faoswsProduction: A sub-module for the imputation of missing time series data in the Statistical Working System - Processed items

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Abstract

This vignette provides a detailed description of the usage of functions in the **Processed commodities** package.

Keywords: Imputation, Linear Mixed Model, Ensemble Learning.

1. Introduction

Before analyzing the main steps of the *derived item production sub-module*, it is important to identify the key items and elements involeved in this imputation process.

1.1. Items

The FAO statistical division is currently collecting information of derived item production. This data is disseminated on FAOSTAT under the domains:

1. **Crops processed** (FAOSTAT definition). Processed products of vegetal origin. Their parent products are found in the group 'Primary crops'. Production corresponds to the total output obtained from the processing of the input commodity in question (primary crops) during the calendar year. The quantity includes the output of home processing and of manufacturing industries and traditional processing. Data refer to total net production excluding processing losses, i.e. ex-factory or ex-establishment weight. As with the production of primary crops, it may occur that most of the output is obtained at the end of the calendar year and will be utilized during the following year. Olives picked towards the end of the year are immediately crushed after to avoid spoilage. Olive oil output therefore cannot enter the consumption during the same year. In these cases allocations to and from stocks (in the subsequent years) are made.Production data refer only to primary products while data for all other elements also include processed products derived there from, expressed in primary commodity equivalent." Source: *FAO Statistics Division Derived commodities are those items whose production derives from a productive process*.

2. **Livestock processed** (FAOSTAT definition). "**Processed livestock** products from live animals. These are derived from primary livestock products from live animals, particularly dairy products, such as butter,cheese,and dried eggs. Production data refer only to primary products while data for all other elements also include processed products derived there from, expressed in primary commodity equivalent. *Source: FAO. 2001. Food balance*

sheets. A handbook. Rome. **Processed livestock** products from slaughtered animals Derived from the processing of primary livestock products from slaughtered animals and include bacon, ham, sausages, canned meat, lard and tallow. Production data refer only to primary products while data for all other elements also include processed products derived there from, expressed in primary commodity equivalent. *Source: FAO. 2001. Food balance sheets. A handbook. Rome.* **Slaughter fats** Edible and inedible unrendered fats which fall in the course of dressing the carcasses and are recovered from the discarded and fallen animals; guts, sweepings, hide trimmings etc. Source: FAO Statistics Division. **Total unrendered fat** Includes slaughter fats and butchering fats (edible and inedible)." *Source: FAO Statistics Division*

This data may be collected direcly from official sources like government agenicies (through questionnaires, surveys..) but where official data are not available, it may become necessary to consider alternative sources (commonly defined *semi-official*) that may include industry groups, publications, or investigations conducted by product value chain experts.

Even if FAO conducts a strong effort to collect a broad set of official and semi-official information on derived items, when no official and semi-official data are available, the only alternative is the model-based imputation of missing data.

The exigency to develop a systematic approach to estimate the production of derived items (where missing) is not only for dissemination purposes, indeed the starting point to produce the Food Balance Sheets (FBS) is the Supply and Utilization Account (SUA) equations associated to all the commodities classified through the CPC classification. In this prospective the existence of reliable estimations of all the SUA components (or at the least of the main components: production and trade) results essential to evaluate the food component and consequently to compute the the final Dietary Energy Supply (DES) coming from each FBS item.

The enstablished best practice developped in the *old methodology* framework was based on the so-called *Crude Balancing* operation. The idea was to ensure that the total supply is enogh, at least, to cover the outflow. In other words a country characterized by a positive trade balance for a specific good (exports greater that imports) must have produced at the least the exceeding export amount of that specific good.

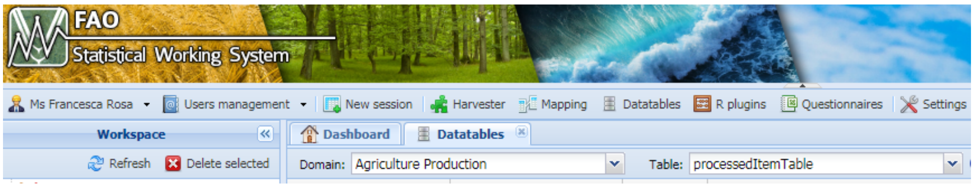
This approach presents several shortcomes:

- there are no constrains on the potential ammount of production of a derived items that can be produced. This component is estimated looking at the SUA equation of the processed item itself, while the production of a derived item should be linked to the availability of its parent commodity (or commodities).
- the new food imputation module contains many derived products classified as *food residual*, it means that the food component is estimated using, once again, the imbalance between the total supply and the total utilizations which at this stage would be equal to zero if we had already used the same imbalance to compute the production component (which would have been estimated exactly equal to the trade imbalance).

