



Module 2: Developing a National Education Indicator Framework and Strategies for Education Statistics

Module overview – objectives, topics and learning outcomes

Before deciding on the system of data collection, for every country it is important to understand existing data collection strategies and coverage, as well as identifying the existing data producers relevant for national education indicators.

National indicators of education need a supporting legal framework with norms and standards that help formalize the role of different institutions and develop national statistical capacities to own the production of education data and monitoring performance.

Developing a National Education Indicator Framework (NEIF) does not only help identify the indicators to be monitored at the national level, but this approach will help provide specifications and mechanisms to collect and report data at both the national and global levels.

Therefore, countries should have their own National Education Indicator Framework to institutionalize a priority list of indicators relevant to their own national education policies, plan and priorities.

Countries also need to develop strong strategies to generate data that is needed to calculate the set of these indicators, which in turn requires setting clear objectives that show purposeful results. This process is called National Strategies for the Development of Education Statistics.

This module will discuss the development of the National Education Indicator Framework and explain the process of preparing National Strategies for the Development of Education Statistics.

The following topics are covered by this module:

- Understanding the instruments for monitoring SDG 4, including the methodologies needed to calculate the indicators;
- Developing a National Education Indicator Framework for SDG 4;
- Instructions and resource materials to map education data sources;
- Creating National Strategies for the Development of Education Statistics through a results-based management approach for improved SDG 4 monitoring.

After completing the module, learners will have acquired the following learning outcomes:

- Able to explain the importance of and requirements for developing a National Education Indicator Framework;
- Able to develop a National Education Indicator Framework for the individual's own country;
- An understanding of the means to conduct data source mapping;
- An understanding of conducting a data quality assessment of national data sources;
- Able to explain the rationale and process/steps of creating National Strategies for the Development of Education Statistics;
- Able to apply the process and utilize the tools for developing National Strategies for the Development of Education Statistics for the individual's country.

1 Strengthening Institutional Capacities to Monitor SDG 4

The discussions in this module will demonstrate the need for strengthening institutional capacities for effective monitoring of SDG 4. This topic looks into organizational and institutional structures for managing education data and examines some available tools for both data quality improvement and the development of national strategies for the development of education statistics.

1.1 Organizational and institutional structures for managing education data

There are different institutions that collect education data at different levels. National and international household surveys are often the responsibility of a national statistics office, with little interaction with the statistics unit of the ministry of education. There are not only limited horizontal data exchanges (among the different ministries), but also limited vertical integration of data (among the different levels of administration, such as, local, district/provincial/state and national levels).

Other instances relate to the production of education statistics being completed in silos, separate from other sectors, such as, social protection, health, or civil registration statistics. On top of all this, the data relating to education activities of the private sector and NGOs may not feed in to the national data system. Such a situation may result in a lot of useful data collected not being put to proper use.

The net result of all these issues may be the creation of blind spots in the national education dashboard; that is to say that the quality and quantity of education delivered, often to some of the most marginalized and vulnerable groups, is neither fully assessed, nor in the same way as for the public sector¹.



Remember!

The management initiatives taken to contextualize SDG 4 commitments must be country-led and country-owned.

¹ UNESCO, 2016: Mainstreaming SDG 4 Education 2030 in sector-wide policy and planning. Paris, UNESCO, access: <http://unesdoc.unesco.org/images/0024/002464/246475e.pdf>

This includes a review of the existing organizational and institutional structures at the country level, with particular reference to a review of the existing sector mechanisms and processes for coordination, in tandem with the system-wide inclusiveness and transparency requirements of the Education 2030 Agenda.

Simultaneously, partner dialogues may also have to be organized in order to ensure coordinated efforts to contextualize SDG 4 commitments. It is important that these efforts are country-led and country owned. It is also essential that they are also embedded in the national education policy and planning processes and structures.

Similarly, multi-stakeholder partnerships linked to broader SDG processes are essential for translating SDG 4 commitments into national education development efforts.

1.2 Managing institutions for the production of data

Data production takes place at different levels and institutions within a country's context and as levels and institutions vary, so does the number of reporting units. The reporting units can be identified as follows:

- Individuals in society (in household surveys), students (in learning assessments);
- Schools, colleges, vocational and technical training institutions;
- Teacher training institutions;
- Institutions on employment (in labour market surveys);
- Communities, social groups (in large qualitative studies, e.g. ethnographic data, focus group discussions, spatial studies);
- Sub-district consolidation units;
- District consolidation units;
- State/provincial consolidation units;
- National consolidation units.


Some units may also report data on specific studies conducted on a subject of education by academic institutions, by the national statistical office, by institutions for education research and by institutions for policy research.

With the many institutions collecting data for many groups and individuals on many different topics, several ministries of education, home, labour, health, child development, planning, finance, etc., will have to be involved in the organization, consolidation and managing of data.

It is crucial that the work of all these ministries is coordinated and sensitized to prioritize and harmonize the data on SDG 4 and their indicators. It may be necessary, if not already

done so, to establish an inter-ministerial steering group or committee for the purpose of collaborating on monitoring the progress towards achieving SDG 4 in the country. At this point it should be mentioned that the same inter-ministerial coordination is required for all the other SDGs!

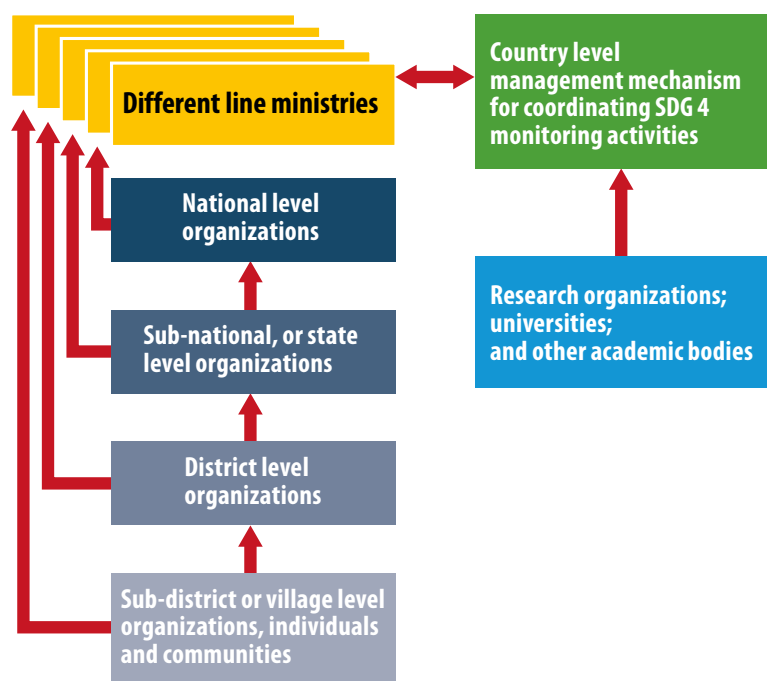
It would be helpful if the already existing mechanisms for such coordination and partnerships at the country level are employed to establish, strengthen and/or adapt them for a truly sector-wide, inclusive and country-led monitoring process. A possible structure of such a mechanism is illustrated in Figure 1.



Remember!

A well-coordinated and managed data collection system will improve data quality and its use for policy planning for education development.

Figure 1: Coordination mechanism for SDG 4 monitoring at the country level



Source: UIS, 2017: SDG 4 Data Digest, UIS, Montreal, **access:** <http://uis.unesco.org/sites/default/files/documents/quality-factor-strengthening-national-data-2017-en.pdf>

This figure represents a possible management mechanism for coordinating the monitoring of SDG 4 indicators at the country level. This may vary for different countries.

However, it is important to ensure that the central management mechanism is fully representative of the interests of all stakeholders and adequately empowered to function effectively.

The data gathered for both regional and global monitoring should then be consolidated and systematically fed in to the concerned institutions at those levels.

Case Study: Managing education data in Pakistan

Education data management in Pakistan struggled with missing common standards in data collection and processing and subsequently with harmonizing the education indicators from its eight provinces.

Some provinces showed delays in the collection, processing and reporting of the data due to limited capacities, such as absent data validation mechanisms, insufficient data analysis competencies and low priorities in resource allocation to the Education Management Information System (EMIS). Some provinces also did not collect relevant data from all sectors of education. Also, the usability of the data for policy making and education planning was limited.

To tackle the challenges, face-to-face advocacy and sensitization seminars were conducted among EMIS stakeholders to improve the data collection within the EMIS. This required developing common data standards valid for the time of collection until the time of dissemination. The improvement of the coordination with and among the many education data stakeholders was crucial in this process.

- Key achievement and sustainability -

The most recent achievement that has emerged from improved standardization and coordination in Pakistan has been the establishment of the Education Atlas. This has resulted in six publications to date and an interactive website on presenting institution-level data to visually compare education indicators by district and identify geographical areas that require attention.

This was possible thanks to establishing regulatory committees within the provinces and providing technical support to the provincial EMIS. The data now collected, processed and analysed is distributed to national and international entities, such as the Economic Survey of Pakistan, or the UNESCO Institute for Statistics (UIS).

In order to ensure effective management of education data, the established EMIS regulatory committees play a pivotal role in provincial coordination and ownership. Hereby, EMIS' role is at the federal level and acts as the standard setting agency for all provinces. The federal EMIS coordinates and facilitates sub-national data production, analysis and applications.

1.3 Introducing the National Strategies for the Development of Education Statistics²

The National Strategies for the Development of Education Statistics (NSDES) is a powerful policy instrument designed by government and its partners to establish the National Education Statistical System, with holistic education data strategies. The NSDES aims to provide a medium-term vision for where the National Education Statistical System (NESS) should be in five to ten years; set the milestones for getting there; and fully integrate it into broader National Strategies for the Development of Statistics (Please note: National Strategies for the Development of Statistics (NSDS) is not to be confused with NSDES).

The development of NSDES itself builds on the establishment of a National Education Indicator Framework and the Data Quality Assessment Framework (DQAF). These frameworks – with their respective instruments and methods – are helpful for governments to generate most of the multiple input needed for the development of NSDES and build quality data into a comprehensive and well-coordinated statistical system.

Ideally, the stakeholders of the National Education Statistical System, who have a mandate to produce official statistics for policy and planning, should be able to produce and share quality, relevant statistics from multiple data sources through a coordinated national effort aimed at improving the mechanisms and processes for data production.

However, the National Education Statistical System consists of discrete information systems working in isolation in each sub-sector, as in early childhood, basic education, Technical and Vocational Education and Training (TVET) and tertiary education.

Development partners support the development of a sector-wide approach to education statistics in order to strengthen the statistical capacity of the National Education Statistical System to produce data to monitor SDG 4. The development of national strategies for the development of education statistics hinges upon national ownership of data production, as well as a holistic approach to the same.

The challenges to data collection for SDG 4 can be addressed with a fair amount of ease from the angle of national policy priorities and needs of the stakeholders for such data. Coordination between the various data sources poses the main challenge in the production of quality data. Specifically, the existence of data silos creates analytical gaps in understanding the progress of education.

Besides, there are concerns about partial sectoral or sub-sectoral data and challenges of harmonization of data between education and non-education sectors and between countries.

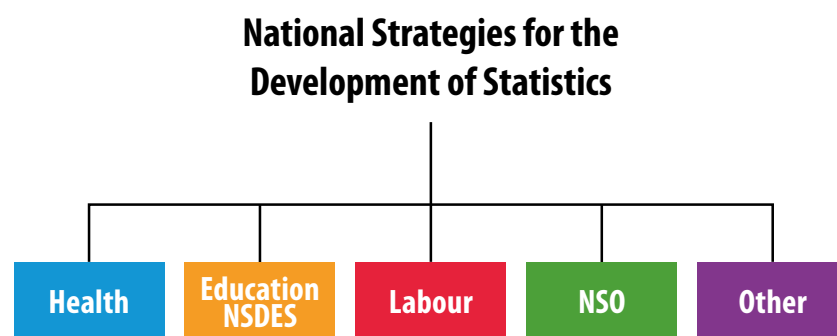
² The UNESCO Institute for Statistics (UIS) has been supporting several countries in Asia-Pacific region to develop NSDES for holistic education statistics production at national level. The UIS has developed several resources and tools for developing NSDES (<http://uis.unesco.org/en/capacity-development-tools>).

The strength of NSDES:

- It is a **country-led process**. The NSDES is the responsibility of the national government which has to make the final decisions in terms of committing resources, as well as for its implementation. The strategy must be grounded in a government's commitment to the preparation process and this commitment should deepen through the process.
- It is an **inclusive process**. The strategic planning process should be accompanied by a participatory policy dialogue among multiple stakeholders that builds consensus on and commitment to the development of strategies. Existing mechanisms for such policy dialogue between the government and its development partners include the Sector Working Group (sometimes called the Local Education Group).
- It is a **well-organized process**. Clarity is required on the roles and responsibilities of the multiple stakeholders, especially those who lead and coordinate. NSDES structures may include a steering committee to oversee and guide the process, a National Technical Team (NTT) to coordinate the technical work, thereby bringing together all the ministry's directorates and departments and selected working groups to focus on specific themes, or sub-sectors.
- It is a **process of growing mutual accountability for education statistics**. This entails the respective accountability of multiple-stakeholders working together toward shared outcomes, where each stakeholder is accountable for its own contribution.
- It is a **capacity-development process**. Plan preparation is itself a form of 'learning by doing' capacity development, making the process of NSDES preparation as important as the strategy itself.

Box 1, below, shows NSDES as a participatory exercise designated to reinforce synergies among all education data producers and users.

Box 1: National strategies for the development of statistics (NSDS)



Note: The National Education Statistical System would source relevant data from all of the above.

Source: Paris21, 2018: NSDS Guidelines. Guidelines for the elaboration of a National Strategy for the Development of Statistics. April 2018, **access:** <https://nsdsguidelines.paris21.org/NSDS-GUIDELINES-full-lang-en.pdf>

Module 2

For a quick understanding, these frameworks establish essential criteria for developing NSDES and education statistics:

- An integrated process as part of the National Strategies for the Development of Statistics (NSDS);
- An integrated process for national planning and national statistical capacity development;
- An integrated element of the overall education sector development plan;
- Captured education data needs arising out of policy priorities, objectives and commitments;
- A framework for international and bilateral assistance;
- The means of adequate monitoring and evaluation;
- A holistic perspective for including all aspects and units of the data production chain.

The processes of developing NSDES

NSDES is developed and implemented through a national expert group on education data, which provides an avenue for dialogue between the relevant governmental institutions and its stakeholders and partners. Following a preparation phase during which the education data platform will be initiated, the design of NSDES takes place as follows:

- Developing a National Education Indicator Framework;
- Mapping data sources and identifying data gaps against SDG 4 indicators;
- Conducting a Data Quality Assessment (DQA) in the National Education Statistical System for all the relevant data sources;
- Developing and validating NSDES.

We will look section-by-section into mapping the relevant data sources, developing the National Education Indicator Framework, the Data Quality Assessment and finally, the National Strategies for the Development of Education Statistics.

2 Developing a National Education Indicator Framework

The NEIF is an instrument to define data needs and the demands of a country with regard to its policy priorities. Establishing the NEIF, aligned with international indicator frameworks, has the benefit of streamlining processes of data collection, meeting international definitions and standards in education and integrating global development goals into the national planning processes.

The capacity development support must be guided by partnership development, national ownership and a holistic approach³.

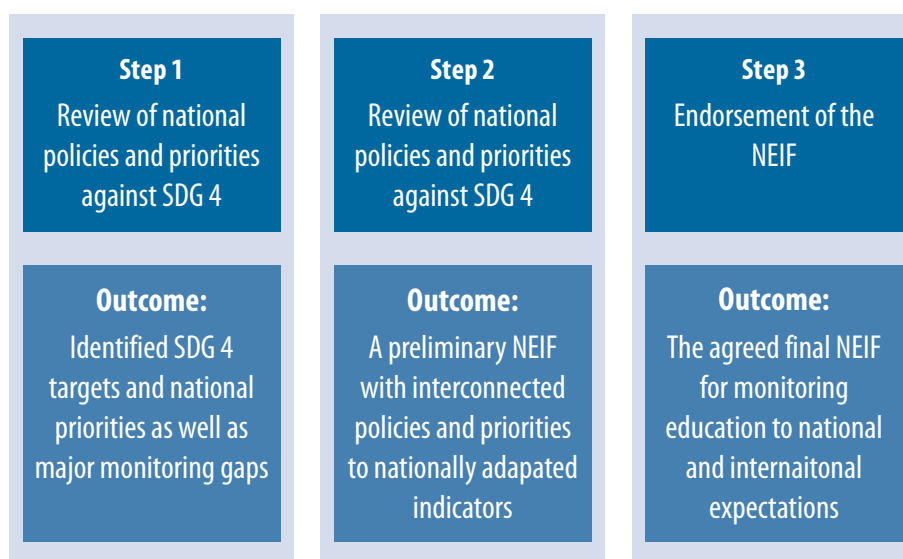
The benefits of setting up a National Education Indicators Framework will lead to:

- Determining data needs for monitoring SDG 4 from a national perspective;
- Harmonizing the collection of quality education data from various sources (see also the DQAF section below);
- Facilitating the preparation of data for dissemination to national policy-makers, planners and other stakeholders;
- Improving the national information system on education data collection;
- Aligning national indicators of education with international frameworks for internationally comparable definitions and standards;
- Integrating SDG 4 into national planning processes to avoid inefficiencies.

Developing NEIF is a systematic process and needs thorough consultations with, and among all stakeholders, data producers and data users, including planners. The country should have well planned and valid national education policies and priorities before developing this Framework. The Framework should focus on monitoring national policies and priorities, as well as agreed international goals. The development should follow the suggested three steps with their respective outcomes, as outlined in Figure 2. We will go through each step in ensuing sections.

³ UIS, UNESCO, UNICEF and other partners can support the countries in preparing their NEIF. The UIS has developed Capacity Development Tools that can be found at: <http://uis.unesco.org/en/capacity-development-tools>.

Figure 2: Overview of the NEIF development process



2.1 Step 1: Review of national education priorities against SDG 4 targets

Before any monitoring mechanism can be modelled to track national and international education goals, countries must have translated national and internationally agreed aspirations into achievable targets.

Presumably, this is done with the development of a national education sector plan that outlines a country's policy priorities and addresses the strategies that are to be employed to realize these priorities. It goes without saying that every education sector plan requires monitoring too. Creating the NEIF, therefore, provides the double benefit of monitoring national priorities, as well as internationally agreed goals; in this case SDG 4 on education.

The instruments to review for priorities to monitor are typically:

- The type of learning assessments;
- Household surveys and census surveys;
- Political commitments of access to, quality of, and equality and equity in education.
- The policies related to:
 - Out-of-school-children;
 - Non-formal education;
 - TVET;
 - Gender equality;

Box 2: Ideal composition of the NEIF

In essence, the NEIF is composed of:

- National education indicators;
- + Global SDG 4 indicators;
- + Additional indicators (e.g. SDG 4 thematic indicators; Other SDG indicators, such as SDG 13.3).

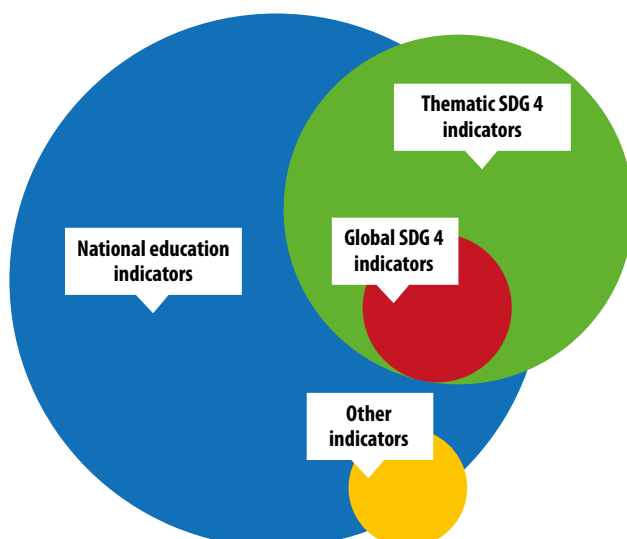
= National Education Indicator Framework

- Disability;
- Marginalized populations (ethnic groups, migrants, refugees, among others);
- Education in emergencies in accordance with the emergency;
- Teachers.
- Education for sustainable development and global citizenship education, including peace education;
- Laws, or Acts on education, including international frameworks (e.g. human rights);
- Budget priorities for education.

Note that some policy priorities of a country can be unique to a particular country and may not be covered by the SDG 4 targets. In this case, NEIF should also include indicators to monitor specific and unique priorities.

2.2 Step 2: Identifying national indicator sets against SDG 4

Figure 3: Schematic outline of indicator coverage at the national level



Identifying the global and thematic indicators on SDG 4, as they are potentially present in established national indicators, will ease the burden of monitoring national priorities, while also ensuring the relevance for global data requirements.

This applies especially to national policy frameworks on education, such as a national education sector plan which will include reference to populations, ratios, resources and other means that are to be measured. The NEIF can therefore build upon national education sector plans (or similar frameworks), the globally committed SDG 4 targets and selected thematic indicators as they relate to nationally relevant objectives.

As the NEIF must facilitate clear and transparent reporting and effective communication about

the objectives at each stage of implementation, different stakeholders and partners, including donors and NGOs, should be consulted in the formulation of the Framework.

Some countries may need to involve provincial/district partners in the discussions. Therefore, a series of consultative meetings can bring all stakeholders together to discuss and agree on a purposeful education monitoring framework. The following is a short outline on the criteria to apply when selecting indicators. More on indicator development will be discussed in Module 5.

Box 3: Criteria for selecting indicators



- Indicators must be **relevant**: They must reflect the most critical national policy themes in the SDG4 Targets and vice versa. Generally acknowledged among the education community has been the emphasis on measuring learning outcomes and equity.
- The indicators must have proper **alignment**: They must have the same meaning and significance in all settings, be ideally measured by a similar question, or item in different surveys.
- Indicators must be **feasible**: This implies regularity in the collection of data. This also implies being cost-effective.
- Indicators must be **communicable**: They must be easily understood and narrate progress towards aspirations.
- The indicators must be **interpretable**: Their values can change; this change must be easily understood by keeping in mind the time, circumstance, or population they originated from.

The following table is an example of a developed NEIF for Cambodia on the topic of Early Childhood Education (ECE). It shows which results are expected overall; which concepts they address; which indicators have been chosen to track the expected results; and to which type (global, thematic, or additional) of indicator they belong; as well as which national strategy they link up with. The latter, especially, allows for policymakers and planners to cross-check which indicator to choose for which national priority.

Table 1: Example of a National Education Indicator Framework for the Cambodian national priority area on early childhood education (ECE)

Expected results in line with SDG 4	Indicators to monitor policy priorities			Linkage with national indicative strategies
	Concept	Indicator	Type	
Priority 1: All girls and boys have access to quality ECCE and pre-primary education and complete free, equitable and quality basic education (primary and lower secondary) with relevant and effective learning outcomes.				
1.1 All young children under 5 years of age have increased access to quality early childhood development, care and pre-primary education and are fully prepared for primary education,	Readiness	1.1.1. