Food Balance Sheets (FBS)

FBS component: Production



Outline

- 1. Introduction
- 2. Agricultural production domain
- 3. Production data sources
- 4. Imputation and estimation



Introduction



1. Introduction

Data for production should include:

- all production quantities of a given commodity within the country
- both commercial and non-commercial production

Production of primary products:

- reported at the farm gate level (so it does not include harvest losses)
- It should include: any post-harvest on-farm loss occurring during the different farm operations, such as threshing, cleaning/winnowing or storage

Data for meat production:

- both commercial and farm slaughter
- production should be expressed in terms of carcass weight



1. Introduction



FOOD BALANCE SHEETS

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1. Introduction

- Data on agricultural production is one of the foundations of the food balance sheet framework.
- Countries not currently collecting agricultural production data should consider first investing their resources in generating reliable data on production.
- Even countries with highly-developed official survey methodologies may not collect production data on all commodities.
- So, some suggestions on alternative data sources and imputation strategies are needed.





CROPS CEREALS ROOTS AND TUBERS SUGAR CROPS PULSES NUTS **OIL CROPS VEGETABLES** FRUIT **STIMULANTS** SPICES FORAGE PRODUCTS TOBACCO NATURAL RUBBER FIBERS, VEGETAL OR ANIMAL ORIGIN **CROPS PROCESSED** SUGAR, RAW, CENTRIFUGAL **VEGETABLE OILS** CAKES **FRUIT PREPARATION** ALCOHOLIC BEVERAGES









LIVESTOCK AND PRODUCTS

Livestock – Live Animals

Product from Slaughtered Animals

Products from Live Animals



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Other relevant variables that could be necessary for:

1. The imputation of missing values (activity and productivity variables)

Activity variables

- Crops: area sown, area harvested
- Livestock: number of animals

Productivity variables

- Crops: Yield in MT/HA
- Livestock: carcass weight and off-take
- 2. Validation of main production variables

e.g. to check the production estimate, compilers can (i) analyse the area and yield, (ii) compare yields to historic trends or agronomic potential.
e.g. to validate the quantity of meat produced from a given number of animals, compilers can use the carcass weight.







Official data sources

- Official sources should collect not only information on production output, but also on activity and productivity variables.
- Outside of surveys, **administrative data** may be another potential data source for certain products.
- Data from industrial output surveys may also be useful sources for the production of derived products, such as flour or beer.







Production Questionnaire

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS STATISTICS DIVISION Questionnaire on Crop and Livestock Production and Utilization Central Production Classification (CPC) version 2.1 exp. Country: China, Main - 1248 Reference Years: 2014-2016 National Reporting Office and Contact name Reporter name Administration and Office Address Tel Fax E-Mail

This questionnaire contains the following sections: Food and Agriculture Organization of the United Nations

Section 1: PRIMARY CROP PRODU

Please specify the annual production of commodities in metric tons (t) and the area harvested in hectares (ha). Data should relate to calender year. In the case of crops where har takes place. Area and production of crops should include all areas actually harvested and the corresponding total harvested production. Cereals and Pulses are reported in dry grain: refer to the weight of the whole nut, excluding the fibrous outer husk. Seed Cotton production should include both fibre and seed. Cocca Beans data relate to fermented and dried bea Please refer to the description of commodities for more details.

Cereals								
COMMODITY		ELEMENT		2014	2015	2016	N If a (e	
0111	Wheat	Area Harvested	ha	24,069,420	24,141,400	24,187,000		
UTT		Production	t	126,208,400	130, <mark>1</mark> 85,000	128,845,000		
0112	Maize (com)	Area Harvested	ha	37,123,390	38, 1 19,300	36,768,000	Γ	
		Production	t	215,646,300	224,630,000	219,552,000		
0113	Rice	Area Harvested	ha	30,309,870	30,215,700	30, <mark>178,00</mark> 0		
		Production	t	206,507,400	208,230,000	207,075,000	Γ	
0114	Sorghum	Area Harvested	ha	619,200	574,000			
		Production	t	2,885,000	2,752,000		Γ	
0115	Barley	Area Harvested	ha	468,800	446,600			
		Production	t	1,812,000	1,868,000		Γ	
						· · · · · · · · · · · · · · · · · · ·	_	



Section 2: PRIMARY CROP UTILIZATION

Please specify the annual utilization of commodities in metric tons (t). Data should relate to calender year. Please refer to the section of commodity description for more details on the utilization con

Cereals								
COMMODITY		ELEMENT		2014 2015 2016		NOTES: If a different un as well as any (eg: provisional		
		Food	t					
0111	Wheat	Seed	t					
		Feed	t					
		Loss	t					
		Industrial Utilization	t					
		Food	t					
		Seed	t					
		Feed	t					
0112	Maize (corn)	Loss	t					
		Liquid biofuel	t					
		Solid and gaseous biofuels	t					



Section 3: LIVESTOCK (ANIMAL NUMBERS AND LIVE

Please specify the annual total number of heads (or 1000 head for poultry and rabbits) and if applicable to the livestock, milking/laying and slaughtered. Total live animal numbers har October and 30 September of the following year should be considered for the later year). Neat production data (reported in terms of dressed carcass weight, i.e. excluding offal and s head, the feet and the skin as well as back-fat, bacon and ham in fresh equivalent. Poultry meat should be expressed in terms of dressed weight, i.e. including the carcass, the edible sucked by young animals but should include quantities fed to livestock. Please refer to the description of commodities for more details.

