

**GENERAL DATA DISSEMINATION SYSTEM
(GDDS PHASE 2 Project), World Bank, Washington D.C.**

MISSION 2 – UGANDA - FINAL REPORT

**TECHNICAL ASSISTANCE to the
Uganda Bureau of Statistics
Kampala, Uganda**

December 2008

**By Barry Proud
Consultant to the World Bank
bzproud@shaw.ca
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MISSION TO THE UGANDA BUREAU OF STATISTICS FOR
THE DEVELOPMENT OF NATIONAL FOOD BALANCE SHEETS

NOVEMBER 30 TO DECEMBER 13 2008

INTRODUCTION

Uganda is a central African country straddling the equator with about forty percent of GDP coming from the agricultural sector where eighty percent of the labor force is engaged. Over four million farm households make estimation of crop and livestock production extremely difficult; while largely open borders with five neighboring countries pose a challenge to those responsible for import and export estimates.

During the entire two week mission I closely followed the objectives and the work plan described in the Terms of Reference (Annex 1).

In summary: three workshops were provided on the third, fifth and final working day and seven preliminary food balance sheets prepared and discussed.

It became obvious from an early examination of the available statistics that the main difficulty would not arise from the presentation and understanding of the concepts of the development of food balance sheets, but rather their data requirements. Without any doubt the lack of data and the questionable accuracy of much of that which exists inhibit the construction of reliable balance sheets for many food items. This will not improve until information from the recent 2008/09 Census of Agriculture can be verified and incorporated.

PREPARATORY WORK

Once in Kampala, the first two days of the mission were devoted to a briefing by the Director of the Production Statistics Directorate, Mr. Seth Mayinza at present responsible exclusively for the 2008/09 Uganda census of Agriculture and a very cursory examination of related unpublished data and information that should be forthcoming from the 2008/09 Agricultural Census. Unfortunately, because of the demands of the field work for the Census, most of the Director's staff were unavoidably detained in the field. It was therefore difficult to fully follow the instructions of the Terms of Reference to the effect that - "The following six days will be devoted to working closely with staff members of the two institutions mentioned above (UBOS – the Uganda Bureau of Statistics and MAAIF - the Ministry of Agriculture, Animal Industry and Fisheries). The fact that the MAAIF offices are located in Entebbe, some twenty miles from Kampala, did not help, though I did manage two visits and representatives of MAAIF attended the seminars. In the absence of other members of the UBOS Census team Mr Mayinza offered his complete cooperation.

In the three days offered for preparation prior to the visit, I studied and noted considerable background information about Uganda including the history, details of the economy and especially details of the agricultural sector gleaned from FAO, the Uganda Government and other sites. With only one exception (Simsim) I was familiar with all the crops grown and with the type of agriculture practiced by the over four million subsistence farms.

FIRST SEMINAR

I considered the seminar to be one of the more important features of the mission in that it would provide the conceptual basis for future work on food balances by members of UBOS and MAAIF. Those who attended are listed in Annex 2.

In introducing the seminar, I stressed that it would not be a lecture and that questions and comments were appreciated at any time. In particular, alternative views or opinions would be welcomed during the presentation.

I opened the seminar with a brief history of food balance sheets, starting with their use during the First World War and subsequently in the Second World War when they were used to determine available food supplies for rationing purposes. This led to a discussion of their use today in Uganda for indicating the direction over time of food supplies, given the ever increasing population. The degree to which measures of self sufficiency could be estimated was covered.

Two handouts were provided at this time, (Basic Simple National Food Balance Sheet and Glossary of Statistical Terms) - Annex 3. It was emphasized that this material presented only the simplest possible description of the subject, but that an understanding would add clarity to the rest of the seminar.

Rather than immediately covering national balance sheets, an example of how a food balance sheet for an individual household could be constructed was first described. From this example the information requirements at the national level were explained.

The balance sheet begins at the beginning of the period, usually a calendar year, with stock estimates in all locations – on farm, in commercial storage and theoretically, in transit. To this is added all imports during the period plus production of crops and increase in livestock numbers. Adjustments are made for post harvest losses, deaths of livestock, amounts used for feed and seed, exports and stocks held at the end of the period. Further reductions occur for losses in manufacturing and transforming the basic product into a more refined form i.e. from an animal to a carcass. These calculations result in a derived or residual estimate of the food available. This is not necessarily a measure of the food consumed, although it is often taken as such, as further losses may occur during the final stages of preparation.

The question was raised as to whether food aid should be included in the balance sheet. The answer is “yes”, unless a measure of self sufficiency is required.

The procedure described above provides an estimate from a supply side point of view. In theory a similar estimate can be obtained using household surveys to obtain information on food consumption expanded by estimates of population.

Once constructed, the balance sheet indicates the overall food situation in the country for the period considered for each product covered. In the case of complete coverage (of all products), average consumption patterns for individual consumers can be derived. As a gross estimate, limitations must be recognized. Patterns of consumption usually differ widely between rural and urban areas, between different ethnic groups, between different parts of the country and between different economic classes. However, on a year to year basis the individual estimates do indicate the trend in the availability of a particular food type and, in total for all foods, will measure the national situation.