As mentioned above, the *derived item production sub-module* is not working on all the CPC commodities, but on a specific subset. This subset includes those items that have been storically pubblished on FAOSTAT plus all flours that have been recognised very important for dissemination purposes. In addition all those commodies that in the *food imputation module* are classified as *food residual* are included in the *derived item production* routine in order to be imputed indipendetly from the trade balance. This step ensures that the resulting SUA imbalances can still be allocated in the food components (if it is missing).

The complete list of derived items explicily included in the module is stored as a data table in the SWS:

domain:	Agriculture Production
dataset:	processedItemTable



It is important to point out that the module is working on all the commodities involved in the tree of the items included in this list. This means that we may obtain production imputations also for commodities not explicitly included in the list (e.g. intermediate parent commodities, co-products . . .)

For example the list includes: Skim milk of cow; Whey, fresh; Cheese from Skimmed cow Milk; Skim milk and whey powder (and other child-items coming from the Raw milk of cow tree), but the module produces production imputations also for Casein which was not originally included in the processed item list.

2. Elements

The SWS *agriculture production* domain contains production data for all the commodities involved in the FBS. The name of the domain may be misleading because it recalls only to the Crop production, but it actually contains information about livestock derived products (meat, eggs, milk) and crop derived items (oils, fibers, vegetable fats..)

Associated to each item there are three variables composing the so-called *triplet*. The production imputation process is based on the concept of triplet. The triplet contains three elements linked through the relation:

$$output_t = input_t * productivity_t$$

This identity is the basic equation to compute the production quantities (where missing) and to validate the output, since we can have an a priori information on feasible *productivities* and/or *inputs* associated to different productive processes.

Several sub-modules have been developped in order to capture different feautres of several specific productive processes:

- Crop production imputation sub-module
- livestock sub-module
- milk and eggs
- derived items

For example, the non-livestock sub-modules produces imputations for all crops[1]. The elements composing the triplet for **crop commodities** are: production, area harvested and yield.

Generic Triplet	**Specific Triplet**
output	production [t]
input	area harvested [ha]
productivity	yield [t/ha]

Crop Item Production Triplet

If just two out of three of the three elements composing the triplet are available, it is always possible to compute, as identity, the remaining one. In addition, it is possible to monitoring the trend of the three components separately. For example we may be interested in monitoring yield trend ensuring that it is feasible according to different typology of crops, different climate zones and level of technology.

Equally, those commodities classified as *livestock* commodities follow exactly the same procedure, but the triplet is represented by:

Generic Triplet	**Specific Triplet**
output	production [t]
input	number of animal slaughterd [heads]
productivity	carcass weight [kg/heads]

Livestock Item Production Triplet

Derived items, in turn, have their specific triplet:

Generic Triplet	**Specific Triplet**
output	production [t]
input	input [t]
productivity	extraction rate

While for boh livestock and non-livestock items we may dispose of a broad set of official and semiofficial data for at least two of the triplet elements, we generally do not dispose of this information for the major part of the derived items included in the production imputation process.

Even if the derived item submodule presents some peculiarities that make it quite different from other imputation-production sub-modules, and the role of the triplet may seem a secondary aspect of the developped methodology, we will try to reduce the computation of derived item production to the already well-known equation:

$$Production_t = Input_t * ExtractionRate_t$$

2.1. Input: Availability

We do not have official or semi-official data for *Input*. Inputs must be computed from the Supply Utlization Account equation of the parent(s) items.

[1] It is also improperly used for additional commodities as honey, bees... (The complete list of item can be browsed in the datatable *fbs_production_comm_codes*)

$$\begin{aligned}Prod_t^{parent} + Imp_t^{parent} - StockVariation_t^{parent} = {} & Export_t^{parent} + Food_t^{parent} + Seed_t^{parent} + Feed_t^{parent} \\ & + Loos_t^{parent} + TouristConsumption_t^{parent} \\ & + IndustrialUtilizations_t^{parent}\end{aligned}$$

It results particularly important to point out that **not all the SUA components** are used by the *derived item imputation sub-module* to compute the available input. In particular we use a rescricted equaton where only the following components are considered:

$$Prod_t^{parent} + Imp_t^{parent} - StockVariation_t^{parent} = Export_t^{parent} + Seed_t^{parent}$$

The imputation process is based on the hypothesis that, at all levels, the quantity of each commodity not allocated to any of the utilizations reported in the supply-utilization account equation (not exported, not wasted, not used for food, seed, feed, industrial utilization and tourism consumption) is completly allocated in several productive processes to be transformed in *other goods* (precisely processed commodities). The choice to use only a sub-set of the parent SU A components is not completly correct: in theory we should have taken into account all the components to properly estimate the taxtitavailability. The problem is that we do not dispose of the *food* component yet and the food componet for the *food residual* items needs figures for production.

