



Report on National Activities to Enhance Statistical Capacity of Countries to Measure SDG Indicators on Material Flow, Waste and Policy Coherence

Challenges and lessons learnt



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1. Background and Objectives

1.1 Background

The project Enhancing Capacity for Measuring Progress towards the Environmental Dimension of the Sustainable Development Goals (SDGs), funded by the European Commission, was instituted to strengthen national capacity for monitoring and reporting on the environmental dimension of the SDGs, including SDG indicators 8.4.1/12.2.1 on material footprint, 8.4.2/12.2.2 on domestic material consumption, 12.3.1b on food waste, 12.4.2 on hazardous waste generated and treated, 12.5.1 on national recycling rate and 17.14.1 on policy coherence.

As part of its effort to enhance capacity, UNEP prepared three resource documents: *Global Chemicals and Waste Indicators Review Document (2021)*, *UNEP Food Waste Index Report (2021)* and *Global Manual on Economy-Wide Material Flow Accounting (2023)*. In addition, an online course was developed to cover environmental indicators of the SDGs. It provides detailed information to better understand the methodologies and assists participants in guiding the compilation and dissemination of SDG indicators data ([English](#), [French](#), [Russian](#)). Three tools were newly developed to assist in the compilation of the data necessary to calculate the values for SDG indicators 8.4.2/12.2.2, 12.4.2 and 12.5.1.¹ These tools are formed of (i) Excel spreadsheets containing detailed variables that are calculated together to generate the value of SDG indicators, and (ii) step-by-step documents to guide government officials on filling the Excel spreadsheets.

¹ [Compiler For Economy-Wide Material Flow Accounts](#) (SDG Indicator 8.4.2/12.2.2); [SDG Indicator 12.4.1 Hazardous Waste Workbook](#); and [SDG Indicator 12.5.1 National Reporting Rate Workbook](#). The Compiler facilitates the compilation of data on domestic extraction, which is used to derive SDG Indicator 8.4.1/12.2.1. UNEP prepared the compiler for SDG indicator 8.4.2/12.2.2 (domestic material consumption) as a separate component.

National activities were implemented in different formats in beneficiary countries in Africa and Asia. In-country technical assistance missions were held in a total of five beneficiary countries (Ghana, Jordan, Kazakhstan, Senegal and Uganda) to cover training for SDG indicators 8.4.1/12.2.1, 8.4.2/12.2.2, 12.4.2, 12.5.1 and 17.14.1.² An out-of-country training was held in Paris, France with participants from India, the sixth beneficiary country, as well as Bangladesh, Kazakhstan and Senegal on SDG indicator 12.3.1b. This report presents the activities undertaken, the challenges faced by countries, the results obtained, and highlights the lessons learned.

1.2 Objectives

The aims of the national activities were to deepen government officials' understanding of the adopted methodologies for SDG indicators, to equip them with the necessary statistical capacity to report on these indicators and as these indicators require data from multiple national stakeholders, engage all stakeholders together for future collaborations. The main objectives were:

- To empower officials of beneficiary countries with knowledge and know-how to collect information and disseminate selected SDG indicators;
- To strengthen inter-institutional coordination to invigorate the production of SDG indicators and data flows;
- To share and discuss country challenges in measuring specific SDG indicators; and
- To develop national statistics related to relevant SDG indicators under goals 12 and 17.

² An additional in-country technical assistance mission in a sixth pilot country had been planned; however, it was not possible to schedule this during the project implementation period.

To attain these objectives, data availability assessment was performed for each of the beneficiary countries to better understand the strengths of the national statistical systems and identify relevant line institutions. National activities were grouped and implemented as follows:

- In-country technical assistance mission on material flow indicators (SDG indicators 8.4.1/12.2.1 and 8.4.2/12.2.2);
- In-country technical assistance mission on waste indicators (SDG indicators 12.4.2 and 12.5.1);
- In-country technical assistance mission on policy coherence indicator (SDG indicator 17.14.1); and
- Out-of-country training on food waste indicator (SDG indicator 12.3.1b).

2. Outcomes and Observations

2.1 Outcomes

In-country technical assistance missions on material flow and waste indicators

Two spreadsheets were prepared, one for SDG indicator 12.4.2 and the other for SDG indicator 12.5.1. The compiler for SDG indicator 8.4.2/12.2.2 had been prepared previously. The three tools were used in the trainings to enter sample national data.

Trainings were held in four countries. The approach and schedule were adapted to each country's need. The trainings started with an overview of the indicators, including an introduction to the [UNSD country profiles](#), the [UNEP Scorecard](#), and the [Global Material Flows Database](#). Each national statistical office (NSO) made a short presentation on data availability. This was followed by a detailed walk through the compiler and spreadsheets. Participants were invited to provide data and enter it into the appropriate cells of the tools.

More time was devoted to SDG indicator 8.4.2/12.2.2 in all countries (five to eight days). In part this was because SDG indicators 12.4.2 and 12.5.1 are more straightforward; the limited availability of data for these indicators was also a factor.

In two of the countries, an initial compilation of data and estimates of domestic material consumption (SDG indicator 8.4.2/12.2.2) was completed during the training. These countries have committed to review and validate the data in the near future. A third country was able to compile this information subsequent to the training and a draft estimate of domestic material consumption was completed in August 2023. UNEP provided feedback and revisions to the calculations. In the fourth country, the NSO has reached out to the relevant ministries to obtain the necessary information to be able to complete the compilation of data for SDG indicator 8.4.2/12.2.2.

Finalising the compilation of data for SDG indicators 12.4.2 and 12.5.1 is ongoing in all countries.

In-country technical assistance mission on policy coherence indicator

The technical assistance mission on SDG indicator 17.14.1 on policy coherence was held in four countries. The project's fifth beneficiary country is already reporting on the indicator and was therefore omitted.

The training was scheduled for a duration of two days in each country. A broad range of government officials from the NSOs, various line ministries and agencies participated. Participants were welcomed by UNEP and the respective NSO, followed by an introductory presentation about policy coherence and the tool to use for country self-assessment.

UNEP questionnaire on the mechanisms in place to enhance policy coherence of sustainable development was then presented through its eight domains, each including a set of three to seven mechanisms, discussing availability of information, policies, national strategies and other policies and mechanisms already available in the country. Participants were invited to discuss the mechanisms in each domain and set preliminary scores by identifying specific supporting evidence. The duration of the discussions varied and was adapted to the needs of each country. The training was concluded with drafting a set of recommendations on future proceedings. Steps to officially report on SDG indicator 17.14.1 were provided, along with the potential repetition of similar exercise now that all national stakeholders are identified and are familiar with the process.

As a result of the training, all beneficiary countries were able to self-score. The scoring is preliminary and requires official adoption from each country's respective agency. Once approval is obtained, countries will officially report on the indicator by sending their score to UNEP, the custodian agency for this indicator.

Out-of-country training on food waste indicator

A training focusing on SDG indicator 12.3.1b on food waste was implemented with the participation of three beneficiary countries in Paris, France. As the remaining three beneficiary countries have already received technical assistance on food waste, they were not invited to participate in this training.

A two-day training was held with representatives from beneficiary countries from NSOs and line ministries responsible to collect and disseminate data related to food waste, as well as one representative from Bangladesh. The objective was to explain in detail the adopted methodologies, potential sources of data and guide countries, where no food waste data is available, how to collect and disseminate food waste related data. The training was concluded by developing national measurement strategy, stakeholders' mapping, identifying responsibilities and putting systems in place to make the most of data.

2.2 Observations

The involvement of representatives from various agencies and departments who are primarily responsible for collecting data on the elements required for compilation of the indicators was an important feature of the trainings. In some cases, participants had worked together in the past, but in others not. This approach improved awareness of the data available and their custodians. It also helped the responsible agencies identify data gaps that could be filled. By building and strengthening relationships, this is expected to contribute to the sustainability of reporting on these indicators.

SDG indicator 8.4.1/12.2.1 – Material Footprint

SDG indicator 8.4.1/12.2.1 was introduced. However, given that the adaptation of the Eurostat methodology for calculating raw material equivalent of imports (RME_{IM}) and raw material equivalents of exports (RME_{EX}) was not yet available, the data for this indicator were not compiled.

SDG indicator 8.4.2/12.2.2 – Domestic Material Consumption

To calculate domestic extraction, countries have data on quantities of crops harvested. Less data are available on crop residues, but data are available to use

the estimation methods in the compiler. Information on roundwood harvested is generally available, but data on wood used for fuel and other extractions is generally lacking or of poor quality. Information on commercial fish and other seafood is generally good, but data on the other wild harvest elements is often not available.

Data are available on extraction of metal ores, although it is not always clear if these are for run-of-mine quantities as required for the material flow accounts (MFA). Data for non-metallic minerals are generally scarcer. The estimation tool for carbonate minerals important in cement is helpful as well as the sand and gravel estimation tool. Several countries noted the challenge of estimating the amount of sand and gravel used in building sub-layers.

Data on fossil fuels are readily available in all countries.

Data on imports and exports are also readily available in all countries. The correspondence table for HS 2017 Codes to EW-MFA Codes makes the compilation of these data straightforward.

For materials outflows, data are available for greenhouse gases. There is limited data for the other elements.

The guidance in the manual is sufficient to calculate amounts for the input and output balancing items, although, data to estimate bacterial respiration in solid waste and wastewater is not readily available in several of the participating countries.

Follow-up work will be needed in Ghana and Senegal to finalise and validate the MFA. The Global Material Flows Database provides data until 2019. Results of the data compiled as part of this project were compared to the global database. Some differences would be expected because of the different years compared (2019 to 2021/2022). For Ghana and Senegal, the lack of accurate data for non-metallic minerals largely explains underestimation of domestic extraction.

In all four countries, data used in the MFA are collected under the territorial principle. More guidance is needed on estimating amounts based on residential principle, if it is considered essential.

In addition, a line-by-line comparison between calculations done by the International Resource Panel and the national team would be a very useful quality control and validation exercise for the countries to undertake, as this would allow countries to better understand whether estimations are as close to actual calculations or not.

SDG indicator 12.3.1b – Food waste

The representatives of countries were informed in advance to bring available information on food waste for their respective countries. Representatives showed high interest in the training; multiple questions were asked to clarify information and discussions took place regarding the actual status in their respective countries, and how they can leverage their countries' data situation to be able to collect and report on SDG indicator 12.3.1b.

As none of the countries present have food waste data, a general discussion about the complexity of the data collection exercise and the allocation of financial resources to collect meaningful data that can be representative of the components of the indicator took place. The training concluded with a brainstorming session on national action plan to start the collection of food waste related information.

As participants were representing different institutions from the same country, it was beneficial for them to discuss how they can collaborate to collect and compile data about food waste and draft an initial starting point to plan the collection of food waste data.

SDG indicator 12.4.2 – Hazardous waste generated and treated

Two of the countries had information on hazardous waste but noted that these data are based on national definitions. In the other two, data are not available as there is no national reporting requirement for this information at the moment, although it was noted that this information could be available in the future. In addition, the data are not necessarily broken down as per the Basel waste categories Y2-Y18 and Y46 (household hazardous waste) or readily available by economic activity, according to ISIC Rev. 4. Countries are encouraged to submit data on hazardous waste generation to the Basel Secretariat, but this is not an obligation and none of the four countries that benefited from the trainings did or do so.

Some countries noted that the involvement of the informal sector in e-waste recycling made it difficult to estimate the amount of e-waste generated and managed. Two countries have estimates of e-waste generated; one country has estimated quantities based on electric and electronic equipment put on the market using the approach outlined in the United Nations University *E-waste Statistics: Guidelines on Classifications, Reporting and Indicators*.

While information on household waste generation is available, at least for waste collected by the formal sector, in several of the countries this waste is not segregated and therefore the proportion of hazardous components in this waste, including e-waste, is not known.

While some countries have the necessary data to report on this indicator, others will need to fill gaps by collecting relevant data.

SDG indicator 12.5.1 – National recycling rate

Countries have data on the amount of household waste generated, at least for the largest urban areas if not total for the country. As previously above, municipal waste in some countries is not segregated. In addition, the informal sector is highly engaged in recycling. For these countries, accurate information on collection and recycling rates are not available.

Not all countries have a reporting system for waste generation in industrial sectors, which makes it a challenge to estimate the recycling rate for industrial waste.

E-waste originates in the manufacturing, electricity, gas, steam and air conditioning supply, other economic sectors and households. It is not always possible to parse out the e-waste generated from the total waste generated in the individual sectors. Several countries noted the challenge of estimating amounts of e-waste collected and recycled.

Countries with better waste management infrastructure have better data which can be used to report on this indicator. Countries, which do not already require the reporting of amounts of waste generated, collected and recycled, are encouraged to do so as part of their efforts to improve the management of their waste.

Countries noted the need for on-going support to ensure that the compilation of data for the indicators was accurate before it was submitted.

Questions arose about the data that is available through the UNEP/UNSD questionnaire on environment statistics. For example, in some cases there are differences in the data on the UNSD country profile and UNEP scorecard. The reason for these differences is not clear. Information provided through the UNSD/UNEP questionnaire includes explanatory notes. However, these limitations are not indicated when the data are presented in the UNSD country profile and UNEP scorecard, which could lead to misinterpretation.

Also, large discrepancies between countries were noted in the quantities of e-waste generated reported in the [UNSD/UNEP Questionnaire 2020](#) on Environment Statistics. For example, in 2017, reported e-waste generated in Kazakhstan was 10 kilotonnes, while in Uganda it was 18,547 kt. Although published data is reported by relevant institutions nationally, this could be because some countries only report on a portion of e-waste generated because other data is not available, or countries use different approaches to calculate total e-waste generated. For example, some countries' estimates are derived using the UNU methodology. In others, the data are from national surveys, waste management records, or limited to waste from certain sectors.

SDG indicator 17.14.1 – Policy coherence

The technical assistance mission on policy coherence focused on identifying the relevant institutions that could have the information necessary to complete the self-assessment tool. The training provided the space for all relevant institutions to be present, better understand the requirements to fill in the self-assessment, discuss the national policies and settings that respond to the respective questions, and provided an opportunity to do similar two-day trainings to fill in the self-assessment.

Although the self-assessment tool is only indicative of the situation in countries, countries were able to discuss and fill in the information with supporting evidence. They also understood the importance of having all relevant representatives present due to difference in perspectives and knowledge.

In addition to enhancing the statistical capacity of countries to report on SDG indicator 17.14.1, the technical assistance mission played an integral role in instigating conversations on policy coherence and related country specific situations between government officials. This serves as a pivotal first step towards promoting policy coherence, opening the door to potential future advancements, and fostering collaboration among various government entities.

3. Impact of National Activities and Way Forward

One main conclusion, based on the beneficiary countries, is that countries have the ability to report on SDG indicators 8.4.2/12.2.2, 12.4.2, 12.5.1 and 17.14.1, though in some instances the relevant data are not available and so only partial reporting is possible. Collating data on SDG indicator 8.4.2/12.2.2 is more complex. However, the step-by-step guide and compiler facilitate the task. Walking through the process step-by-step was very beneficial and made the compilation of data more straightforward.

Guidance and tools are needed to assist countries in the calculation of raw material equivalent of imports (RME_{IM}) and raw material equivalents of exports (RME_{EX}), although such calculations are complex and require specific knowledge and skills. This would enable countries to estimate their material footprint and report on the SDG indicator (SDG indicator 8.4.1/12.2.1).

The beneficiary countries have sufficient data to estimate their domestic material consumption (SDG indicator 8.4.2/12.2.2) and fill in the self-assessment tool for policy coherence (SDG indicator 17.14.1) and are encouraged to complete, validate and submit the results for these indicators to UNEP, as custodian Agency for these indicators.

Several countries indicated that they had data available on waste generated but that it was not always categorized as requested by UNSD/UNEP. The ability to report unsegregated data, including totals, would allow countries to provide some high-level information.

Other countries have limited data available on waste. The lack of legal frameworks and infrastructure for the management of waste impedes the availability of data needed to report on SDG indicators 12.4.2 and 12.5.1. However, it is expected that the relevant data could become available in the future.

Suggestions made to improve the quality of the data collection and reporting included the following:

- Obtain input from experts and stakeholders to improve the accuracy and relevance of the national data collected;
- In each of the implicated national institutions, assign and resource a focal point with responsibility for data collection; and
- Hold regular meetings and/or an extended meeting period in an off-site residential setting.

The trainings were a catalyst for countries to compile the data required to derive SDG indicators 8.4.2/12.2.2, 12.3.1b, 12.4.2, 12.5.1 and 17.14.1. They provided an opportunity to strengthen inter-agency collaboration at the national level and to identify gaps in available data that could be filled in the future. The trainings increased confidence in their ability to derive the indicators. Countries are following up on the trainings, finalising the results, and have indicated their intent to submit their indicators data to UNEP in the near future.

3.1 Way forward/Potential for improvement

Ensuring regular reporting on the selected SDG indicators during the implementation of the national activities will require institutionalisation of the process to compile this information in each country. UNEP shall provide additional support to the beneficiary countries to complete the first cycle of reporting.

Greater awareness of the benefits of compiling these indicators to evaluate the implementation of national programmes and policies, as well as to guide their improvements, would support institutionalisation. UNEP could compile case studies of how SDG indicators have been used to guide development and implementation of national programmes and policies. This could provide countries with additional incentive to compile and report on the SDG indicators.

Material flow accounts use the residential principle. However, most national data are compiled using a territorial approach. More guidance on how to adjust national data from territorial to residential principle is needed, if these significantly impact the results of the MFA.

When guidance for SDG indicator 8.4.1/12.2.1 is finalised, UNEP is encouraged to reach out specifically to the beneficiary countries to advise them of its availability and to invite feedback on its utility.

Until SDG reporting becomes routine and that material flow accounting becomes common practice, UNEP is encouraged to continue to raise awareness and provide training on how to compile information and report on these indicators. While there are advantages to country-by-country trainings, these are challenging to organise and not financially sustainable. However, making simple step-by-step guides available in all UN languages on the internet, and providing links to them when reminders are sent to compile the data would help. In addition, UNEP could offer a “help line” and highlight the review mechanism that is in place to ensure validity of the submitted data. This would increase countries’ confidence and encourage them to submit their information.

Annex

Data availability assessments

- a. Ghana
- b. India
- c. Jordan
- d. Kazakhstan
- e. Senegal
- f. Uganda