Once national estimates are in place it is a relatively simple matter to convert these estimates to per capita levels. In theory, allowances should be made to exclude tourists and refugees present on a temporary basis. However this is seldom done.

Additionally balance sheets can provide valuable information, especially to nutritionists and other health officials, not only on the amount of food being consumed, but on its composition. Different foods can be reduced to a common measure – calories. At this point the information sheets “Nutritive Factors” – FAO Statistics Division www.fao.org/es/ess and “Food Composition Table For use in Africa” – www.fao.org/docrep/003/X6877E/X6677E05.htm - Annex 3, were distributed. As can be seen, these sheets only comprise the initial pages of much larger documents. The “Food Composition Tables” contain details of over one thousand items. The intention was to indicate to the group where relevant information can be located. In fact only one side of the table “Food Composition Table for Africa” was distributed. The left hand side covers B complex vitamins which were only discussed superficially.

Following a description of measurements of calories and their varying need depending on sex, age and the energy requirements of different jobs, an explanation followed covering the derivation of estimates of quantities of fats and proteins and how it was even possible to make per capita estimates for different forms of protein and both saturated and unsaturated fats. Similarly, the presence or otherwise of various minerals in the diet can be determined.

In the discussion period at the end of the seminar, when a work plan for the following seven days was presented, a representative MAAIF requested that Beans and Irish Potatoes be added to the list of those crops for which balance sheets would be created. To the extent that time permitted this was agreed.

Following the seminar, the next two days were devoted to an extended search of data sources and a visit to Mr. Jackson Waydanya, the Assistant Commissioner for Fisheries, located in Entebbe, to ascertain whether sufficient information existed to assemble a balance sheet for fish, a major source of animal protein in Uganda. With material provided by the Assistant Commissioner it was decided to continue.

SECOND SEMINAR

The second seminar/meeting held on Friday morning, December 5, was intended to finalize plans for construction of a representative selection of balance sheets. Unfortunately certain key people from MAAIF were unable to attend (A listing of those present is provided in Annex 2). As support staff for the Agricultural Census were still occupied with field work, alternative assistance was requested, and the services of Statistician, Waswa Hassan were provided. Following some discussion, the decision was made by the Director that, due to lack of information and questions of the accuracy of the data for 2007, balance sheets should be created for the year 2004.

DEVELOPMENT OF BALANCE SHEETS AND DATA APPRAISAL

The second and final week of the Uganda mission was devoted to calculation of balance sheets for Maize, Beans, Cassava, Irish Potatoes, Bananas, Finger Millet and Fish and the preparation and presentation of a concluding seminar discussing the results of the work.

All food balances start with the opening stocks, or in a shorter form, the difference between the opening and closing stocks. These are stocks held in all locations in the country, on farms, in commercial holdings and theoretically in transport. Unfortunately, for the products listed above, stock figures are not available. There is therefore no alternative except to assume that no difference exists between beginning and year-end amounts. This assumption may have some validity when annual production changes little over time, but otherwise is questionable. Suggestions have been made that in order to iron out large changes in stocks, when such data are missing, food balances should be calculated as averages over a three year period. We did not attempt this procedure.

It is unfortunate that in the current 2008/09 census, in the section on the Production and Disposition of Crops, the relevant question asks for the amount of the crop "Currently in Storage" will presumably result in an estimate on the date of the interview rather than for a common date for all interviews. Even so it should still provide a reasonably good benchmark for end of year stocks in farm positions.

Imports and exports of food must be accounted for in the balance sheet, the former as an addition; the latter as a subtraction. Food aid is included as an import. For Uganda, quantities of agricultural products exported and imported are available for the major crops. However, there is a problem in that the figures published refer to what are classed as "Formal Exports" and "Formal Imports". These are goods passing through commercial or regulated channels. There are large quantities termed "Informal" moving through less recognized routes. Unpublished data for these "Informal" movements are available, though how accurate they are, is another question. And this informal trade appears to be extremely important, at least for exports of maize, amounting in 2005 to over twice the formal estimate.

Though not considered in this exercise, balance sheets for cattle and therefore meat could be seriously affected by what one would expect to be an extensive "Informal" cross border trade in animals.

Moving on from problems with estimates of stocks and imports and exports, by far the most important contribution to the balance sheet is made by the current production. Unfortunately regular crop surveys were discontinued over twenty years ago and subsequent production estimates have received much criticism. There exist special difficulties in estimating such crops as bananas and cassava. Additionally, I have serious reservations whether survey methodology originally designed to capture crop production estimates of mostly commercial crops in temperate zones can successfully measure the output of many crops grown on subsistence holdings. In designing a survey, emphasis is usually placed on the efficient distribution of enumeration areas in order to reduce the sampling error. So far as it goes this is fine. However, I would contend that non sampling error is a more serious problem and, in particular, the ability of the farmer to correctly answer the questions posed. For example, I suggest that most small farmers have no idea of the weight of bananas produced annually on their holding. Why should they know? Their only concern is that they have sufficient to feed their family with, in a good year, perhaps a few to sell at the local market.

