Measuring the results of FAO's statistics work

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ABSTRACT

The growing awareness of the importance of evidence-based decision making in governments and organizations at all levels emphasises the role of statistics in monitoring and achieving national and international development targets. The Food and Agriculture Organization (FAO) of the United Nations plays an essential role in monitoring global food and agriculture statistics by developing methods and standards, providing capacity building support to member countries, and disseminating global databases.

This paper aims to propose a methodology to assess, monitor and report on FAO's statistics work, by evaluating the quality of agricultural data at country level and of their use in evidence based decision- making. FAO's statistics work was last assessed as part of the Corporate Outcome Assessment in 2014 and 2015. Changes in the international policy environment and lessons learned from the previous assessment, led to a revised FAO Results Framework. The 2017 Corporate Outcome Assessment will leverage the last assessment while incorporating some significant improvements. The methodological revisions include the harmonization of the results chain and outcome formulation for FAO's statistics work across Strategic Objectives, alignment with the Sustainable Development Goals (SDGs), and changes to the survey design and sampling methodology.

Keywords: agricultural statistics, evidence-based decision making, policy monitoring, results framework, strategic planning, corporate assessment, Sustainable Development Goals, balanced sampling method.

1.   Introduction

In September 2015, the United Nations General Assembly formally adopted the universal, integrated and transformative 2030 Agenda for Sustainable Development, along with its 17 Sustainable Development Goals (SDGs) and 169 associated targets. Agriculture plays a central role in achieving these goals, which include eradicating hunger and poverty, ensuring sustainable management of natural resources, and combatting climate change.

At the same time, evidence-based decision making (EBDM) is becoming increasingly recognized as an important tool for change on the national and international levels. Within the context of EBDM, policy decisions are informed by rigorous analysis using relevant and accurate data. High quality statistics play an important role, not only in designing new policies, but also in monitoring progress towards national and international development goals and targets, and in evaluating policy impact. FAO is positioned to play a crucial role in achieving the SDG targets and influencing positive change, as it sits at the intersection of statistics, policy, and agriculture. , FAO has been identified as the *custodian agency* for 21 indicators and as a *contributing agency* for an additional 4.

This paper presents the methodology developed and used by FAO to assess, monitor and report on both the quality of agricultural statistics at country level, as well as the level of their use in evidence-based decision making. The paper is organized as follows: Section 2 provides an overview of FAO's role in food and agriculture statistics; Section 3 describes the new FAO Results Framework to support monitoring; Section 4 presents FAO's methodology, experience, and lessons learned in monitoring Outcome level progress in the *Medium Term Plan 2014-2017*; and Section 5 illustrates some of the methodological improvements defined so far for assessing the results of FAO's statistics work as part of the next *Medium Term Plan 2018-21*.

2.   FAO's Role in the Production of Food and Agriculture Statistics

High-quality statistics are essential for designing and targeting policies to reduce hunger, malnutrition and rural poverty, promoting sustainable use of natural resources, and increasing resilience to threats and crises. They provide the foundation for evidence-based decision making for governments, the private sector and the international community and play a critical role in monitoring progress towards national and international development goals and targets.

FAO's statistics work is comprised of three main functions: (a) to assemble, analyse, and provide access to data for national, regional and global monitoring, including for the SDGs; (b) to develop the required statistical methods/tools for food and agriculture statistics; and (c) to provide technical assistance and capacity building to member countries for the implementation of international standards in agricultural statistics. In the new FAO Strategic Framework, statistics plays a dual role by directly contributing to specific outputs of the five Strategic Objectives (SOs) and by creating the internal and external enabling environments to facilitate delivery of corporate results under Objective 6 (O6), the FAO internal objective to ensure technical quality, knowledge and services. The FAO Medium Term Plan 2014-17 (MTP 2014-17) results framework identified a specific Outcome within Objective 6 to ensure the quality and integrity of FAO's Statistical work.

In a decentralized statistical system, such as that of the FAO, this can only be guaranteed through a strong governance system and corporate accountability framework that defines the responsibilities of the different units involved in statistical work. To this end, FAO has recently adopted a comprehensive Quality Assurance Framework, providing guidelines on best practices to be applied to all statistical processes and products in order to ensure corporate consistency, to avoid duplication and fragmentation of statistical activities, and to guarantee the quality of FAO data, whilst making the most effective use of resources. The Chief Statistician at FAO oversees FAO's statistical work across all SOs, and is responsible for delivering results under O6. The

Interdepartmental Working Group on Statistics (IDWG), along with representatives from all technical divisions involved in statistical work, support the Chief Statistician in these efforts.

The FAO Statistical Work Programme is developed by the FAO Chief Statistician with the support of FAO technical divisions and the IDWG on Statistics and it mainly focuses on:

a. Supporting the production and dissemination the 21 SDG indicators under FAO custodianship, in addition to the established compilation/dissemination of food and agricultural statistics;

b. Strengthening the statistical capacity of member countries, including on SDG monitoring, through the provision of training, technical assistance and support in the adoption of new and cost-effective survey methods.

c. Improving communication with countries and development partners on the importance of high quality data, and advocating for the increased use of statistics in decision making and for its proper inclusion in country programmes;

d. Ensuring that the FAO Statistical System is able to respond promptly and effectively to new data demands.

Figure 1: *The FAO results chain model*
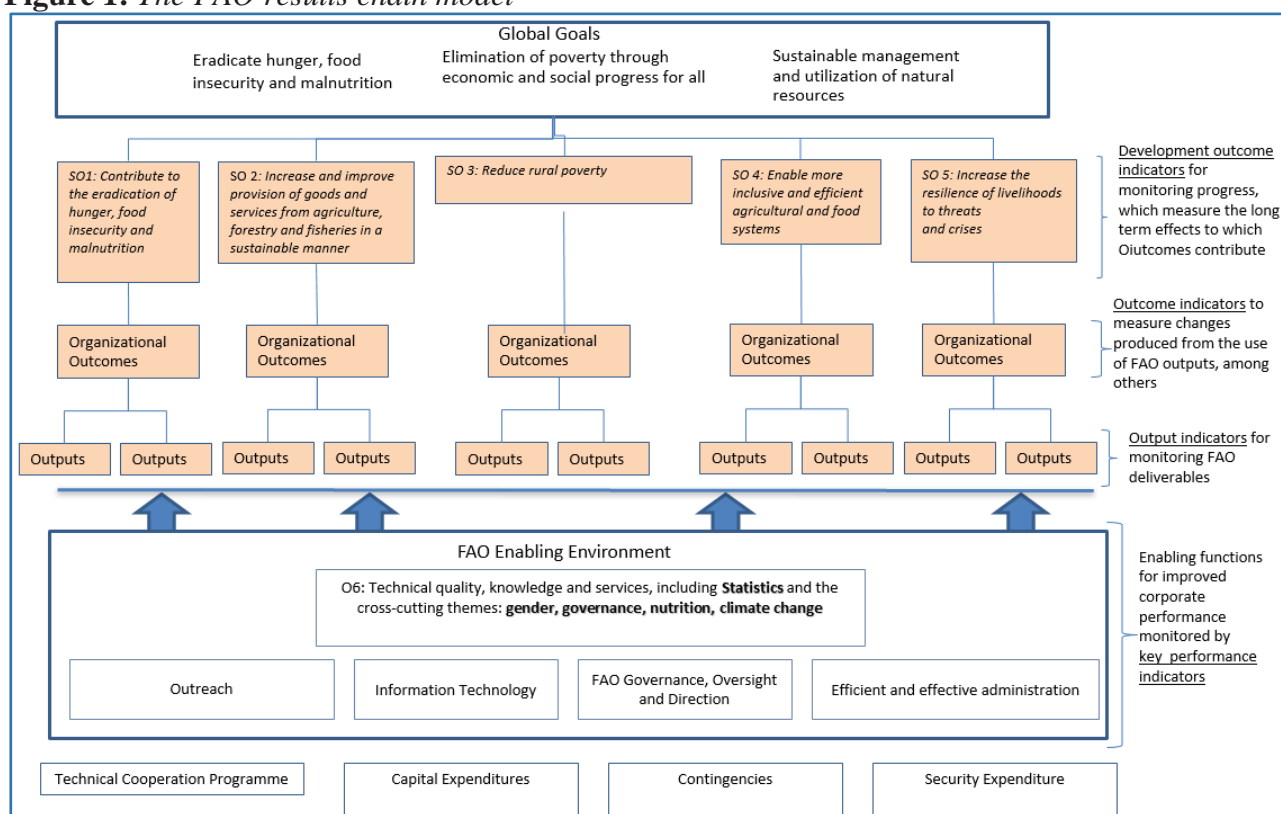
3.   FAO Results Framework

The Director General's Medium Term Plan for 2014-2017 and the Programme of Work and Budget for 2014-2015 outline FAO's new result-based model and monitoring framework (FAO, 2013). In the FAO results-chain model, each of the five SOs links to a set of Organizational Outcomes (OOs), which are underpinned by Organizational Outputs.

Outcomes reflect the changes in the country-level enabling environment needed to achieve each specific SO. For each SO, the Outcome indicators measure the main determinants of success. These indicators include factors such as relevance of policy and programming frameworks, level of committed resources and investments, level of coordination/partnerships, and availability/use of information and data for decision making. The indicators measure countries' progress in making

reforms and developing capacity in order to achieve the SO. A set of indicators is defined for each Outcome within each SO.

Outputs are a set of deliverables that result from FAO's intervention (tangible products and services) and for which FAO is directly accountable. In this case, indicators are selected to reflect the key outputs of the Organization, those which have the most important influence on the outcomes at country level.

3.1   Statistics in FAO Results Framework

Statistics contributes in two ways to the implementation of the MTP 2014-17. Under each SO, statistics produce outputs and services at the country level to help inform EBDM. Under Objective 6, statistics serve as a global public good, ensuring technical quality for the analytical and policy work of FAO and other external stakeholders. The second outcome of Objective 6, Outcome 6.2 is therefore entirely devoted to statistics with the aim to ensure quality of FAO Statistics to support evidence-based decision making at all levels. This outcome covers the quality and integrity of FAO's statistical work, and is measured using two indicators:

Outcome	Indicator
6.2.A: Use of statistics for evidence-based policy making in the fields of food security and nutrition, sustainable agriculture, rural poverty and resilience to threats and crises	Number of countries in which statistics is available, accessible and used for evidence-based decision making
6.2.B: Level of statistical capacity development in member countries	Number of countries having shown significant progress in statistical capacity

Outcome 6.2 in Objective 6 is supported by the following four distinct **Outputs** and indicators:

Output	Indicator
6.2.1: Methods for the collection, compilation, dissemination, analysis and use of data under different data domains are developed and shared	Number of new guidelines and technical standards published
6.2.2: Support provided to strengthen national statistical institutions and to improve the competencies of national statisticians in collecting, analysing and disseminating data.	Number of new statistics capacity building projects in countries
6.2.3: High quality and internationally comparable data are produced and accessed by all countries	Number of FAOSTAT visits
6.2.4: Strengthened governance and coordination of FAO statistics and improved internal capacity to evaluate the results of FAO's work.	Number of new datasets included in the corporate Statistical Working System

Finally, most of the SOs incorporate an OO-level indicator to monitor country capacity to generate and use statistics for analysis and decision making within the specific SO.