In addition we tried to include in the module only those components that are more stable and already *validated* in the time-window used to build the new imputations.

This approximation of the *imbalance* which is supposed to be positive at primary level, is interpreted as the *availability*. In other words we define the input as the amount of primary goods that it is not used as it is, but which is involved as *input* in one or more productive processes.

2.2. Productivity: Extraction rate

The *extraction rate* plays the role of the productivity. It indicates the quantity of derived item that can be obtained from one unit of input. It is a technical coefficient associated to each parent-child combination. It is country specific because it depends on the efficiency of the production system and it is time specific since it evolves in time and reflects the improvements in the level of technology. It is important to highlight that it cannot be associate to a single commodity (as the productivity of other typology of items: crop-yield can be associated to wheat or barley and may vary across countries and evolve along time), but it can be associated to parent-child combinations. That's why it is stored directly in the commodity tree where each row contains the parent-child relationship between all the CPC items. In other words extation rates can be associated to a productive processes and not to single commodities.

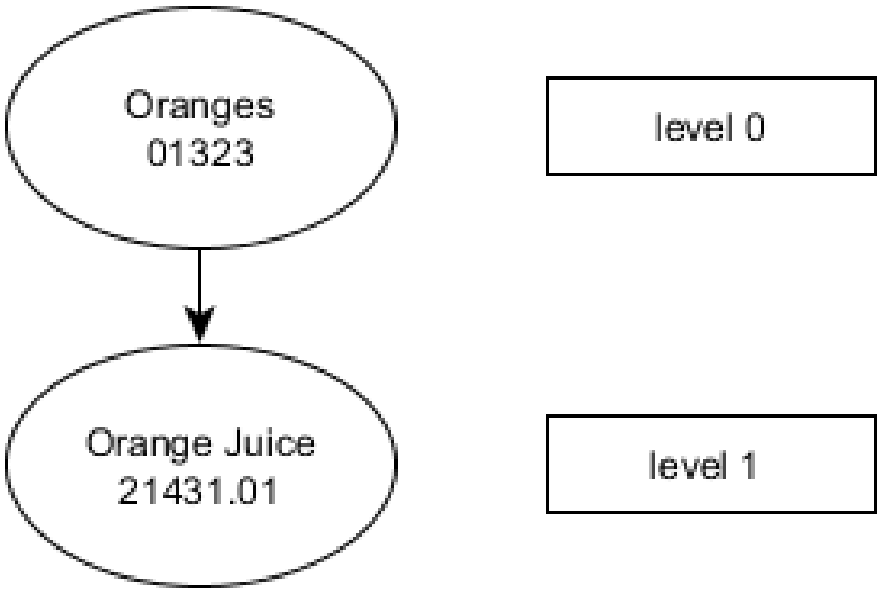
The *extraction rate* is the component that summarises the overall level of technology, as mentioned it can be interpreted as a Technical Conversion Factor (TCF). Extraction rates are treated as exogenous coefficients. We curreny do not have a method to update the table of extraction rates. Extraction rates have been inherit from the old system up to 2013 whose figures have been re-used in 2014 and 2015.

2.3. Output: Production

The overall output is the *Production*, out target variable. *Production* is stored in *Agriculture production* dataset in the SWS. It is identified by the code 5510 for all the derived commodities and it is always measured in tons.

3. Methodology

Lets's start with a simple concrete example: we want to compute the production of *Orange juice* in Algeria in 2010. In this case the total ammount of the processed commodity derived from one single parent: *Oranges*



Since the final goal of this process consists in producing production imputations for *Orange juice* in Algeria, let's try to build the triplet elements for this commodity in order to use the general formula:

$$output = input * productivity$$

1. **Input**:

$$input = availability_{parent}$$

The parent availability is equal to the SUA imbalance at primary level. The following table contains the Supply and Utilization components of the parent commotidy (in this example: *Oranges*). The **inpunt** to produce *Orange juice* is the availability of *Oranges*.