Some years ago when I lived and worked in Africa I had several banana plants growing and regenerating themselves in my garden. As far as bananas were concerned I was a subsistence farmer. Had anyone come to my house to ask me what weight of bananas were produced over the past year or even over the previous month I would have had great difficulty in making even a reasonable guess. This same problem of lack of knowledge by the producer probably extends to tubers, especially cassava. Perhaps a solution is to ask questions as to consumption over a previous short period and then to expand the responses to annual production.

Lacking any alternative, the balance sheets were constructed using the official published data for 2004.

Estimates of the production of fish posed a different problem. All of the data used came from discussions with, and material provided by, the Assistant Commissioner of Fisheries. As with other classes of food, no estimates are available for stocks. For production, three types of fish need to be considered – Nile Perch, Tilapia and Mukene (a small fish often caught by light attraction). Published estimates exist for landings of all three but, as with imports and exports of crops, there exists an unregulated and unrecorded trade mostly for Perch and Tilapia involving an estimated sixty thousand pounds. This figure has not been changed for several years. Additionally an estimated ten thousand pounds of Tilapia are raised in farm ponds, and although there appears to be evidence of expansion in the number of ponds, the estimate remains static. In the balance sheet for fish a conversion rate of whole fish to food of forty five percent was employed. It was pointed out in the final seminar that a similar type of adjustment would need to be made in order to convert numbers of live animals to a meat product (a carcass). While Nile Perch and Tilapia are essentially sold for human food with an extensive export market in the European Union for the Perch, it is estimated that fifty percent of the Mukene catch goes for livestock feed. This adjustment was made in the balance sheet. Catch estimates should improve in future when a licensing scheme for all boats is introduced early in 2009.

As described earlier, modifications need to be made to the gross estimate of harvested production. Losses in storage can occur due to infestations of insects, rodents, mould and more seriously flooding etc. In attempting to estimate post harvest losses for maize using survey data it was surprising to discover that the average loss was below one percent. Further research revealed that only about five percent of the farm households reported such losses and that losses reported amounted in most cases to no more than one to five percent. Can anyone even estimate a loss as small as one percent? This raises another question. In the current 2008/09 questionnaire, in Section 5.2 appears the column heading “Portion lost after harvest (%)”. Is the subsistence farmer expected to provide a percentage figure or is this in some way derived by the enumerator? Incidentally, from previous studies by FAO and others, normal losses of from ten to twenty percent would be expected.

The balance sheet for Finger Millet illustrates another adjustment that should be made to production estimates. Millet is extensively used in brewing and therefore the amount used in this process should be deducted and introduced into a separate balance sheet for beer. While it has little food value, it does contain an appreciable number of calories. If a balance sheet is ever constructed for milk, that quantity which is diverted into the manufacturing stream to produce butter, cheese, ice cream and yoghurt has to be deducted from the liquid product.

As was explained during the final seminar, the balance sheets which were produced and which are displayed in Annex 4 should only be considered as first attempts. They were constructed as a

training exercise with insufficient time to verify the accuracy of the calculations let alone the accuracy and reasonableness of the data used.

THIRD SEMINAR

During the closing seminar, in addition to the balance sheets for Irish Potatoes, Beans, Cassava, Bananas, Finger Millet and Fish, - Annex 4 - I distributed and discussed the points raised under the heading “NOTES ON THE PRELIMINARY FOOD BALANCE SHEETS” –same annex. In the discussion which followed, one participant suggested that with the present government policy of increasing exports of manufactured agricultural products, food balances could provide an insight into the affect of the removal of this food on the availability of the food for local consumption.

One matter I raised during the discussions, which arose from examination of survey data, was the continuous decline in the average area of farm holdings now estimated to be less than one hectare. Should this continue, and unless more land is brought into agriculture or more off farm work is created, there is little doubt that in a year of low rainfall, what are now classed as subsistence farms could well provide less than subsistence to the operators.

During my research into data sources, I had a discussion with Ms. Anununciata Hacuza a Senior Agricultural Economist with MAAIF who had attended the GDDS meetings in Maputo. She is charged with developing an early warning system for food and questioned whether food balance sheets might prove useful. Over the longer term they could be an indicator of trends. However, we agreed that while balance sheets provided information after the fact, what was really required was a system that could forecast harvests during the growing season. Perhaps this could best be attained by setting up focus groups of agricultural producers organized by the District Agriculturalists. I suggested she might approach the European Union or other such organization for funding. It might be a project in which the World Bank would be interested.

SUGGESTIONS AND CONCLUSIONS

As I expected, problems in assembling National Food Balance Sheets for Uganda are not in the concepts and procedures, which I believe are now well understood by those who attended the seminars and worked with me, but in obtaining accurate data to introduce into the calculations. Once information from the current census of agriculture becomes available, presumably with better data, an attempt should be made to compile current balance sheets for the major crops, for fish and for cattle. These should then be related to the preliminary estimates that we made for 2004 to determine where we might have gone wrong or conversely which of the more recent estimates should be held in question.

The strength of future agricultural statistical series rests on the successful completion of the 2008/9 Uganda Census of Agriculture, now in progress. A few thoughts on this survey possibly are in order.