OO level indicators measuring the existence and use of information systems, data and statistics	
SO1	Countries with high quality analytical products generated through functional information systems in support of food security and nutrition policy and programming processes
SO2	Countries that use statistics extensively in policy making processes pertaining to agriculture and natural resources management.
SO3	Capacities to monitor and analyse social protection policies and programmes
SO5	Countries with capacity to deliver regular information and trigger timely actions against potential, known and emerging threats to agriculture, food and nutrition

4.   Monitoring Progress in the Medium Term Plan 2014-2017

Monitoring and reporting for the Medium Term Plan is conducted every two years at the Outcome level, and every year at the Output level. Given the nature of the Outcomes, very few data are currently available in the public domain on the selected indicators. Moreover, no information is currently produced on FAO's direct contribution to the achievement of the Organizational Outcomes (OO). Consequently, the data to inform the Outcome indicators are only partially obtained through secondary data, while the main source of information is the Corporate Outcome Assessment. This includes a review of key national policy documents, and a perception survey on the quality, availability, and accessibility of data that are needed to inform the FAO SOs.

The first assessment was conducted in 2014, and was used to establish baselines for the indicators. A second assessment was conducted at the end of 2015 to measure progress made on the indicators since baseline, and to assess FAO's direct contribution to these results. The next assessment will be conducted at the end of 2017, as part of the Medium Term Plan 2014-17 monitoring and reporting cycle.

4.1 The Design of the Corporate Baseline Assessment (CBA 2014)

The Corporate Baseline Assessment (CBA) was conducted in 2014, and assessed those countries where FAO delivered a meaningful programme of work during the 2011-2012 biennium. In total, 148 FAO member countries satisfied this criterion, and were included in the target population. In order to limit the length of time, costs, and human resources needed to conduct the assessment, the CBA analysed a sample of 80 countries, rather than the entire target population.

Countries were selected for inclusion in the CBA in order to obtain a representative sample of the population, taking into consideration factors such as geographical region, performance within each of the five SOs, and importance to FAO delivery. The key indicators reflecting the country's performance within the SOs are:

Indicators reflecting country performance within each of the five SOs	
SO1	Prevalence of stunting among children under 5
SO2	Average arable land per person
SO3	Poverty headcount ratio at $1.25 a day in PPPs
SO4	Proportion of agriculture value added over the GDP
SO5	Vulnerability Index and Crisis Index Final Index Rank

The main criterion used to select countries for the sample was the level of delivery (in USD). This ensured that countries with larger FAO programmes had a higher chance of being included in the sample. In addition to level of delivery, sample countries were also selected based on a set of six stratification variables, based on geographical region and the five SO indicator groups[1]. In this context, some countries were included in the sample with certainty, as they were assigned an inclusion probability equal to 1[2]. The amount of delivery was used to allocate the sample among the strata and to define the selection probabilities.

In order to ensure the representativeness of the sample at global level for the entire work programme of the Organization, the sampling design was based on a random selection procedure that accounted for all the SOs simultaneously. Due to the small size of the population (and consequently of the sample), the sample was selected using the balanced sampling method (Deville and Tille, 2004). This method is the most efficient methodology designed for the selection of a

[1] For each of the five indicators, the countries have been classified into two groups on the basis of the median value of the distribution of the indicator. A third group for each indicator was defined reflecting the countries with missing values.
[2] The list of self-representative countries includes: Somalia, Afghanistan, Pakistan, Sudan, DR Congo, Zimbabwe and Bangladesh.

random sample in terms of marginal allocations (Falorsi and Righi, 2008). Therefore, the randomly selected sample ensures all the marginal allocations as well as the total sample size.

In the first phase of the fully-fledged survey, the sample size was fixed at 39 countries. Subsequently, in order to satisfy the need of the SO Teams to obtain data for all FAO focus countries, the final sample size was increased to a total of 80 countries. Given that the list of focus countries changed SO by SO, the total number of countries surveyed was different for each SO[3] (55 countries for SO1, 50 countries for SO2, 58 countries for SO3 and 55 countries for SO5).

Data were collected through a structured questionnaire with sections dedicated to each SO. The specific questions in each section were defined based on the data requirements of each SO Team. When possible, data were obtained from existing data sources (secondary data) and were therefore not included in the survey questionnaire.

The respondents in each country were identified, with the support of the FAO country offices, as senior representatives of six stakeholder groups: government, UN agencies, international donors and International Financial Institutions, research institutions/academia, civil society and the private sector. This diverse group of perspectives ensured a comprehensive assessment of each country's capacity for and commitment to achieving the Strategic Objectives. Given the broad range of respondents involved, the survey was conducted through a facilitated data collection event. At this event, facilitators explained the assessment's objectives and questionnaires, and then respondents individually completed their relevant sections. A total of 1474 questionnaires (334 for SO1, 346 for SO2, 490 for SO3 and 304 for SO5) were collected.

The estimates of the Outcome-level indicators and sub-indicators for the whole population were obtained using adjusted sampling weights. The initial sampling weights, calculated as the inverse of the inclusion probability of the 39 sample countries of the initial CBA, were adjusted to take into account non respondent countries (2 for SO1, SO2 and SO5, 3 for SO3). These weights allowed the indicators' values to be expanded from the sample countries to the target population.

After broadening the sample to include all SO focus countries, different weighting systems were defined to provide representative estimates for each SO. Two domains, unplanned for in the original sampling design, were also considered for each SO: the set of the focus countries and the set of non-focus countries. The weight adjustment was performed taking into account regional differences.

Finally, each Outcome-level indicator was derived by combining the values of sub-indicators derived from the CBA and those taken from secondary sources. Survey data for a specific country were firstly aggregated by group of respondents (through a simple mean), and then aggregated at country level (also through a simple mean). A score was calculated for each indicator, ranging from zero to one, as a result of an average of the values of the sub-indicators.

4.2 The Design of the Corporate Outcome Assessment (COA 2015)

At the end of 2015, another assessment was conducted to assess changes at the country and global levels at the end of the 2014-2015 biennium. COA 2015 was very similar to the CBA and surveyed the same set of countries to obtain estimates of the changes that occurred in the national enabling environment during the two year period. The COA planned to collect data on the same set of respondents, to obtain an evaluation of the change during the two year period not affected by the variability due to a change in the respondent.

The questionnaires were expanded to include two additional sections: a) FAO's perceived role in *contributing to change*; and b) a more articulated *assessment of the use of statistics for evidence-based decision making*.

In parallel to the primary data collection, secondary data were updated whenever possible. The COA obtained reliable estimates of the following three variables at aggregate level:

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[3] The CBA did not cover SO4. Therefore the OO indicators for SO4 were obtained only through secondary data.

a. Values of the Outcome-level indicators in 2015;
b. Changes in the values of the Outcome-level indicators between 2014 and 2015;
c. Percentage of FAO contribution to this change, based on responses to specific questions inserted in the questionnaires

Data collection took place from December 2015- January 2016, and differed somewhat from the CBA. While the CBA collected all data at data collection events, the COA data collection differed by country: some countries still collected data through organized data collection events; for others the respondents received the questionnaires and national consultants followed-up to ensure coverage and timely response.

In the COA, two different sets of weights were used to develop global indicator estimates. The first was used to obtain the 2015 estimates of the Outcome indicators and FAO's contribution to the change, while the second was used to estimate the differences between the Outcome indicators at the two points in time.

The first set of cross-sectional weights were used for expanding the sample of the respondent countries to the target population. The second set of longitudinal weights were used for estimating the differences of Outcome indicators by expanding, to the whole population, the countries responded both to the CBA and COA (co-present countries). Thus, four weighting systems were obtained (one for each SO) following the same procedure used for the weights of CBA and a weight adjustment was carried out, taking into account regional differences in the rate of non-responses.

4.3 Challenges and Lessons Learned

The biggest challenge that emerged during the COA was attrition of respondents. Many of the CBA respondents could not be found for the COA, or, to a lesser extent, declined to be interviewed. These respondents had to be replaced by other stakeholders at short notice, which caused reduced comparability between the two assessments and a decline in the quality of results. Since many of the survey questions were based on respondents' *perceptions*, the change in respondents introduced variability into the survey results, thus reducing their overall reliability and accuracy.

Moreover, a set of sample countries were excluded from the final estimates[4] because the number of respondents by stakeholder groups was not sufficient to ensure unbiased results. Table 2 compares the number of countries included in the theoretical sample by SO, and the number of those that actually participated in both the CBA and the COA. A significant decline was registered, especially for SO1.

Number of countries in the sample of the CBA and the COA by SO			
	Actual sample		
Theoretical sample	**CBA**	**COA**	**Co-present in CBA and COA**
SO1	*55*	53	41	40
SO2	*50*	48	43	42
SO3	*58*	55	51	49
SO5	*55*	53	46	45

The challenges faced in the data collection phase were primarily caused by a few issues in the survey implementation:

a. *Short interval between the two assessments:* Due to organizational issues, especially the countries added in the enlargement stage completed the CBA questionnaires with almost one

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[4] The criteria used for including countries' data for the estimation of the final results were to have valid questionnaires for at least 2 stakeholders' groups and a minimum of 3 questionnaires in total.

year delay (September 2014). The COA questionnaires for all 80 countries were completed in November-December 2015. This meant that many respondents were requested to complete almost identical questionnaires after just one year, which led to a lower response rate in some countries. Furthermore, some OO indicators did not show any significant change in such a short time period.

b. *Timing of the COA*: Data collection began in November 2015 and the deadline to return the questionnaires fell during the holiday season (December 2015 - January 2016), which affected the actual time dedicated to complete the exercise, and the possibility of subsequent follow-ups to try expand the number and diversity of respondents.

c. *Length and complexity of the questionnaires:* Due to the large number of sub-indicators, the CBA questionnaires were lengthy and complex. The COA questionnaires were even longer, as they incorporated additional questions on stakeholders' perceptions about the FAO contribution to change, as well as an additional section on the use of statistics. Moreover, the heterogeneity of the topics covered made it difficult for a single respondent to have the knowledge and experience to answer all sections with the accuracy required.

d. *Time lag of secondary data.* Secondary data are normally published with a time lag (for e.g. 2014 data is available only after 2015) with variable delays among different sources. Due to the short period of time between implementation of the CBA and COA, few indicators could be updated.

These issues affected the quality of the COA results, and increased the difficulties in conducting meaningful data analysis across the assessments at country level. In the comparison between the CBA and COA, some of the changes detected over time were likely due to measurement errors, especially considering the limited time elapsed between the two surveys.

5. ooking Ahead: The New COA Design for Medium Term Plan 2018-21

5.1. Review of the FAO Results Framework

FAO's programme of work is constantly evolving to respond to changes in the international policy environment. The new trends and challenges emerging at global level, as well as the new international policy frameworks recently adopted (2030 Agenda for Sustainable Development, the Paris Agreement on climate change, the COP 21 and 22, the follow-ups to the ICN2 and to the World Humanitarian Summit), provide the opportunity to adjust FAO's focus and work programme in order to integrate new priorities and the resulting demands from member countries.

There is also clear recognition of the need to refine the FAO results framework on the basis of lessons learned during the implementation of the MTP 2014-17. The technical adjustments identified for the next MTP include improvements in the theory of change, the clarity and consistency of outcome and output formulations, and the measurability and relevance of the indicators. This review of the FAO Strategic Framework and Results Framework is currently being carried out as part of the Medium Term Plan 2018-21 planning phases.

Finally, regarding Statistics, the results framework is being revised to avoid overlap between outcomes in Objective 6 and the SOs and the information compiled under various SOs will be used to feed the assessment of Objective 6. Moreover, the use of statistics in decision making is not directly linked to the current statistical capacity development work of FAO, which focuses mainly on helping countries to produce new and better quality data, not on helping them to transform data in key messages and communicate them well to the media and the decision-makers. Data access itself is only one component of EBDM. Therefore, capturing the impact of FAO's statistics work on decision making requires the consideration of different layers and different actors in those processes related to decision making. This helps explain the multi-stakeholder approach to monitoring and reporting on level of availability and capacities in the use of statistics.

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