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منظمة
الأغذية والزراعة
للأمم المتحدة

PROGRAMME COMMITTEE

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Update of statistical tools and data for statistics

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EXECUTIVE SUMMARY

➢ This matter is being referred to the Committee under Rule XXVI/7(a)i of the General Rules of the Organization. At its 132nd Session, the Programme Committee recommended "*continued informal briefings and consultations with Members through the Governing Bodies on the data for elaboration of statistics and statistical work of the Organization (...)*". In the same way, at its 170th Session, the Council requested FAO "*to provide regularly updated information on the content, use and technical characteristics of data and statistical tools and platforms deployed by FAO through its Governing Bodies and informal technical consultations*".

➢ The 125th Session of the Programme Committee requested that a new Evaluation of FAO's statistical work be carried out, following the first Evaluation in 2008. At its 128th Session, the Programme Committee "*welcomed the timely and thorough Evaluation of FAO's Statistical Work*". The results of the Evaluation highlighted the need to improve and modernize the FAO statistical systems. The Evaluation argued, inter alia, that legacy tools and procedures were often acting as constraints on progress towards a coherent, modern statistical system. Insufficient harmonization of procedures, information technologies (IT) support and infrastructure were further limiting progress. The evaluation thus recommended that "FAO needs to accelerate actions to improve the quality of its data and IT infrastructure support" (document PC 128/5, Recommendation 4).

➢ As a response, the Office of the Chief Statistician - in coordination with the Interdepartmental Working Group on Statistics - organized an informal consultation with Members in April 2021 to introduce the Implementation Plan of the FAO Strategy for the Modernization of Statistics. In addition, FAO presented a proposal for an improved governance of FAO statistical activities to the Programme Committee at its 132nd Session (document PC132/5). One of the priority areas identified in this proposal is to "Improve the quality of the IT infrastructure supporting data and statistics work". In its report, the Committee "*reiterated the importance and critical role of the Organization's statistical work (...), and appreciated the measures proposed by Management to further enhance the quality of its outputs, including the modernization of the information technology (IT) infrastructure in compliance with tendering procedures*".

➢ To this end, the project "Modernization and integration of the FAO statistical system" was launched. This document summarizes the actions taken by FAO to improve the quality of the IT infrastructure supporting data and statistics work and, in particular, highlights the key components of the project and discusses progress in its implementation.

➢ The project was launched on 1 January 2022 and is due to be finalized by 31 December 2023. Its objective is to modernize the production cycle of FAO statistics, as defined by the Generic Statistical Business Process Model (GSBPM). The project has two components: the first aimed at modernizing the Statistical Working System (SWS); the second at starting the implementation of a Statistical Data Warehouse (SDW).

➢ The SWS component will transform the current one into a full-fledged corporate working system, by implementing new technologies and functionalities to match the requirements of those statistical units that are still running disparate tools and solutions. It will promote the establishment of an integrated system to process data, which makes use of the same classifications, standards, quality assessment and overall procedures.

➢ The SDW component will catalyse the modernization and harmonization of the data dissemination and analysis phase. Specifically, the SDW will provide an integrated dissemination platform which will further reduce manual data entry and overcome inefficiencies, while improving standardization, interoperability and the adoption of corporate statistical standards in the dissemination of data.

GUIDANCE SOUGHT FROM THE PROGRAMME COMMITTEE

➢ The Programme Committee is invited to take note of the information provided in the document.

Draft Advice

The Committee:

➢ **acknowledged the actions taken by FAO to modernize and improve the quality of its IT infrastructure supporting data and statistics work;**

➢ **noted with appreciation the progress in the implementation of the project for improving and modernizing FAO's statistical systems; and**

➢ **encouraged Management to continue pursuing the current objectives, while ensuring support to a sustainable and integrated enhancement of FAO's statistical system.**

I. Background and objective

1.   This matter is being referred to the Committee under Rule XXVI/7(a)i of the General Rules of the Organization. At its 132nd Session, the Programme Committee "*recommended continued informal briefings and consultations with Members through the Governing Bodies on the data for elaboration of statistics and statistical work of the Organization (...)*". In the same way, at its 170th Session, the Council requested FAO "*to provide regularly updated information on the content, use and technical characteristics of data and statistical tools and platforms deployed by FAO through its Governing Bodies and informal technical consultations*".

2.   Statistics is a key area of FAO's work, supporting evidence-based decision-making of national governments and the international community, and enabling the monitoring of progress towards national and international development goals. Article 1 of the FAO Constitution stipulates that "The Organization shall collect, analyse, interpret and disseminate information relating to nutrition, food and agriculture." where agriculture is meant to include fishery and forestry activities. As such, the Organization produces updated statistics at national and international levels on a wide range of topics, including food security and nutrition, sustainable agriculture, rural development, natural resources management, forestry, fisheries and aquaculture. FAO is recognized as an authoritative source of data and statistics in all such areas, developing and promoting international food and agriculture statistical standards as well as methods and tools for collecting, analyzing and disseminating data. It works with countries to develop national statistical strategies, strengthen institutional and technical capacities and improve statistical systems.

3.   FAO's statistical processes cover the entire production cycle, involving the collection, validation, compilation, production, analysis and dissemination of statistics. In these processes, FAO relies on a large number of sources, data production approaches and information technology (IT) tools.

4.   In 2016, with the implementation of the 2030 Agenda for Sustainable Development, FAO was designated as custodian agency for 21 Sustainable Development Goal indicators. As such, the Organization is responsible for the design and implementation of these indicators' methodologies, in agreement with Member Nations; and for the compilation, harmonization, validation and dissemination of related data and metadata, which are submitted to the United Nations Statistics Division (UNSD).

5.   In this context, and ten years after the first independent Evaluation of FAO's Work in Statistics, the 125th Session of the Programme Committee in 2018 requested an evaluation of FAO's statistical work be carried out. The Evaluation Report[1] was considered at the 128th Session of the Programme Committee. The Committee "*welcomed the timely and thorough Evaluation of FAO's Statistical Work*". The Committee further "*requested that the recommendations of the evaluation of FAO's Statistical Work be taken into account in the framework of the proposed organizational adjustments*".

6.   The results of the Evaluation highlighted the need to improve and modernize FAO's statistical systems. The report argued, *inter alia*, that legacy tools and procedures were often acting as constraints on progress towards a coherent, modern statistical system. Insufficient harmonization of procedures, IT support and infrastructure were further limiting progress. Hence, the Report recommended that FAO "*accelerate actions to improve the quality of its data and IT infrastructure support*" (document PC 128/5 Recommendation 4). In particular, the report argued that:

  a. Limited resources (financial, human and IT/infrastructure) had been invested in statistical activities, leading to serious delays in updating procedures and databases and implementing modern data storage methods.

  b. Despite improvements in the production and dissemination of FAO statistics, additional efforts were required to achieve a full coordination of the statistical processes, which allows

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[1] Document PC128/5 https://www.fao.org/3/nc854en/nc854en.pdf

delivering the expected level of quality. To effectively handle a large number of data domains FAO should establish a unified Statistical Working System (SWS), and one single Data Warehouse (SDW) to house all FAO statistics under one coherent platform.

7. In response to the recommendations described in the document on the "Evaluation of FAO's Statistical Work" and the concerns expressed by the Programme Committee, the Office of the Chief Statistician - in coordination with the Inter-departmental Working Group on Statistics - organized an information seminar with Members in April 2021 to introduce the implementation plan of the FAO Strategy for the Modernization of Statistics. Based on this plan and the feedback received from Members, the Office of the Chief Statistician presented a proposal for improved governance of FAO statistical activities (document PC 132/5) to the 132nd Session of the Programme Committee[2]. The proposal is articulated across four cross-cutting priority action areas, which are derived from the priorities highlighted in the Evaluation of FAO's Statistical Work. One of the priority areas is to "Improve the quality of the information technology (IT) infrastructure supporting data and statistics work". In its report, the Committee "*reiterated the importance and critical role of the Organization's statistical work (...), and appreciated the measures proposed by Management to further enhance the quality of its outputs, including the modernization of the information technology (IT) infrastructure in compliance with tendering procedures*".

8. Against this background, a Capital Expenditure (CapEX) project was approved at the beginning of 2022.

9. This document aims at summarizing the actions since taken by FAO to improve the quality of the IT infrastructure supporting data and statistics and, in particular, illustrates the key components of the project and discusses progress in its implementation. Progress is reviewed separately for the two main components of the project, that is, the modernization of the FAO Statistical Working System (SWS), and the establishment of FAO's Statistics Data Warehouse (SDW).

II. The Project: objective, activities and governance

10. The project was launched on 1 January 2022 and is due to be finalized by 31 December 2023. Its overall objective is to modernize the production cycle of FAO statistics, as defined by the Generic Statistical Business Process Model (GSBPM). This includes the data design, planning, collection validation, processing, analysis and dissemination phases, while adopting a user-centred approach to data production and dissemination. The project aims to increase FAO's capacity to produce and disseminate relevant, reliable, accurate and timely data and statistics, while enabling comprehensive cross-sectoral analysis by deriving indicators and insights across all FAO statistical data domains. The project is articulated in two components, centred on further developing the Statistical Working System (SWS); and allaying the foundations for the Statistical Data Warehouse (SDW), respectively.

11. The SWS is a corporate solution that integrates the FAO statistical production system (from design, planning and data collection, to processing and validation), covering all statistical activities, to ensure full adherence to existing and new internationally accepted statistical standards and norms. The project proposes an upgrade of the current system and to transform it into a full-fledged corporate working system by implementing new technologies and functionalities to match the requirements of those statistical units that are still running disparate tools and solutions. This component aims to modernize the SWS and extend its lifespan, by replacing obsolete modules of the original software and introducing innovative functionalities, while at the same time promoting the establishment of an integrated system to process data, which makes use of the same classifications, standards, quality assessment, and other functionalities. At the same time, this component also aims at expanding the number of statistical processes currently using the SWS.

12. The SDW, in turn, is a central database for publishing statistical data and metadata through an integrated dissemination platform. Its main objective is to open new channels and services of data dissemination and exchange between FAO and national/international statistical organizations, as well as research institutions and the global users' community. The SDW component aims at modernizing

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[2] Document PC 132/5

the data dissemination and analysis phase. Specifically, the integrated dissemination platform aims to complete the automation of statistical processes, by reducing manual data entry and overcoming inefficiencies while improving standardization, interoperability and the adoption of corporate statistical standards.

13.   While the improvement of the SWS and the development of the SDW correspond to two distinct project components, their outputs are planned to be fully integrated, with the SWS automatically harvesting information from Member Nations, allowing a seamless process of processing, validation and harmonization, whose outputs are harvested by the SDW, which caters for the dissemination and analysis of the data.

14.   The project relies on an integrated governance, which also integrates the SDW within the SWS. A single project board was established, under the guidance of the Chief Economist/Executive Data Champion, which will provide strategic guidance, monitoring and oversight to the implementation. Project board members comprise the managers of the units responsible for the realization of the specific components of the overall project – specifically the Director of the Statistics Division as Senior statistical supplier of the SWS; the Chief Statistician, as Senior statistical supplier of the SDW and as Senior statistical user of the SWS; and the Director of the Digitalization and Informatics Division, as Senior IT supplier for both SWS and the SDW. The project board is assisted by:

   a.   a coordination and quality assurance team, which includes the project coordinator;

   b.   members of the Inter-departmental Working Group on Statistics as suppliers' group and the Programme Priority Areas (PPA) leaders as users' group - which will ensure a user-centric perspective; and

   c.   three delivery teams, that is, the SWS statistical team, the SDW statistical team, and the SWS-SDW team on information technology.

15.   Focal points for the different components of the project are appointed with the responsibility to regularly monitor progress in the implementation of the project and report back to the project board.

A.   Progress in the delivery of the Statistical Working System (SWS) component *Progress in the delivery of the Statistical Working System (SWS) component*

16.   Currently the SWS counts with more than 15 major statistical processes in the areas of fisheries, forestry, water resources and agricultural water management, agriculture, and environment. These were migrated into the system over the past years, from legacy systems. Activities initiated at the end of 2020 under the project will facilitate the implementation of important new features, including the integration with external products and the SDW. The SWS will undergo a comprehensive upgrade that entails a change in the original software, which has since become obsolete. The SWS is being optimized and migrated to the cloud. Additional statistical modules addressing new functionalities are being included, while some existing modules are being re-engineered to ensure full interoperability with the SDW.

17.   The statistics and IT activities embedded in this component consists of iterative developments, where requirements and solutions evolve through collaboration between self-organizing cross-functional technical teams (statistics and IT). An online tool is being jointly used by the development team and users, to track, manage, and monitor project progress. The IT platform development will make frequent releases into a quality assurance environment, to allow users to test and sign-off on the work as it is completed.

18.   Concerning the statistics-related deliverables, the following activities have been carried out:

   a.   *Building up the team* with key skills, such as classifications, statistical standards, and programming.

b. *Gauging users' requirements.* A round of consultations took place with the main internal users in various FAO Divisions (Statistics Division [ESS], Forestry Division [NFO], Fisheries and Aquaculture Division [NFI], Land and Water Division [NSL], etc.), to identify the new statistical processes that will be integrated in the SWS, and the existing processes that require enhancements or re-engineering.

c. *Harmonization of reference files.* Work is underway to align all corporate classifications to a "single-source-of-truth" – EBX, which is the FAO Master Data Management System.

d. *Integration of additional domains in the SWS.* The integration of the food security statistics domain, and particularly the computation of the prevalence of undernourishment, is underway; while plans are ready for the integration of the greenhouse gas (GHG) emissions database domain. Enhancements were implemented in the AQUASTAT domain.

e. *Development of new analytical functionalities.* An application was developed to improve the visualization and analysis of selected statistical domains. This was based on a Shiny application, which supports, *inter alia*, the internal peer-review and data validation process that leads to dissemination in FAOSTAT.

f. *Collaboration with the SDW team.* Classification experts and other personnel are providing input and identifying requirements with a view to integrating the SWS and the SDW dissemination, starting from pilot domains.

19. Concerning the IT deliverable, the following activities were carried out:

a. *Coding of priority domains.* Domains were identified on the basis of users' requirements, and prototype coding has begun. The addition of a front-end developer on the statistics modernization support (SMS IT) team will allow speeding up the work on the new user interface (UI).

b. *The first experimental version of the new user interface (UI) is available for users' assessment.* The new UI will be simpler, with a cleaner, consistent approach and more optimal usage of screen space. The new interface requires extensive user inputs. In this respect, the current experimental version is estimated to be about 50 percent complete. The new UI will be complemented by a new session management system which will leverage cloud scaling opportunities, hence addressing bottlenecks experienced by users so far and improving performance.

c. *Statistical Processing Modernization.* The SWS R package has been updated, and users can now select different versions of the R statistical software in the SWS. Older R programs will also be replaced with a modular approach, using the same architecture pioneered with the SDW. A dedicated Cloud Engineer was added to the team.

d. *Development of a task manager.* This is underway, in response to one challenge of the existing SWS, that is, the inability for users to monitor progress of tasks launched. This is estimated to be 80 percent complete; however, more work is required to enable existing functionalities to avail such new management infrastructure provided by this new facility.

e. *Progress in the creation of the EBX (FAO Master Data Management System) browser.* This will make statistical codes stored in EBX directly visible from the SWS. A proof-of-concept is currently complete.

f. *Progress with the creation of middleware for the integration of the SWS with SDW.* A new application programming interface (API) facility was developed, which will return FAO code lists in SDMX, i.e. a format that allows their integration into the SDW.

g. *Development of a statistical campaign manager (SCM)* to automate communication with national focal points, particularly the responses to questionnaire dispatches. The identification of user requirements for this tool is complete, and a solution architecture has been developed. Coding is estimated to be 35 percent complete.

B. Progress in the Delivery of the Statistical Data Warehouse (SDW) component

20.   As an integrated dissemination platform, the SDW will allow further harmonization of FAO's statistical outputs, and facilitate the adoption of standardized operating procedures that enable quality assurance, monitoring and support. The integrated system will reduce development and maintenance costs of multiple IT platforms and technologies. It will be based on the Statistical Data and Metadata Exchange (SDMX) standard, endorsed by the UN Statistical Commission in 2016. The full adoption of the SDMX, which is also approved as an ISO standard, will facilitate inter-operability and integration with other international organizations and with national partners.

21.   The SDW platform will include multiple modules, and require the development of reusable components, independently written and deployed, that are connected through standard interfaces and network connections. The approach of the SDW is user-centric – that is, based on user satisfaction – and it aims at increasing the analytical capacity of users, through the integration of visual analytics software such as PowerBI and Tableau.

22.   Progress in this component of the project is recorded in two areas: the choice of the IT infrastructure and its implementation.

a.   **Choice of IT infrastructure.** After a careful assessment, FAO has selected an off-the-shelf platform called ".StatSuite", developed by the Organisation for Economic Co-operation and Development (OECD). This infrastructure is already used by several international organizations (International Labour Organization [ILO], United Nations Children's Fund (UNICEF), OECD, etc.), as well as a number of National Statistical Offices. In addition, UNSD is planning to use the same infrastructure for a new UN Data Portal, which aims at pooling data from the whole UN system into one single platform. This broad adoption is expected to contribute to the sustainability of the software and its development.

The legal review of the required Memorandum of Understanding (MoU) with OECD by the respective legal offices has been completed. Hence, upon clearances by Senior Management on both sides, FAO and OECD will be able to sign a bilateral agreement that defines the terms and conditions to acquire the software package. The OECD is expected to provide technical assistance to facilitate the adoption and use of .Stat Suite in FAO. Moreover, FAO and OECD will consider the possibility of jointly designing and developing additional components or features of potential interest to both parties. When jointly developed, such components or features will become an integral part of .Stat Suite and, as such, will fall under the management responsibility of OECD.

For the provision of the .Stat Suite software package, technical assistance, and the participation in the Statistical Information System-Collaboration Community (SIS-CC), FAO will transfer to OECD a fee of EUR 80 000 upon signature of the MoU, and thereafter a EUR 30 000 annual fee for the renewal of the SIS-CC membership.

b.   **Implementation.** Activities conducted so far to prepare for the .StatSuite's deployment are as follows:

1.   Recruitment of two data modelers and one data analyst. Members of the SDW IT team are also being recruited to begin the .StatSuite's deployment, which will also involve the data owners of the relevant platforms and datasets. These teams will work closely with the SWS teams (IT and statistical).

i.   Assessment of the data properties of key data domains – notably FAOSTAT, FISHSTAT and the Sustainable Development Goal indicators. This allowed verifying their readiness for integration into the .Stat Suite platform.

ii.   Pilot of the Dataset Structure Definition models for selected datasets in order to test the implementation of SDMX web-services.

iii.   Two consultations with FAO Technical Divisions and the OECD technical team to better understand the project functional requirements and data owners' expectations. Relevant technical units highlighted critical points to be addressed in response to the .StatSuite technical requirements.

iv. Trainings on data modelling in SDMX and the use of .Stat Suite for FAO personnel involved in the first phase of the project were delivered by OECD in September.