As soon as the field work is finished, those involved in the field should be debriefed intensively to determine problem areas, to find out the type of questions farmers can and cannot answer, to discover the reasons for non response (a problem with any survey and one which I am not sure has yet been addressed) and to provide logistical information – how many holdings can be visited in a day – of use in planning future surveys. Many internal checks will need to be performed and results compared with existing series. The use of GPS technology to estimate area is extremely interesting. I wish that I had had the time and the opportunity to follow this application in the field. There

appears to be some question as to its reliability in regions of sloping terrain. Of special use would be a comparison of GPS estimates of plot area (assumed to be an accurate measure) with the farmers own estimate of the area – leading to one of the few possible calculations of non sampling error. During the discussions after the final seminar I suggested this topic as a prime candidate for a research paper.

There may be some possibility of developing stocks estimates from the census data and in fact going further to the calculation of supply disposition balance sheets - a useful tool in preventing estimates from getting out of line and especially necessary in producing estimates of livestock numbers; this is an area of statistics I did not cover due to time constraints.

The census will not assist in solving the problems associated with measurement of “informal” imports and exports. I am not at all sure how these values have been arrived at. Somewhere in a FAO document I remember reading that an “Educated guess was better than no information at all”. This may be true, but how educated are the guesses in this “informal” trade sector and for that matter in determining “regional” sales of fish. Production from fish farms is in the same category of absence of firm data. In the past I have found that close contact with those involved at the lowest level – the regional traders, the fish farmers themselves is the best and possibly the only way to develop the knowledge required for a reasonably “educated” guess.

I certainly hope that once the results from the census are tabulated they will form the basis for further estimates and hopefully the resurrection of some form of annual crop survey. Using a sub sample of respondents from the census should perhaps receive consideration. In this way estimates could be made directly from the information obtained as well as from the year to year change.

And now to a more contentious issue. I was amazed at the productivity of the Agricultural Directorate. The range of agricultural statistics produced is most impressive. However I might suggest with some trepidation that it is perhaps too extensive. For the census, there are almost ninety crop codes. Wouldn't concentration on say twenty to thirty of the most important crops with a category for “other crops” have both increased efficiency and accuracy too? It is suggested that an annual crop survey, if implemented, should be limited in crop coverage to major food crops. Information on crops for export can be obtained through other sources.

Just as I was most surprised by the extensive coverage of the statistics, I was duly impressed by the commitment, knowledge and enterprise of the census staff. As Director, Mr. Seth Mayinza's support of my mission was everything one could expect, especially considering he was in the midst of managing a census. I am truly grateful for his assistance.

I would also like to thank the World Bank for giving me the opportunity to participate in such an interesting and challenging mission.

Barry Proud

Victoria January 6, 2009

ANNEX 1

General Data Dissemination System, (GDDS phase 2)

Statistics Projects for Anglophone Africa: Provision of technical assistance as the expert for:

Topic: Agriculture Statistics

For: Uganda, Uganda Bureau of Statistics (UBOS)

Background

With financial support from the Department for International Development (DFID) of the United Kingdom, the World Bank is implementing a project to assist 21 Anglophone Africa countries to participate in the General Data Dissemination System (GDDS). Participating countries are being assisted to participate in the GDDS through two separate, but linked projects both financed by DFID. The IMF is providing project management and technical support in the area of economic and financial statistics. The World Bank is providing technical support in the area of socio-demographic statistics. Both projects run concurrently until March 2009.

Technical Assistance

Technical assistance is being provided through the World Bank to help countries implement plans for improvement in population, health, agriculture, labor market, justice and security, management of statistical systems, GIS and small area statistics. The GDDS framework developed by the IMF provides the framework for the detailed elaboration of long-term statistical development strategies. Participating countries have already expressed their requests for technical assistance and both the IMF and the World Bank have developed their assistance strategies.

Uganda was one of the countries which asked for technical assistance in the field of Agriculture Statistics.

Terms of Reference

Background

Uganda attended the GDDS 2 Module launch workshop on Agriculture statistics in Maputo in March 2007. They drew up their Country Work Plan regarding the delivery of three technical assistance missions covering three country-identified priorities. The first mission (developing a sample for the Census of Agriculture) has already been carried out. A second mission (developing a producer price index for agriculture) is scheduled to be carried out early in 2009. The focus of this mission is intended to facilitate the development of **national food balance sheets** for Uganda.

The overall objectives for this mission are to

- present a seminar to the staffs of the Uganda Bureau of Statistics (UBOS), and

- work with the staff of UBOS and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) to construct food balances for principle foods.

Detailed Terms of Reference and Provisional Work Plan

The consultant is being asked to do the following:

1. Prior to arrival in Uganda conduct a review of information available regarding agricultural statistics for Uganda agriculture and FAO's methodology for the construction of food balance sheets.
2. On arrival the first two days will be devoted to meeting with relevant officials in the Bureau of Statistics and the Ministry of Agriculture, Animal industry and Fisheries. This will enable the plan of work to be fine tuned according to the Ugandan requirements and further knowledge gained regarding the availability of statistics and their reliability. The work plan should be updated as necessary.
3. On the third day conduct a seminar with the staff of UBOS and the Ministry of Agriculture, Animal industry and Fisheries to provide a broad overview of food balances, but as far as possible will relate to actual crops and food products. The seminar will:
 - a. The use of food balances
 - b. The methodology of their construction
 - c. Strengths and weaknesses of such balances
 - d. Data requirements and possible sources
 - e. The construction and use of consumption surveys
 - f. Reconciliation of differing results
 - g. Development of nutritional information from such food balances
4. The following six days will be devoted to working closely with staff members of the two institutions mentioned above, to develop food balances for various foods as decided in discussions with these authorities. If feasible, the consultant and the staff should ^{work} some representative commodities. For example:
 - a. Maize - a major food crop where the methodology can also be applied to Sorghum and Finger Millet.
 - b. Sweet potatoes or Cassava – both important food crops where methodology is probably similar to that which can be used for bananas.
 - c. Fish – a very important source of protein involving unique problems regarding measurements and methodology.
 - d. If it is not feasible to work with fish, then meat consumption (beef, goat, chicken) could be chosen.
5. The final day in Uganda will be used to present a second seminar/ discussion group to discuss what has been achieved, what problems remain and how they might be addressed and what are the challenges for the future.
6. On return to Canada, prepare a mission report that will be completed by January 15, 2009. The report is to include all the training material used by the consultant.

Extensive use should be made of the FAO web site and material.
See <http://www.fao.org/es/ess/menu3.asp>

Timing

The mission is to take place in Kampala, Uganda during the period December 1-12, 2008. The consultant is expected to complete the mission report by January 15, 2009.

Preparation and Delivery Time

This mission is expected to require 14 days (excluding weekends) including 3 days of preparation, 10 days in Kampala and 1 day to complete the mission report.

ANNEX 2

LISTS OF PARTICIPANTS

FOOD BALANCE SHEETS SEMINAR DECEMBER 3 2008

Ogden Michael Sijje	Statistician	UBOS
Bright Kimuli Richard	Statistician	UBOS
Daisy Eresu	Senior Agric Officer	MAAIF
Dr Kiconco Burn	Senior Veterinary Officer	MAAIF
Annunciata Hakuza	Senior Agric Economist	MAAIF
Kakaire Stephen	Senior Agric Inspector	MAAIF
Seth Mayinza	Director Census of Agriculture	UBOS
Kalibala Julie	Senior Statistician	UBOS
Twinematsiko Jotham	Statistician	UBOS
Waswa Hassan	Statistician	UBOS
Barry Proud	Consultant	World Bank

FOOD BALANCE SHEETS SEMINAR DECEMBER 5 2008

Seth Mayinza	Director Census of Agriculture	UBOS
Kakaire Stephen	Senior Agric Inspector	MAAIF
Ogen Michael Sijje	Statistician	UBOS
Waswa Hassan	Statistician	UBOS
Daisy Eresu	Senior Agric Officer	MAAIF
Kimuli Richard	Statistician	UBOS
Anngela Kiconco	Statistician	UBOS
Barry Proud	Consultant	World Bank

FOOD BALANCE SHEETS SEMINAR DECEMBER 12 2008

Mubiru James	Deputy Executive Director	UBOS
Flavia Duno	Statistician	UBOS
Ogen Michael Sijje	Statistician	UBOS

Mutyaba Andrew	Statistician	UBOS
Twinematsiko Jotham	Statistician	UBOS
Nsiko Israel	Statistician	UBOS
Waswa Hasan	Statistician	UBOS
Seth Mayinsa	Director Census of Agriculture	UBOS
Barry Proud	Consultant	World Bank

ANNEX 3

BASIC SIMPLE NATIONAL FOOD BALANCE SHEET

STOCKS AT THE BEGINNING OF THE PERIOD– in all locations within the country.

Plus - PRODUCTION – amount of harvest of each crop and the addition to livestock through births.

Minus – POST HARVEST LOSSES due to all causes – damage by insects, rodents, moulds, floods etc and deaths of livestock not fit for consumption

Minus – SEED

Minus – ANIMAL FEED

Minus – LOSSES IN CONVERSION AND MANUFACTURING – Milling of grains, slaughtering of animals and poultry.

Minus – EXPORTS

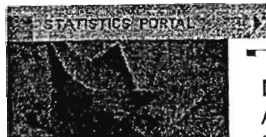
Plus – IMPORTS

Minus – STOCKS AT THE END OF THE PERIOD – in all locations within the country.

Equals – FOOD AVAILABLE FOR CONSUMPTION.



GLOSSARY OF STATISTICAL TERMS



FOOD BALANCE SHEET

- Glossary Home
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Definition:

A food balance sheet presents a comprehensive picture of the pattern of a country's food supply during a specified reference period. The food balance sheet shows for each food item - i.e. each primary commodity and a number of processed commodities potentially available for human consumption - the sources of supply and its utilization.

Context:

The total quantity of foodstuffs produced in a country added to the total quantity imported and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period.

On the utilization side a distinction is made between the quantities exported, fed to livestock, used for seed, put to manufacture for food use and non-food uses; losses during storage and transportation, and food supplies available for human consumption.

