



Methodological Guidelines for Implementing Grain Stock Surveys

Yakob M. Seid

Yakob M. Seid

Statistician- AMIS Project

FAO Statistics Division

Yakob.Seid@fao.org



Content

- Background on AMIS
- Strengthening AMIS Globally and in Selected Countries (BMG Project)
- Designing and Implementing Grain Stock Surveys



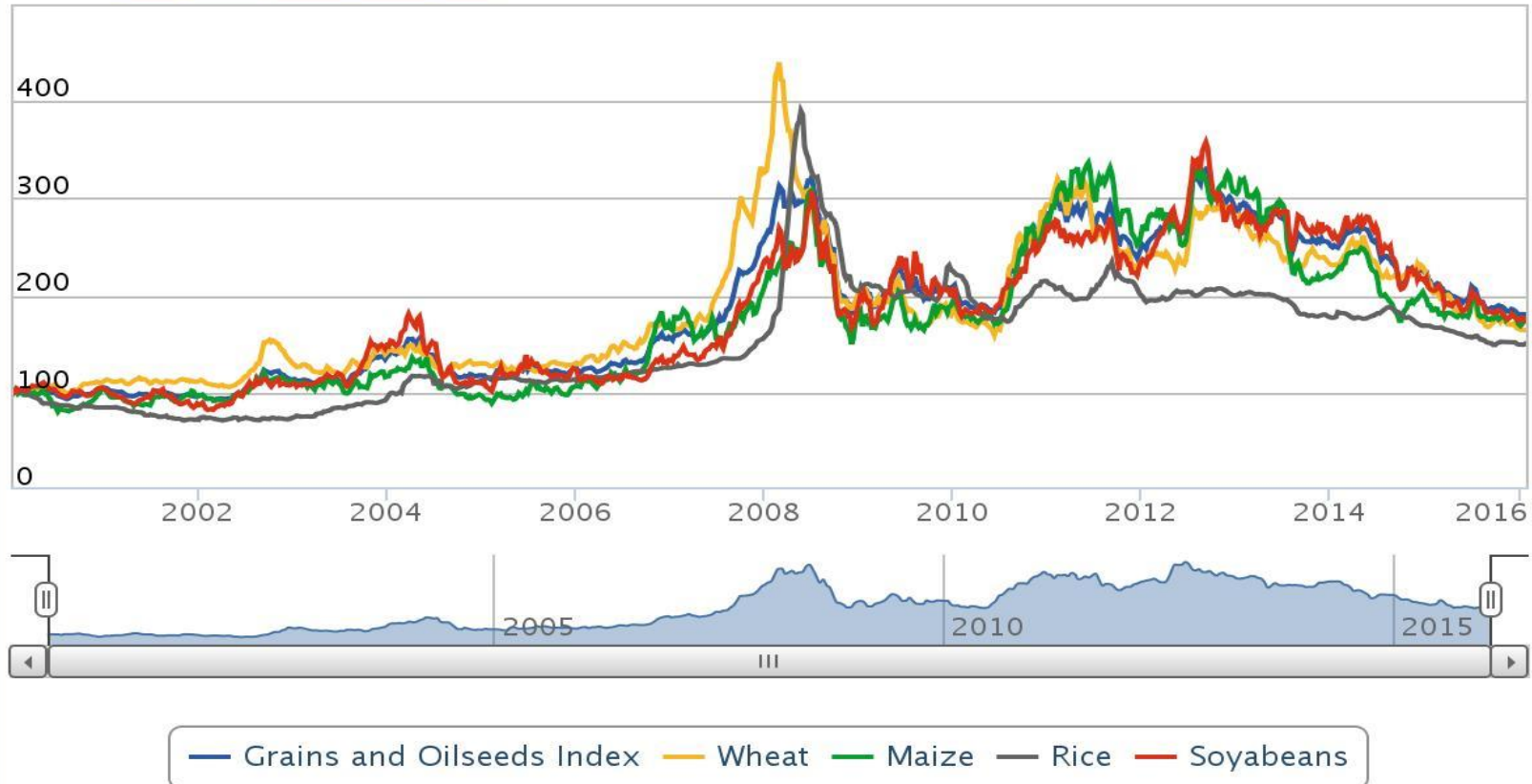
Why AMIS ? - creation

IGC Grains and Oilseeds Index and sub-Indices (Daily)

