:

(Equation 17)

where represents an average change in per capita income, and t is the estimate for a simple time trend factor. Four different functional forms have been distinguished: a linear specification, a log-log, a semi-log, and a log-inverse function. The choice of the functional form was taken in line with the functional form that was used for the estimation of the underlying income elasticities. All equations for all commodities and all countries have been parameterized with an income elasticity for every commodity j, country i, and a trend factor .

Linear specification:

(Equation 18)

Log-log specification:

(Equation 20)

Semi-log specification:

(Equation 21)

Log-Inverse specification:

(Equation 22)

where

### Initial values for food availability

The approach presented above leaves the important question open as to what the initial value of food use is and how it was derived. In other words, there is no “bootstrapping” that would allow rolling forward food availability by applying income growth rates. More importantly, if such an approach were valid and possible, it would replace the entire FBS procedure as next year’s food consumption levels could simply be derived by predicting it from last year’s level, an appropriate income elasticity and a change in income. In practice, such concerns are unwarranted, simply because these values are only initial values for the food consumption in time t. They will be over-written in the balancing mechanism, at least within the range of the assumed measurement error. In other words, the approach tries to capture the impact on food use stemming from population and income dynamics before the balancing algorithm consolidates that information with the overall commodity dynamism on country levels.

Finally, and as assumed for all variables of the FBS, official estimates have precedence over imputed food consumption. Where official country estimates are available, they will be taken into the balancing process without a measurement error (see chapter on the balancing mechanism). The only exception to this rule is where countries provide estimates for processed (say flour) but not for primary food products (say wheat). In this case, it was decided to use the official estimates of processed food and work back to an equivalent level of primary food in the standardization process. This decision is based on a careful review of the extraction rates used in the standardization process, the results of which suggest that many of the implicit extraction rates are out of plausible ranges. The implicit extraction rate in this example is the ratio between primary wheat and wheat flour. This means that the food estimates are derived by dividing the amount of processed product reported by a country by a reasonable extraction rate (for details see section on standardization)..

1. Final estimates will be derived through the balancing mechanism presented in section 2.2 of this document. [↑](#footnote-ref-2)
2. For cereals in the case of flour millers, vegetable oils for oilseed crushers and meat in the case of abattoirs. [↑](#footnote-ref-3)