The per caput supply of each such food item available for human consumption is then obtained by dividing the respective quantity by the related data on the population actually partaking of it. Data on per caput food supplies are expressed in terms of quantity and - by applying appropriate food composition factors for all primary and processed products - also in terms of caloric value and protein and fat content.

Annual food balance sheets tabulated regularly over a period of years will show the trends in the overall national food supply, disclose changes that may have taken place in the types of food consumed, i.e., the pattern of the diet, and reveal the extent to which the food supply of the country, as a whole, is adequate in relation to nutritional requirements.

Source Publication:

FAOSTAT Agricultural Data, Food and Agricultural Organisation of the United Nations, Rome

Hyperlink:

<http://www.fao.org/waicent/faostat/agricult/fbs-e.htm>

Statistical Theme: Agriculture and fisheries statistics

Created on Tuesday, September 25, 2001

Last updated on Wednesday, January 04, 2006

Definition

Close

The context provides detailed background information about the definition, its relevance, and in the case of data element definitions, the appropriate use(s) of the element described. The Context field may also contain links to more detailed documentation describing these aspects.

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FOOD COMPOSITION TABLE FOR USE IN AFRICA

Item No.	Food and Description	French Name	Composition in Terms of 100 Grams Edible Portion											
			Food Energy	Moisture	Protein	Fat	Carbohydrate, total (incl. fiber)	Fiber	Ash	Calcium	Phosphorus	Iron	Retinol	B-carotene Equivalents
			Calories	Percent	Grams	Grams	Grams	Grams	Grams	Milligrams	Milligrams	Milligrams	Micrograms	Micrograms
1. CEREALS AND GRAIN PRODUCTS														
	Acha, acca, findi; fonio; hungry rice (Digitaria spp.):	Fonio												
1	Black (D. iburua)	Fonio noir												
	Whole-grain		343	10.3	8.9	3.0	75.6	6.2	2.2		234	10.0?		
				(1)	(1)	(1)		(1)	(1)		(1)	(1)		
2	Meal		360	10.7	10.5	3.1	74.6	.3	1.1		144	3.0		
				(1)	(1)	(1)		(1)	(1)		(1)	(1)		
3	White (D. exilis)	Fonio												
	Whole-grain		332	11.2	7.1	3.0	74.4	7.4	4.3	41	191	8.5		
				(13)	(12)	(13)		(11)	(11)	(11)	(12)	(5)		
				10.2-13.7	4.5-9.8	1.8-4.5		4.6-9.9	1.6-9.0	30-68	90-360	3.0-12.0		
4	Meal		349	11.2	7.4	1.2	78.7	.9	1.5	26	94	3.4		
				(6)	(6)	(6)		(4)	(5)	(5)	(5)	(3)		
				6.3-13.0	6.4-8.7	6-1.8		4-1.1	5-2.0	20-36	60-149	1.0-8.0		
	African rice, See Rice, red, native.													
5	Barley (Hordeum vulgare):	Orge												
	Whole-grain		337	9.9	10.0	1.6	76.2	6.0	2.3	61	251	17.9		
				(5)	(6)	(5)		(4)	(5)	(3)	(3)	(2)		
				7.1-12.2	7.0-16.6	1.2-2.1		5.4-7.3	1.3-3.5	50-71	221-300	10.4-25.3		
6	Whole-grain, germinated Raw		183	51.6	5.2	1.2	40.9	3.4	1.1	23	130	5.1		0
				(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)		(1)
7	Dried		334	10.9	10.9	2.0	73.6	6.4	2.6	60	328	12.0		0
				(4)	(4)	(4)		(4)	(4)	(4)	(4)	(4)		(4)
				9.8-12.0	10.0-12.3	1.4-2.4		5.9-7.3	2.1-3.1	46-75	310-350	5.5-24.4		-
8	Malted		336	9.1	11.5	1.4	75.0	7.8	3.0			17.6		
				(1)	(1)	(1)		(1)	(1)			(1)		
	Barley - continued:													
9	Meal			14.6	7.8			4.4		80	320			
				(1)	(2)			(1)		(1)	(1)			
					7.7-7.8									
10	Gäbs (barley flour) from Ethiopia		361	9.1	9.8	2.8	76.2	2.4	2.1	92	330	14.9		0
				(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)		(1)
11	Pearled			10.8										
				(1)										
	Biscuits, made from:	Biscuits												
12	Teff, from Ethiopia		367	16.1	15.4	13.6	52.3	3.7	2.6	153	360	12.5		0
				(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)		(1)
13	Wheat, from U. A. R.		371	7.7	12.5	7	77.0		2.1					
				(1)	(1)	(1)			(1)					
14	Wheat, imported from Europe		376	6.5	12.9	1.1	77.0	.4	2.5					
				(2)	(2)	(2)		(2)	(2)					
				5.5-7.5	11.2-14.6	-		-	2.3-2.7					
	Breads:	Pains												
	Cassava bread. See Starchy tubers.													
	Cornbread. See Maize, bread.													
15	Rusks		423	5.6	10.9	12.6	69.9	.1	1.0	40	113	2.2		
				(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)		
16	Rye		245	38.9	6.6	2	52.9	.7	1.4	29	90	1.7		
				(11)	(9)	(9)		(9)	(9)	(9)	(9)	(9)		
				34.6-39.8	-	-		-	-	-	-	-		
17	Syrian		388	6.0	12.2	1.6	79.4	.6	.8	31	87	2.7		

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PRINT

Nutritive Factors

COMMODITY	calories (per 100 grammes)	protein (mg per gramme)	fat (mg per gramme)
ALFALFA MEAL	265	305	20
ALMONDS	236	80	209
ALMONDS SHELLED	589	200	522
ANISE	345	158	149
APPLE JUICE CONCENTRATED	166	5	4
APPLE JUICE SINGLE STRENGTH	47	1	1
APPLES	48	1	3
APRICOTS	45	13	4
ARECA NUTS	245	49	44
ARTICHOKES	20	11	1
ASPARAGUS	12	16	1
AVOCADOS	119	15	113
BACON PIGS	362	131	341
BAMBARA BEAN	365	177	63
BANANAS	60	7	3
BARLEY	332	120	18
BARLEY FLOUR AND GRITS	343	92	17
BARLEY PEARL	346	90	14
BEANS DRY	341	221	17
BEANS GREEN	50	30	4
BEEF BONLESS	150	185	79
BEEF CANNED	233	250	140
BEEF DRIED, SALT, SMOKED	203	343	63
BEEF PREPARATIONS	233	250	140
BEEF VEAL	225	147	180
BEER BARLEY	49	5	0
BEER MAIZE	40	4	0
BEER MILLET	40	4	0
BEER SORGHUM	40	4	0
BEEF PULP DRY	288	111	6
BERRIES NES	49	10	7
BEVERAGES DISTILLED. ALCOHOLIC	295	0	0
BEVERAGES NON ALCOHOLIC	39	0	0
BLUEBERRIES	120	7	4
BRAN RICE	276	133	158
BRAN WHEAT	213	121	31
BRAZIL NUTS	315	69	318
BRAZILNUT SHELLED	656	143	662
BROAD BEANS GROUND	23	23	1
BROAD BEANS DRY	343	234	20
BREAD	249	82	12
BREAKFAST CERLEALS	389	74	7
BUCKWHEAT	330	120	20

ANNEX 4

NOTES ON THE PRELIMINARY FOOD BALANCE SHEETS

1. CHANGE IN STOCKS – I have not been able to obtain any information on December 31st or January 1st stocks for any of the crops. This may not be serious as I doubt that they would differ much. Anyway I am forced to assume they don't.
2. I am still working on IMPORTS and EXPORTS. While export quantities of grains are published the same is not true of imports. Additionally, published data only appear to cover movements through commercial channels, not what is referred to as “regional trade.”
3. We have had problems reconciling PRODUCTION from the “Statistical Abstract” with estimates from the survey. I am not sure how well we can combine first and second season harvests to produce estimates for a calendar year.
4. POST HARVEST LOSSES are already removed from production estimates in the 2008 statistical Abstract though I have no idea how this could be achieved. In obtaining such estimates from the survey for maize we arrived at an estimate of less than 1% with only about five percent of farmers representing any loss. I would consider this to be the gross underestimate. In earlier work in Uganda (1997) FAO estimated such losses at 16%.
5. I am not sure about SEED USE estimates from the survey as we have not had time to correlate the estimate for seed use to the estimate of area sown for second season crops.
6. I see no way of checking the validity of the “FEED USE” figure except possibility to ensure that all farmers reporting such use also have livestock. We have therefore used the figure as is.
7. The population figure used to determine “Amount per Capita” is from the “Statistical Abstract” for 2008 Total “Mid Year Population” page 93.
8. Conversion factors for calories, protein and fats all come from “Nutritive Factors” FAO Statistics Division www.fao.org/es/ess
9. For Fish, all estimates were provided by Mr. J. Wadanga of the Department of Fisheries Resources.
10. Because of severe time constraints, we have not attempted to produce a balance sheet for bovines let alone pigs, goats and poultry. For animals slaughtered for beef there will be serious problems in obtaining reasonable data. Beginning and end of year numbers are unknown. As far as I am aware, there are no reliable figures on imports and exports. I am sure there is a great deal of unrecorded cross border movements. The different weight of animals at slaughter also produce problems.

11. I cannot stress too strongly how these preliminary estimates especially for per capita values should be compared to similar estimates for other African countries and checked for reasonableness with nutritionists from the Ministry of Health.

**FOOD BALANCE FOR
UGANDA**

IRISH POTATOES

2004

CHANGE IN STOCKS

PLUS IMPORTS

MINUS EXPORTS

PLUS PRODUCTION

MINUS POST HARVEST LOSSES

MINUS SEED USE

MINUS FEED USE

EQUALS AMOUNT FOR FOOD

AMOUNT PER CAPITA

AMOUNT PER CAPITA / DAY

CALORIES PER CAPITA / DAY

PROTEIN PER CAPITA / DAY

FAT PER CAPITA / DAY

TAKEN INTO ACCOUNT IN PRODUCTION ESTIMATE

	000 tonnes	2,650
	000 tonnes	170
	000 tonnes	
	000 tonnes	2,480
	Kgs	96
	Kgs	0.26
	No	174
	Mgs	47
	Mgs	

**FOOD BALANCE FOR
UGANDA**

BEANS

2004

CHANGE IN STOCKS

PLUS IMPORTS

MINUS EXPORTS

PLUS PRODUCTION

MINUS POST HARVEST LOSSES

MINUS SEED USE

MINUS FEED USE

EQUALS AMOUNT FOR FOOD

AMOUNT PER CAPITA

AMOUNT PER CAPITA / DAY

CALORIES PER CAPITA / DAY

PROTEIN PER CAPITA / DAY

FAT PER CAPITA / DAY

TAKEN INTO ACCOUNT IN PRODUCTION ESTIMATE

		36
		91
000 tonnes		455
000 tonnes		4
000 tonnes		9
000 tonnes		387
Kgs		15
Kgs		0.04
No		165
Mgs		8,840
Mgs		680

**FOOD BALANCE FOR
UGANDA**

CASSAVA

2004

CHANGE IN STOCKS

PLUS IMPORTS

MINUS EXPORTS

PLUS PRODUCTION

000 tonnes

5,500

MINUS POST HARVEST LOSSES

MINUS SEED USE

MINUS FEED USE

000 tonnes

8

EQUALS AMOUNT FOR FOOD

000 tonnes

5,508

AMOUNT PER CAPITA / YEAR

Kgs

214

AMOUNT PER CAPITA / DAY

Kgs

0.6

CALORIES PER CAPITA / DAY

No

654

PROTEIN PER CAPITA / DAY

Mgs

54

FAT PER CAPITA / DAY

Mgs

12

TAKEN INTO ACCOUNT IN PRODUCTION ESTIMATE

**FOOD BALANCE FOR
UGANDA**

BANANAS

2004

CHANGE IN STOCKS		
PLUS IMPORTS		9
MINUS EXPORTS		19
PLUS PRODUCTION	000 tonnes	9,686
MINUS POST HARVEST LOSSES		
MINUS SEED USE		
MINUS FEED USE	000 tonnes	14
EQUALS AMOUNT FOR FOOD	000 tonnes	9662
AMOUNT PER CAPITA	Kgs	364
AMOUNT PER CAPITA / DAY	Kgs	1
CALORIES PER CAPITA / DAY	No	600
PROTEIN PER CAPITA / DAY	Mgs	70
FAT PER CAPITA / DAY	Mgs	30

TAKEN INTO ACCOUNT IN PRODUCTION ESTIMATE

**FOOD BALANCE FOR
UGANDA**

	FINGER MILLET	
	2004	
CHANGE IN STOCKS		
PLUS IMPORTS		
MINUS EXPORTS		2
PLUS PRODUCTION	000 tonnes	659
MINUS INDUSTRIAL USE	000 tonnes	?
MINUS POST HARVEST LOSSES	
MINUS SEED USE	000 tonnes	3
MINUS FEED USE	000 tonnes	1
EQUALS AMOUNT FOR FOOD	000 tonnes	653
AMOUNT PER CAPITA	Kgs	25
AMOUNT PER CAPITA / DAY	Kgs	0.7
CALORIES PER CAPITA / DAY	No	238
PROTEIN PER CAPITA / DAY	Mgs	68
FAT PER CAPITA / DAY	Mgs	21

1. TAKEN INTO ACCOUNT IN PRODUCTION ESTIMATE?
2. FOR BREWWINE?

**FOOD BALANCE FOR
UGANDA**

MAIZE

2004

CHANGE IN STOCKS

PLUS IMPORTS

MINUS EXPORTS

PLUS PRODUCTION

MINUS POST HARVEST LOSSES

MINUS SEED USE

MINUS FEED USE

EQUALS AMOUNT FOR FOOD

AMOUNT PER CAPITA

AMOUNT PER CAPITA / DAY

CALORIES PER CAPITA / DAY

PROTEIN PER CAPITA / DAY

FAT PER CAPITA / DAY

TAKEN INTO ACCOUNT IN PRODUCTION ESTIMATE?

	000 tonnes	55
	000 tonnes	283
	000 tonnes	1,080
	000 tonnes
	000 tonnes	19
	000 tonnes	45
	000 tonnes	788
	Kgs	307
	Kgs	840
	No	2,994
	Mgs	798
	Mgs	361

**FOOD BALANCE FOR
UGANDA**

	FISH	
	2004	
CHANGE IN STOCKS		
PLUS IMPORTS		
MINUS EXPORTS	000 tonnes	30
PLUS CATCH	000 tonnes	435
PLUS FARMED FISH	000 tonnes	10
PLUS TRADED REGIONALLY	000 tonnes	60
MINUS FEED USE	000 tonnes	106
EQUALS AMOUNT FOR FOOD	000 tonnes	166
AMOUNT PER CAPITA	Kgs	6
AMOUNT PER CAPITA / DAY	Kgs	0.02
CALORIES PER CAPITA / DAY	No	20
PROTEIN PER CAPITA / DAY	mg s	4
FAT PER CAPITA / DAY		

ONLY 45% OF WHOLE FISH IS HUMAN FOOD