Jan-00 = 100

Zoom 1m 1y YTD 5y All

From Jan 3, 2000 To Feb 5, 2016



Source: International Grains Council (IGC)

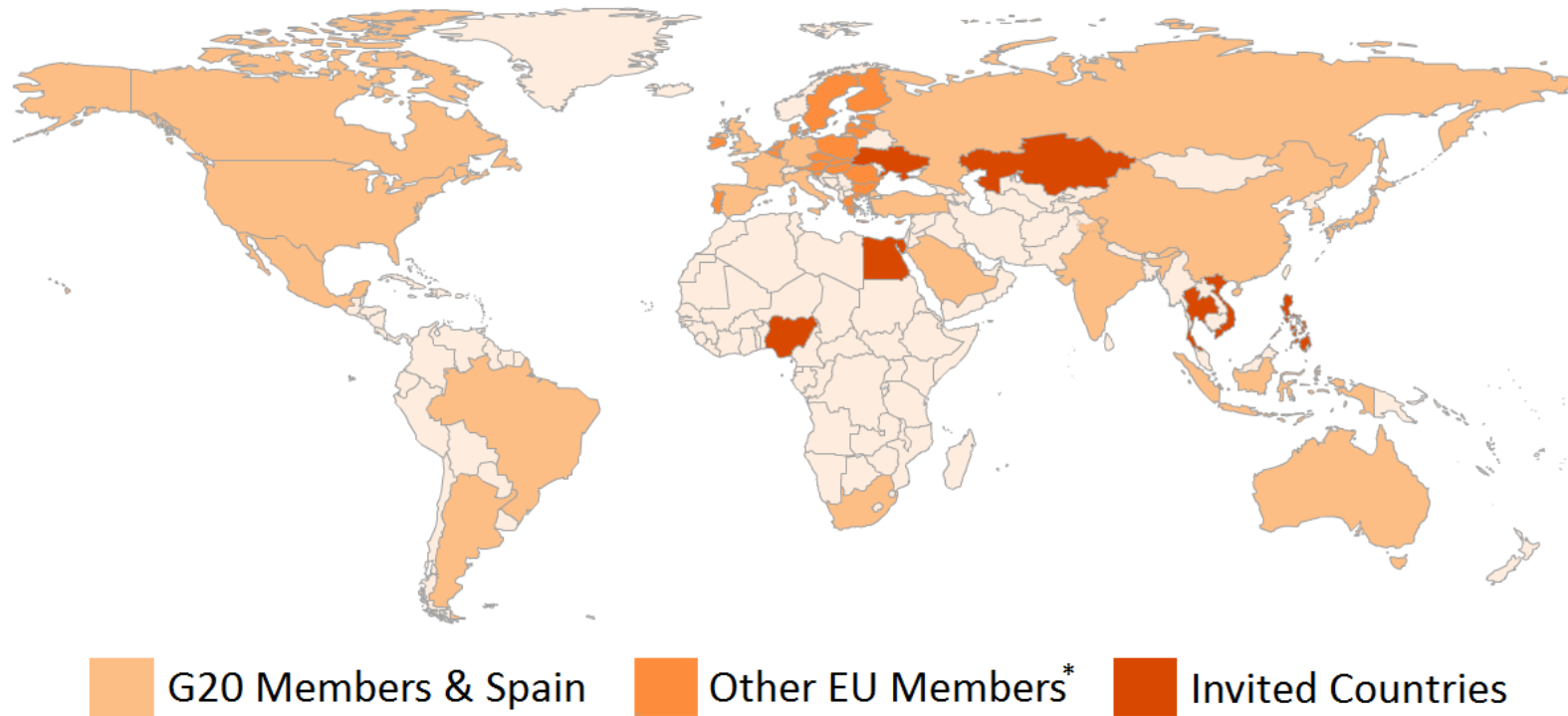


What is AMIS?