	measuredElementSuaFbs	measuredItemFbsSua	geographicAreaM49	timePointYears	Value	flagObservationStatus	flagMethod
1:	loss	01323	12	2000	214195.25841	I	e
2:	tourist	01323	12	2000	0.15750	I	e
3:	production	01323	12	2000	299583.00000		-
4:	seed	01323	12	2000	26.79525	I	e
5:	imports	01323	12	2000	19.00000	T	-
6:	exports	01323	12	2000	0.00000		-

$$Avaiability_t^{parent} = Prod_t^{parent} + Imp_t^{parent} - StockVariation_t^{parent} - Export_t^{parent} - Seed_t^{parent}$$

For example: we report the algebric passages to the manually compute the *Orange availabilty* availabilities in Algeria in 2000. These figures are reported in the next table in the column *availability*.

$$Avaiability_{2000}^{parent} = 299583 + 19 - 26.79525$$

$$Avaiability_{2000}^{parent} = 299575.2$$

```
    Parent    Child Year processingShare FlagObs FlagMeth availability
 1:  01323 21431.01 2000      0.04000358       T        -     299575.2
 2:  01323 21431.01 2001      0.04000334       T        -     327055.7
 3:  01323 21431.01 2002      0.04000304       T        -     362772.4
 4:  01323 21431.01 2003      0.04000281       T        -     389412.7
 5:  01323 21431.01 2004      0.04000256       T        -     417135.3
 6:  01323 21431.01 2005      0.04000252       T        -     435521.5
 7:  01323 21431.01 2006      0.04000248       T        -     474999.5
 8:  01323 21431.01 2007      0.04000222       T        -     495001.5
 9:  01323 21431.01 2008      0.04000211       T        -     505969.4
10:  01323 21431.01 2009      0.04000165       T        -     635244.9
11:  01323 21431.01 2010      0.04000172       I        e     594591.3
12:  01323 21431.01 2011      0.04000189       I        e     823245.0
13:  01323 21431.01 2012      0.04000183       I        e     821848.9
14:  01323 21431.01 2013      0.04000177       I        e     918023.8
15:  01323 21431.01 2014      0.04000171       I        e     981898.8
16:  01323 21431.01 2015      0.04000164       I        e    1024758.3
    extractionRate     Value
 1:           0.65  7789.652
 2:           0.65  8504.158
 3:           0.65  9432.800
 4:           0.65 10125.440
 5:           0.65 10846.212
 6:           0.65 11324.274
 7:           0.65 12350.754
 8:           0.65 12870.754
 9:           0.65 13155.896
10:           0.65 16517.047
11:           0.65        NA
12:           0.65        NA
13:           0.65        NA
14:           0.65        NA
15:           0.65        NA
16:           0.65        NA
```

```
[1] 0.04000358
```

```
[1] 0.04000334
```

2. **Productivity**: the extraction rate is stored in the commodity tree. We report an extraction of the commodity-tree

	geographicAreaM49	timePointYears	Parent	Child	extractionRate
1:	12	2000	01323	21431.01	0.65
2:	12	2001	01323	21431.01	0.65
3:	12	2002	01323	21431.01	0.65
4:	12	2003	01323	21431.01	0.65
5:	12	2004	01323	21431.01	0.65
6:	12	2005	01323	21431.01	0.65
7:	12	2006	01323	21431.01	0.65
8:	12	2007	01323	21431.01	0.65
9:	12	2008	01323	21431.01	0.65
10:	12	2009	01323	21431.01	0.65
11:	12	2010	01323	21431.01	0.65
12:	12	2011	01323	21431.01	0.65
13:	12	2012	01323	21431.01	0.65
14:	12	2013	01323	21431.01	0.65
15:	12	2014	01323	21431.01	0.65
16:	12	2015	01323	21431.01	0.65
17:	12	2016	01323	21431.01	0.65

The *extraction rate* for *Orange juice* in *Algeria* is constant over time, its interpretation is: starting from 100 tons of *oranges*, 65 tons of *Orange juice* are obtained.

3. **Output** is our target element since the final purpose of this process is to compute the processed item productions:

$$Output_t^{child} = Input_t^{parent} * productivity_t^{(parent;child)}$$

Where:

$$Input_t^{parent} = Availability_t^{(parent,child)} * ProcessingShare_t^{(parent;child)}$$

$$Productivity_t^{(parent,child)} = ExtractionRate_t^{parent,child)}$$

$$Output_t^{child} = Availability_t^{parent} * ProcessingShare_t^{(parent;child)} * ExtractionRate_t(parent;child)$$

Using the previous formula we can proceed computing the *Orange juice* productions, but we still miss a passage since we do not have introduced the *Processing Share* yet.