		/I IN
ANIMAL	BERS	(head)

COMMODITY		ELEMENT		2014	2015	2016	NOT If a c as w (eg:
		Stocks	head	113,965,500	108,173,000	106,679,000	
02111	Cattle	Slaughtered/Prod Animals	head	49,292,000	50,034,000		
		Fem Act Repr	head				
02112	Buffalo	Stocks	head				
		Slaughtered/Prod Animals	head				
		Fem Act Repr	head				
		Stocks	head	316,200	356,000	381,000	
02121.01	Camels	Slaughtered/Prod Animals	head	85,000			
		Fem Act Repr	head				
		Stocks	head	158,490,000	162,062,000	161,351,000	
02122	Sheep	Slaughtered/Prod Animals	head				



Section 4: SELECTED DERIVED AGRICULTURAL

Please specify the annual production of commodities in metric tons (t). For data on sugar production from home-grown crops only, they should be reported in terms of centrifugal sugar, ra and from imported oilseeds, they should be reported in terms of crude oil. Please specify when reported in a different way. You may refer to the description of commodities for more details. Please refer to section "Utilization of Oils" after the metadata sections.

Sugar, raw, centrifugal									
COMMODITY		ELEMENT		2014	2015	2016	NOTE If a diff as wel (eg: pr		
23511.01	Cane sugar, centrifugal	Production	t						
23511.02	Cane sugar, non-centrifugal	Production	t						
23512	Beet sugar	Production	t	1,024,051	1,028,096				
Vegetable Oi	ls (Crude or Crude Equiv.)								
COMMODITY		ELEMENT		2014	2015	2016			
2161	Soya bean oil	Production	t	11,699,700	13,553,556				
2162	Groundnut oil	Production	t						
21631.01	Sunflower-seed oil, crude	Production	t	299,848	615,170				
21631.02	Safflower-seed oil, crude	Production	t						
21641.01	Rapeseed or canola oil, crude	Production	t	5,702,700	5,225,500				



Food and Agriculture Organization





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Crops

• When estimating production of crops, imputation is based upon the following identity:

Production (MT) = Yield $\binom{MT}{HA}$ * Harvested Area (HA)

- In the agricultural survey program of many countries, data is collected on sown area, but not on harvested area.
- While data on harvested area is preferred, sown area estimates can also be adapted and used for this purpose



Crops

- Calculating any of the three unknowns (production, yield, or area) requires only an estimate of the other two terms.
- So for production, the recommended imputation approach is a three-step procedure:
 - **Step 1:** Measure, impute, or approximate a yield estimate.
 - **Step 2:** Measure, impute, or approximate an estimate of harvested area.
 - **Step 3:** Multiply yield and harvested area estimates together to arrive at a production estimate.



Crops

Step 1: Measure, impute, or approximate a yield estimate.

- Understand the nature of yields for the crop being modeled graphing of historical yields and some general research into the typical characteristics for yields .
- The graphing of historical yield data should be followed by an analysis to determine which functional form best fits the data.
- Include other relevant explanatory variables in the estimating regressions



Crops

Step 2: Harvested area

• Calculate a harvested area based on the estimate of sown area, and some estimate of the percentage of land that was abandoned (abd).

Estimating some percentage of abandoned area, countries may have some information as to the actual area of land abandoned

Harvested $area_t = Sown area_t - Abandoned area_t$

 Use sown area to proxy for harvested area if an abandonment rate or a quantity of abandoned area is unknown



Crops

Step 3: Derive production estimate by multiplying estimates for harvested area and yield.

• With estimates of both harvested area and yield in hand, FBS compilers need only multiply the two together.

In this case, the quality flag assigned to the production estimate should reflect the quality of the yield and harvested area used.



Processed products derived from crops

- Only two pieces of information necessary for imputing values for derived goods :
 - The amount of the primary good that is being processed (that is, quantities of primary goods assigned to the food processing variable).
 - The extraction rate (for most products, extraction rates will fluctuate very little over time).
- Estimating the quantity of a given primary commodity destined for processing can be a bit more complicated.



Processed products derived from crops

Example: Mustard seed processed products





Processed products derived from crops

Example: Mustard seed processed products

Processing shares for oil of mustard seed and cake of mustard seed will both be 80%, since they two are outputs of a single transformation process (co-production)

		Mustard seed	Oil of mustard	Cake of mustard seed	Flour of mustard
A	Amount Processed	400,000			
в	Processing Share		80%	80%	20%
С	Amount of Input		320,000	320,000	80,000
D	Extraction Rate		36%	60%	70%
E	Production of derived goods		115,200	192,000	56,000



Livestock and livestock product imputation

• Using this estimate of animals slaughtered, and applying the appropriate yield conversion factor for the product in question below:

Production (MT) = Carcass Yield $\left(\frac{MT}{Animal}\right)$ * Animals Slaughtered



Livestock and livestock product imputation

 If the number of animals slaughtered is not known, but production of at least one derived product is known, then FBS compilers should start from that number and work backwards to first derive an estimate of the number of animals slaughtered.

Animals Slaughtered = $\frac{Production (MT)}{Carcass Yield \left(\frac{MT}{Animal}\right)}$

FBS compilers are advised to combine official data with an estimate of nonregistered animals or production of livestock-derived goods outside of official channels.





- Guidelines for the compilation of Food Balance Sheets (FAO, 2017), chapter 3.5, section 3.5.1 (Global Strategy & FBS Team)
- The FAO source book for the compilation of Food Balance Sheets (FAO, 2016) (Global Strategy & FBS Team)
- Technical Conversion Factors for Agricultural Commodities (FAO, 1972)
- FAOSTAT Production domain: <u>http://www.fao.org/faostat/en/#data</u>



THANK YOU!

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www.fao.org/faostat