- **A G20 initiative** to increase food market transparency and reduce food price volatility
 - Crops: wheat, maize, rice, and soybeans
 - Focus: production, utilization, stocks, trade
- Participants: G20 Members plus Spain and 7 invited countries
- **Bodies and governance:**
 - Secretariat of International Organizations, hosted by FAO
 - The Global Food Market Information Group (countries, technical)
 - The Rapid Response Forum (countries, policy)
 - + steering committee, etc.



What is AMIS? - coverage

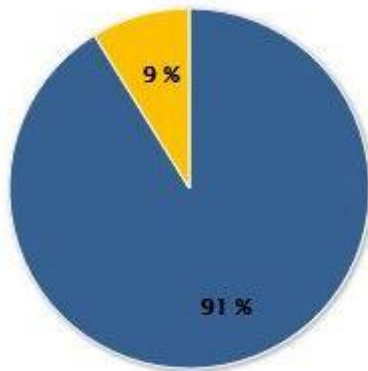


* Not participating in AMIS as individual countries, but collectively represented by the European Union



What is AMIS? - main market players

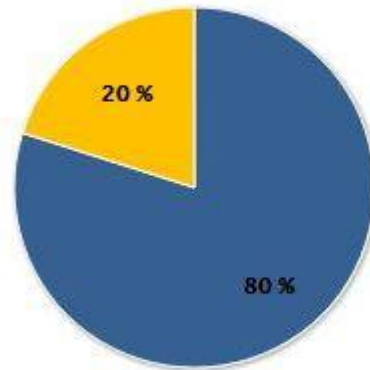
Maize Production
2013 - 2015 average



■ AMIS ■ Non-AMIS

Source: AMIS Statistics

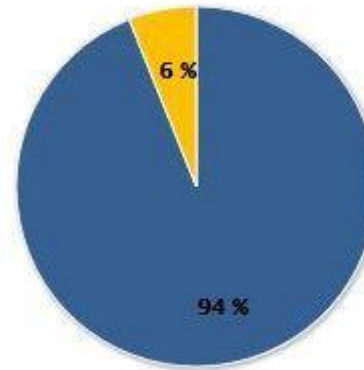
Rice (milled) Production
2013 - 2015 average



■ AMIS ■ Non-AMIS

Source: AMIS Statistics

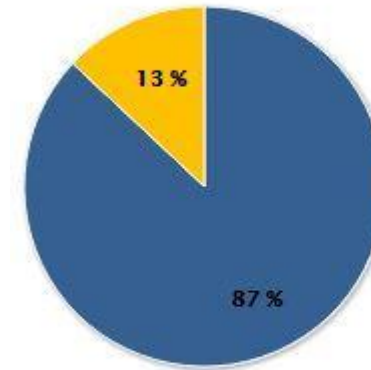
Soybeans Production
2013 - 2015 average



■ AMIS ■ Non-AMIS

Source: AMIS Statistics

Wheat Production
2013 - 2015 average



■ AMIS ■ Non-AMIS

Source: AMIS Statistics



What is AMIS? - activities





Strengthening AMIS Globally and in Selected Countries (Nigeria, India, Bangladesh)

Objective:

- Adopt and further develop existing data and analysis tools and AMIS platforms for use at global and country level
- Design and test rigorous statistical methods based on geo-referenced technologies
- Improve the ability of Bangladesh, India and Nigeria to apply the best methods and digital technology for improved data collection and analysis

Activity 2.1.1

Improvement of **Food Stock Estimation** with a view to developing an approach that can be applied in developing countries .



Designing and Implementing Grain Stock Surveys

Conceptual framework:

The first step in developing a strategy for stock measurement through sample surveys is to define the relevant stocks.

Generally speaking, stocks are defined as the quantities of particular crops held in storage by supply-chain agents, from farmers to consumers, at a given time.