Generally speaking, the *processing shares* are the ratios that allow to split the total parent availability to its different parts allocated to different processed items. Indeed it is possible that a primary item might be involved in more than one productive process leading to different processed items. This choice depends not only on the country's preferences and exigencies but mainly from the existence of a consolidated productive system. That's why the dynamic in the time of processing shares is quite rigid especially for industrialized country where the productive processes are tied to the existence of a consolidated industry. In those countries it will be preferred to keep more or less constant the availability of input, for example importing when it is not enough.

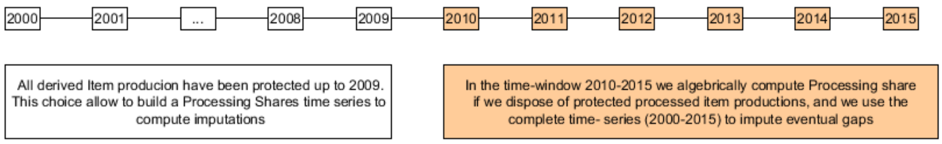
We decided to derive this information from the past time series of both Availability and Production.

$$ProcessingShare^{(parent;child)} = \frac{prod'_{child}}{availability_{parent}}$$

Where $prod'_{child}$ represents the total child production expressed in parent equivalent, which is:

$$prod'_{child} = \frac{prod_{child}}{extractionRate}$$

The formula highlights that it is possibile to compute *processing shares* as long as we dispose of official-semioffiacial child production data. We decided to protect all (official, semi-ufficial, estimated . . .) available figures for processed commodites up to 2009 [2] in order to build a *processing share* time-series.



The following table reports, in a more userfriendly format the *processing shares* that up to 2009 are algebrically computed from protected (or artificially protected) figures of both parent-availabilities and child-productions.

The over-all approach to impute the *processing shares* between 2010 and 2015 is once again[3] the *ensemble approach*.

Parent	Child	year	Processing Share	flagObs	flagMeth
Oranges	Orange juice	2000	0.04000358	T	-
Oranges	Orange juice	2001	0.04000334	T	-
Oranges	Orange juice	2002	0.04000304	T	-
Oranges	Orange juice	2003	0.04000281	T	-
Oranges	Orange juice	2004	0.04000256	T	-
Oranges	Orange juice	2005	0.04000252	T	-
Oranges	Orange juice	2006	0.04000248	T	-
Oranges	Orange juice	2007	0.04000222	T	-
Oranges	Orange juice	2008	0.04000211	T	-
Oranges	Orange juice	2009	0.04000165	T	-
Oranges	Orange juice	2010	0.04000172	I	e
Oranges	Orange juice	2011	0.04000189	I	e
Oranges	Orange juice	2012	0.04000183	I	e
Oranges	Orange juice	2013	0.04000177	I	e
Oranges	Orange juice	2014	0.04000171	I	e
Oranges	Orange juice	2015	0.04000164	I	e

In the analyzed example the *processing share* series is extremly smooth up to 2009. The inputed values mantain the same constant trend.

3.1. Multiple parents items

In the previous section it has been presentented a very simple example where the *child* commodity is entirely produced from one single parent-commodity.

[2]This is a parameter that the user can explicitly set in running the derived-imputation plugin in the SWS. This means that is not fix to 2009.

[3]The ensemble approach is widly applied in the Agriculture Production domain to impute missing data. In particular it has been developped to estimate the triplet of Crop items and it has finally applied also in the livestock sub-module.

The formula to compute *processing shares* is:

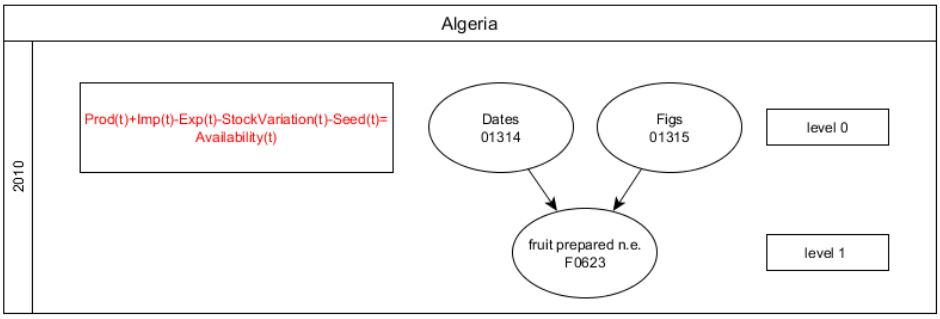
$$ProcessingShare^{(parent;child)} = \frac{prod'_{child}}{availability_{parent}}$$

It involes the $prod'_{child}$ which is the observed child-production expressed in parent-equivalent. In this specific example (which represents a very common situation) to express the *child-production* in terms of parent equivalet it is sufficient to divide the *child-production* by the *extraction rate*. What if the child commodity could have been obtained from more than one parent?

In case one child have more than one parent, we should be able to split the overall child production in its different components obtained from different productive processes.

In other words we should be able to identify the portion of child production that has to be *standardized* on each of its different parent commodities.

Suppose that we want to compute the production of *fruit prepared n.e.s.* in Algeria in 2010. We know, from the commodity-tree that this processed item has two parent-commodities.

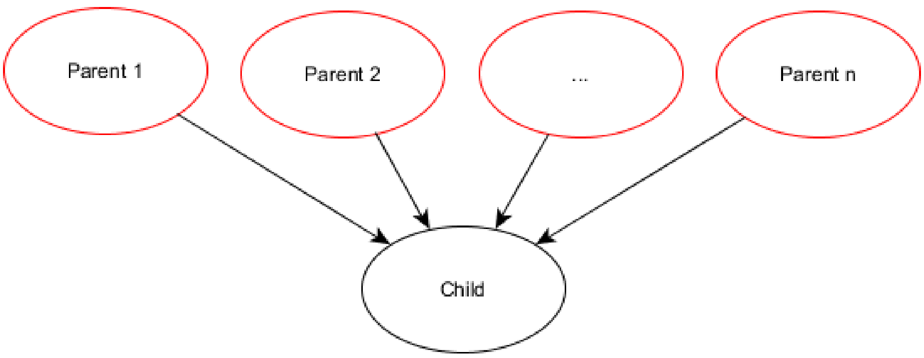


The total production of *fruit prepared n.e.s.* comes from two productive processes. We have to separatly compute the production-component coming from Dates and from Figs. In this prospective we should identify a rule to determine how much of *fruit prepared n.e.s.* comes from *Dates* and how much from *Figs*.

This rule is based on the availabilties of both *Dates* and *Figs* and establishes that the child-production is allocated on its different parents proportionally to its parent-availabilities:

$$share^{(Fruitpreparedn.e.s.;Dates)} = \frac{availability_{Dates}}{availability_{Dates} + availability_{Figs}}$$

Generalizing the previous example, supposing that a processed commodities is obtained from n productive processes, the child-commodity have n parents:



The generalisized formula is:

$$share_i^{(child)} = \frac{availability_{parent_i}}{\sum_{i=1}^{n} availability_i}$$

On the other hand just a small percentage of the total availability of both Dates and Figs have been used to produce *fruit prepared n.e.s.*, then we have to compute the *processing shares* as describes above.

The following tables show *processing shares* for both *Dates* and *Figs*.

Parent	Child	year	Processing Share	flagObs	flagMeth
Dates	fruit prepared n.e.s	2000	0.02786568	T	-
Dates	fruit prepared n.e.s	2001	0.04337616	T	-
Dates	fruit prepared n.e.s	2002	0.04443857	T	-
Dates	fruit prepared n.e.s	2003	0.04786766	T	-
Dates	fruit prepared n.e.s	2004	0.04245302	T	-
Dates	fruit prepared n.e.s	2005	0.05476584	T	-
Dates	fruit prepared n.e.s	2006	0.05869542	T	-
Dates	fruit prepared n.e.s	2007	0.05402774	T	-
Dates	fruit prepared n.e.s	2008	0.05069266	T	-
Dates	fruit prepared n.e.s	2009	0.04639765	T	-
Dates	fruit prepared n.e.s	2010	0.05314685	I	e
Dates	fruit prepared n.e.s	2011	0.05318194	I	e
Dates	fruit prepared n.e.s	2012	0.05412407	I	e
Dates	fruit prepared n.e.s	2013	0.05506621	I	e
Dates	fruit prepared n.e.s	2014	0.05600835	I	e
Dates	fruit prepared n.e.s	2014	0.05695049	I	e

Parent	Child	year	Processing Share	flagObs	flagMeth
Figs	fruit prepared n.e.s	2000	0.02786568	T	-
Figs	fruit prepared n.e.s	2001	0.04337616	T	-
Figs	fruit prepared n.e.s	2002	0.04443857	T	-
Figs	fruit prepared n.e.s	2003	0.04786766	T	-
Figs	fruit prepared n.e.s	2004	0.04245302	T	-
Figs	fruit prepared n.e.s	2005	0.05476584	T	-
Figs	fruit prepared n.e.s	2006	0.05869542	T	-
Figs	fruit prepared n.e.s	2007	0.05402774	T	-
Figs	fruit prepared n.e.s	2008	0.05069266	T	-
Figs	fruit prepared n.e.s	2009	0.04639765	T	-
Figs	fruit prepared n.e.s	2010	0.05315988	I	e

$$\begin{aligned} Prod^{fruitsprepared} = {} & [availability^{Dates} * ProcessingShare^{(fruitsprepared;Dates)} * ExtractionRate] \\ & + [availability^{Figs} * ProcessingShare^{(fruitsprepared;figs)} * ExtractionRate] \end{aligned}$$

3.2. The multiple level processed commodities

The module is built to work level by level, computing at first the productions of processed items directly obtained from primary items and going down in the tree-hierarchy to impute the production of all the processed commodities.

In the second (..and following) round of the loop, the processed items just computed, become *parent-commodties*, and their availabilities are than re-computed including the just imputed production values.

This approach is based on the idea that, even if a processed commodity can be obtain from several productive processes (so from different parents), we assume that all the productive processes leading to a specific processed item, occurs at the same processing level of the commodity tree.

This assumption is true most of time. Some commodities present very complex commodity tree and can be obtained not only as result of many productive processes, but at many different levels of the commodity tree.

The adopted strategy consists in approximating the total availability of parent-commodities with the sum of its components belonging to the highst level in the hyerachy. It is important to highlight that this is an approximation and in many cases we are not properly computing the parent-availability and consequently the child-production.

Appendices

Item	Item Labels
23110	Wheat and meslin flour
23120	Other cereal flours
23170	Other vegetable flours and meals
22249.01	Butter and Ghee of Sheep Milk
22241.01	Butter of Cow Milk
22254	Cheese from milk of goats, fresh or processed
22253	Cheese from milk of sheep, fresh or processed
22110.02	Skim Milk of Cows
26110	Raw silk (not thrown)
22251.01	Cheese from Whole Cow Milk
22251.02	Cheese from Skimmed Cow Milk
21521	Pig fat, rendered
22120	Cream, fresh
22241.02	Ghee from Cow Milk
22212	Skim milk and whey powder
22222.01	Whole Milk, Condensed

22211	Whole milk powder
22221.01	Whole Milk, Evaporated
21523	Tallow
22130.02	Dry Whey
22230.04	Dry Buttermilk
22222.02	Skim Milk, Condensed
22242.02	Ghee, from Buffalo Milk
22130.03	Whey, Fresh
22221.02	Skim Milk, Evaporated
22242.01	Butter of Buffalo Milk
22252	Cheese from milk of buffalo, fresh or processed
22230.01	Yoghurt
22249.02	Butter of Goat Milk
01921.02	Cotton lint, ginned
0143	Cottonseed
23540	Molasses (from beet, cane and maize)
2168	Cottonseed oil
21691.12	Oil of Linseed
2167	Olive oil
21691.07	Oil of Sesame Seed
21631.01	Sunflower-seed oil, crude
2351f	NA
24310.01	Beer of Barley, malted
21700.02	Margarine and Shortening

2162	Groundnut oil
2165	Palm oil
2161	Soya bean oil
24212.02	Wine
21641.01	Rapeseed or canola oil, crude
21631.02	Safflower-seed oil, crude
2166	Coconut oil
21691.14	Oil of Palm Kernel
01491.02	Palm kernels
21691.02	Oil of Maize
01930.04	Tea nes (herbal tea)
01990.01	Vegetable products, fresh or dry nes
02293	Raw milk of camel
17400	Ice and snow
23912.01	Coffee Substitutes
21182	Bovine meat, salted, dried or smoked
21183	Other meat and edible meat offal, salted, in brine, dried or smoked; edible flours and meals of meat or meat offal
21184.01	Sausages and similar products of meat, offal or blood of beef and veal
21184.02	Sausages and similar products of meat, offal or blood of pig
21185	Extracts and juices of meat, fish, crustaceans, molluscs or other aquatic invertebrates
21189.04	Liver Preparations

21189.05	Fatty Liver Preparations
21313	Potatoes, frozen
21319.01	Sweet Corn, Frozen
21321	Tomato juice
21329	Other vegetable juices
21330.90	Other vegetables provisionally preserved
21340	Vegetables, pulses and potatoes, preserved by vinegar or acetic acid
21393.01	Dried Mushrooms
21393.90	Vegetables, Dehydrated
21397.01	Canned Mushrooms
21399.01	Paste of Tomatoes
21399.02	Tomatoes, Peeled (O/T vinegar)
21399.03	Sweet Corn, Prepared or Preserved
21411	Raisins
21412	Plums, dried
21419.01	Apricots, Dried
21419.02	Figs, Dried
21422	Almonds, shelled
21423	Hazelnuts, shelled
21424	Cashew nuts, shelled
21429.01	Brazil Nuts, Shelled
21429.02	Walnuts, Shelled
21429.07	Coconuts, Desiccated

21431.01	Orange Juice
21431.02	Orange Juice, Concentrated
21432	Grapefruit juice
21432.01	Grapefruit Juice, Concentrated
21433	Pineapple juice
21433.01	Juice of Pineapples, Concentrated
21434	Grape juice
21435.01	Apple Juice
21435.02	Apple Juice, Concentrated
21439.01	Juice of Tangerine
21439.02	Juice of Lemon
21439.03	Lemon Juice, Concentrated
21439.04	Juice of Citrus Fruit nes
21439.05	Citrus Juice, Concentrated nes
21439.07	Juice of plum, concentrated
21439.08	Juice of Mango
21491	Pineapples, otherwise prepared or preserved
21495.01	Prepared Groundnuts
21495.02	Peanut Butter
21499.01	Mango Pulp
21522	Poultry fat, rendered
21673	Oil of olive residues
21700.01	Liquid Margarine
22251.03	Whey Cheese
22251.04	Processed Cheese

23912.02	Coffee Extracts
22270	Ice cream and other edible ice
23140.03	Breakfast Cereals
23140.08	Cereal Preparations
23180	Mixes and doughs for the preparation of bakers' wares
23210.03	Other Fructose and Syrup
23210.04	Sugar and Syrups nes
23210.05	Glucose and Dextrose
23210.06	Lactose
23490.01	Bread and other bakers wares, nec
23520	Refined sugar
23530	Refined cane or beet sugar, in solid form, containing added flavouring or colouring matter; maple sugar and maple syrup
23670.01	Sugar Confectionery
23670.02	Fruit, Nuts, Peel, Sugar Preserved
23710	Uncooked pasta, not stuffed or otherwise prepared
23911	Coffee, decaffeinated or roasted
23991.01	Infant Food
23991.02	Homogenized Vegetable Preparations
23991.03	Homogenized Cooked Fruit, Prepared
23991.04	Homogenized Meat Preparations

23993.01	Egg Albumin
23993.02	Eggs, Liquid
23993.03	Eggs, Dried
23995.01	Soya Sauce
23999.01	Malt Extract
23999.02	Food Preparations of Flour, Meal or Malt Extract
24220	Vermouth and other wine of fresh grapes flavoured with plats or aromatic substances
24230.02	Rice-Fermented Beverages
24230.03	Cider and other fermented beverages
24490	Other non-alcoholic caloric beverages
F0020	bread
F0022	pastry
F0235	prepared nuts
F0262	olives preserved
F0472	vegetables preserved nes (o/t vinegar)
F0473	vegetables frozen
F0475	vegetables preserved (frozen)
F0665	cocoa powder and cake
F0666	chocolate products nes
F0875	beef and veal preparations nes
F1042	pig meat preparations
F1061	poultry meat preparations

F1172	meat prepared n.e.
F1232	food preparations n.e.
F1275	hydrogenated oils and fats
23170.04	Flour of Fruits
23170.03	Flour of Pulses
23170.02	Flour of Roots and Tubers nes
23170.01	Flour of Cassava
23120.90	Flour of Cereals nes
23120.10	Flour of Mixed Grain
23120.09	Flour of Triticale
23120.08	Flour of Fonio
23120.07	Flour of Buckwheat
23120.06	Flour of Sorghum
23120.05	Flour of Millet
23120.04	Flour of Rye
23120.03	Flour of Maize
23120.02	Barley Flour and Grits
23120.01	Flour of Rice
21920	Flours and meals of oil seeds or oleaginous fruits, except those of mustard
39130.02	Maize Gluten
23220.04	Starch of Maize
24110	Undenatured ethyl alcohol of an alcoholic strength by volume of 80% vol or higher
2413	Undenatured ethyl alcohol of an alcoholic strength by volume of less than 80% vol;

	spirits, liqueurs and other spirituous beverages
39120.02	Bran of Rice
22130.01	Whey, Condensed
F1243	fat preparations n.e.
21529.03	Animal Oils and Fats nes
34120	Industrial monocarboxylic fatty acids; acid oils from refining/n
34550	Animal or vegetable fats and oils and their fractions, chemically modified, except those hydrogenated, inter-esterified, re-esterified or elaidinized; inedible mixtures or preparations of animal or vegetable fats or oils/n
39130.04	Gluten Feed and Meal
21691.10	Stillingia oil

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