The value chain actors are :

- Subsistence, small-, medium- and large-scale farmers;
- Millers;
- Wholesalers and retailers;
- Consumers (non-producing households, feed-seed users, others); and
- Governments.



Designing and Implementing Grain Stock Surveys

Conceptual framework:

Food stocks can be categorized in terms of :

- The agents holding them :
 - Public
 - Private
 - On farm stocks
 - Commercial stocks
 - Non farm stocks
- The reasons why they are held :
 - Working stocks
 - Reserves
- The time at which they are held :
 - With regard to the times at which stocks are held, the quantity of any given crop stored at the end of one crop year and carried into the next is considered to be the most informative in terms of establishing prices and determining market outcomes;

=> they are referred to as “carry-out stocks” or “ending stocks”.



Designing and Implementing Grain Stock Surveys

Glossary for stocks data

Concept	Definition
Stocks	Quantity of a commodity held in storage by any of the various agents along the supply chain, from farmers to consumers, at a given moment in time.
Carry-in stocks (or opening stocks)	Quantity in stocks available at the beginning of the reference period irrespective of origin, i.e. including domestic production and imports. In principle, these should include stocks held at various levels between the farm and the level at which the “final consumption” of the commodity is measured. Thus, government stocks, stocks with manufacturers, importers, exporters and other wholesale merchants, transport and storage enterprises and stock on farms are included.
Carry-out stocks (or closing stocks)	Quantity of stocks held at the end of the reference period and carried into the next irrespective of origin, i.e. including domestic production or imports. Carry-out stocks are equal to the Carry-in stocks of the following reference period.
Stock variation (or Change in Stocks)	Changes in stocks occurring during the reference period at all levels between the production and the retail levels, i.e. including changes in government stocks, in stocks with manufacturers, importers, exporters, other wholesale and retail merchants, transport and storage enterprises and in stocks on farms.
Working (or pipeline stocks)	Quantity of a commodity held in storage by a food processor, livestock feeder or other agent in the normal course of its activity to ensure continuous operations.
Reserves (or buffer stocks)	Quantity of storage in excess of working stocks. They can also be defined as the quantity of a commodity held in storage to influence market outcomes or maintain food supplies throughout the crop year.
Public stocks	Quantity of a commodity held in storage by public agencies or parastatal farms, irrespective of final use (working stocks or reserves).
Private stocks	Quantity of a commodity held in storage by any of the private agents along the supply chain, from farmers to consumers.



Designing and Implementing Grain Stock Surveys

Data sources:

Primary data sources: surveys and censuses with farm households and related community structures, business households, or government structures as statistical units of observation.

The secondary sources: administrative records, technological research information and international statistical publications.

When stock surveys are not carried out, countries will mostly rely on estimating stocks as residuals from the food balance or supply-utilization equilibrium. Abbot (2013) provides the following equation to illustrate this point.

$$\begin{aligned} & \textit{Carry - in stocks} + \textit{production} + \textit{imports} \\ &= \textit{exports} + \textit{carry - out stocks} + \textit{food use} + \textit{feed use} + \textit{industrial use, waste, losses and seed use} \end{aligned}$$



Designing and Implementing Grain Stock Surveys

Approaches

Dedicated surveys on a single category of stakeholders

- Off-farm Grain Stocks Survey (USDA-NASS)
- Survey of commercial stocks of corn and Soybeans (Statistics Canada)
- Survey of commercial stocks of the major special commodities (Statistics Canada)
- Ports, Co-operatives and Merchants stocks survey (DEFRA-UK)
- Cereal Stocks Surveys (DEFRA-UK)
- Commercial Stocks Surveys (NFA, Philippine Statistics Authority)
- Palay and Corn Stocks Survey (BSA, Philippine Statistics Authority)

Dedicated surveys on more than one category of stakeholders

- National Survey on Rice Stocks (Indonesia-BPS)
- Stocks Survey (IBGE, Brazil)

Stocks module integrated in other surveys

- Enquête Permanente Agricole (INSD Burkina Faso)
- Crop/Stocks Survey (USDA-NASS)
- Field Crop Reporting Series (Statistics Canada)
- Enquête Agricole de Conjoncture (INSTAT Mali)
- Enquête Agricole Annuelle (ANSD-Senegal)
- Surveys in the LSMS-ISA programme

Recommendations:

- Separate surveys on both farm and commercial stock
- Only in situation where non-farm household stock might influence food security, consuming household stocks should also be collected
- When separate surveys are not possible, surveying on-farm stocks resorting through a module



Designing and Implementing Grain Stock Surveys

Relevant Technical Issues - Timeliness

- Defining stocks in terms of the time at which they are held affects the survey approach
 - it affects the definition of stocks that are the subject of the survey questionnaire
 - it determines when and how often a survey should be carried out.
- For capturing annual ending stocks, surveys should be conducted at the beginning of each crop year.
- Where there are several crops during a calendar year, stocks should be surveyed more than once per year

	Timeliness			
	Frequency	Periodicity	Reference period	Resulting Type of Stocks
USA – CS	4 times per year	Mar, Jun, Sept, Dec	1 st day of the respective month (Mar, Jun, Sept, Dec)	Closing stocks for each trim.
USA- FS	4 times per year	Mar, Jun, Sept and Dec	1 st day of the respective month (Mar, Jun, Sept, Dec)	Closing stocks for each trim.
Canada-CS	3 times per year	Mar, Sept, Dec	Last day of the reference period	Closing stocks for each quarter
Canada-FS	4 times per year	Mar, Jul, Sept and Dec	Calendar year end (Dec, financial year end (Mar), crop year end (Jul/Sept)	Closing stocks for the calendar, financial and crop year
UK-CS	Semiannual	Feb and Jun	End of the reference months	Closing stocks for each semester
UK-FS	Semiannual	Feb and Jun	End of the reference months	Closing stocks for each semester
Philippines-HS	Monthly	Every last 2 days of the current month and the first two days of the succeeding month	1 st day of the succeeding month	Closing stocks for each month
Philippines-CS	Monthly	First day of each reference month	1 st day of the succeeding month	Closing stocks for each month
Brazil	Semiannual	Jan-Mar/Jul-Sept	30 Jun and 31 Dec	Ending stocks of each semester
Burkina Faso-AS	Annual	From the 15 th to the 30 th of September each year	30 Sept	Closing stocks for each crop year
Senegal-AS	Annual	From the 15 th to the 30 th of September each year	30 Sept	Closing stocks for each crop year

Recommendations:

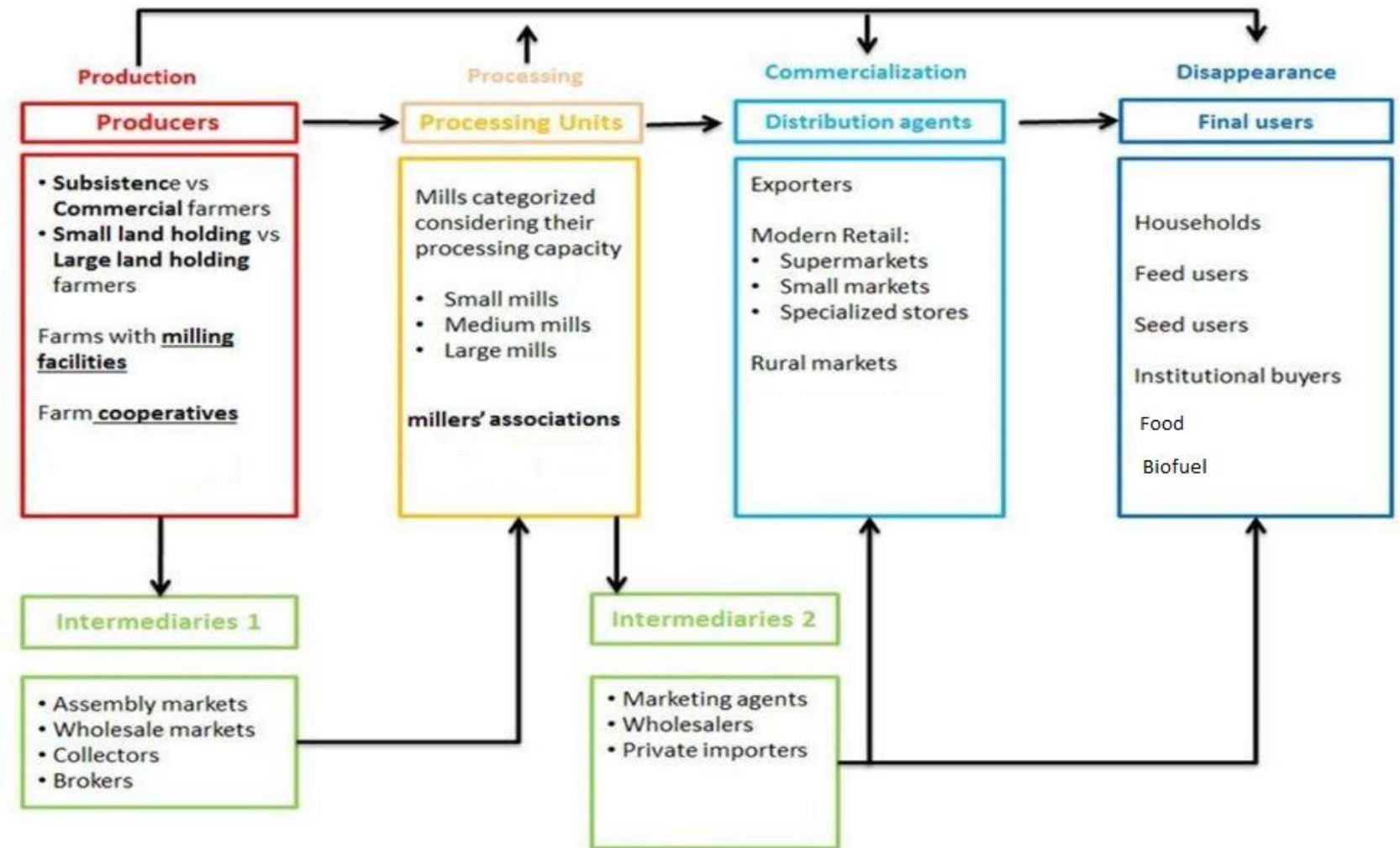
- Quarterly surveys provide useful information
- Crop year data better reflects both markets and food security conditions
- Surveys need to be done quite near the relevant date (stocks are at their lower level with the first day of month when harvest begins).



Designing and Implementing Grain Stock Surveys

Relevant Technical Issues – Understanding Value chain

- Survey method will require a thorough analysis of the supply-chains in order to identify the targets.
- Such studies are specific to each crop and country





Designing and Implementing Grain Stock Surveys

Relevant Technical Issues- Targeting

	Households	Farms	Commercial agents	Other agents
USA		X	X	
Canada		X	X	
Brazil		X	X	
Ukraine	X	X	X	
UK		X	X	
Georgia		X		
Philippines	X	X	X	NFA public stocks
Indonesia	X	X	X	BULOG stocks
Burkina Faso		X		
Mali		X		
Niger		X		
Senegal		X		
Rwanda		X		
Togo		X	X	
Uganda		X		

Recommendations:

- Both on-farm stocks commercial stocks should be surveyed
- Subsistence farmers may generate marketed surplus under better conditions and their food security is more dependent on stocks, so they should be surveyed
- Despite these general conclusions, the selection of stakeholders to survey is country and commodity specific



Designing and Implementing Grain Stock Surveys

Relevant Technical Issues – Commodities to be included

USA-CS	barley, canola, corn, flaxseed, mustard seed, oats, rapeseed, safflower, sorghum, soybeans, sunflowers, and wheat (in all the states). Rice, rye, peanuts, Austrian winter peas, chickpeas (garbanzos), dry edible peas, and lentils (only in selected states)
USD-FS	Corn, sorghum, oats, barley, all wheat, durum wheat, soybeans, rice peanut
Canada-CS	Grain corn and soybeans (main survey) canary seeds, chickpeas, dry field peas, lentils, mustard seeds, sunflower seeds (survey on main special crops)
Canada-FS	Barley, canary seed, canola, chick peas, corn for grain (include seed corn but exclude sweet corn), colored dry beans, white dry beans, white pea, dry field peas, flaxseed, lentils, linola (solin), mixed grains (two or more grains sown together), mustard seed, oats, rye (spring and fall), soybeans, sunflower seed (include sunola & other dwarf varieties), durum wheat, winter wheat, spring wheat
UK-CS	Wheat, Barlet, Oats
UK-FS	Wheat, Barlet, Oats
Philippines-HS	Palay, rice, corn grains, corn grits
Philippines-CS	Palay, rice, corn grains, corn grits
Brazil	Cotton (lint) cotton (seed), rice (paddy), milled rice, rice seed, coffee (natural), coffee (beans), beans black (beans), beans of color (grain), corn (grain), corn seed, soybeans (beans), soybean, wheat (grain), wheat seed
Indonesia	Rice
Burkina Faso-AS	Millet, sorghum, maize, rice, fonio
Togo-AS	Millet, red sorghum, white sorghum, maize, rice, fonio, wheat
Niger-AS	Millet, sorghum, maize, rice, other cereals

Recommendations:

- At a minimum, paddy and milled rice as well as wheat and coarse grain in grain equivalent should be collected
- Surveys should collect data on all major cereals and soybeans



Designing and Implementing Grain Stock Surveys

Designing stock surveys – Sampling frame

	Sampling Frame		
	List Frame	Area Frame	Administrative register
USA-Commercial survey			x
USD-On farm survey	x	x	
Canada-Commercial survey			x
Canada-On farm survey	x		
UK-Commercial survey			x
UK-On farm survey	x		
Philippines-Household Survey	x		
Philippines-Commercial survey			x
Brazil	x		x
Indonesia			
Burkina Faso-Agricultural Survey	x		
Gambia-Agricultural Survey	x		
Mali-Agricultural Survey	x		

Recommendations:

- List frame approach is more adequate
 - Lists will need to be maintained and regularly updated
- The list of the commercial survey needs to include all agents along supply chain who may hold stocks
- Surveys should collect data on all major cereals and soybeans



Designing and Implementing Grain Stock Surveys

Designing stock surveys – Sample survey vs complete enumeration

	Type of Investigation	
	Sample Survey	Complete enumeration
USA-Commercial survey		x
USD-On farm survey	x	
Canada-Commercial survey	x	
Canada-On farm survey	x	
UK-Commercial survey		x
UK-On farm survey	x	
Philippines-Household survey	x	
Philippines-Commercial survey	x	
Brazil	x	
Indonesia	x	
Burkina Faso-Agricultural survey	x	
Mali-Agricultural survey	x	
Niger-Agricultural survey	x	

Recommendations:

- Complete enumeration of large commercial storage entities and large farms is recommended
- Stratified samples of smaller farmers and traders are more cost effective



Designing and Implementing Grain Stock Surveys

Questionnaire for commercial stocks

	Aspects covered by the questionnaires			
	Stock quantity	Storage capacity	Ownership	Other
USA	x	x		
Canada	x		x	
UK	x			
Brazil	x	x	x	
Indonesia	x	x	x	x
Philippines	x			x

Questionnaire for on farm stocks

	Aspects covered by the questionnaires		
	Stock quantity	Storage capacity	Other
USA	x	x	x
Canada	x	x	x
UK	x		
Brazil	x	x	x
Burkina Faso	x		
Philippines	x		x

Recommendations:

- Questionnaires should focus on stocks held at the time of interview
- Should be designed to elicit information about ownership
- Best to use local units of measure and provide conversion
- Storage capacity is less relevant where storage capacity is not well developed



THANK YOU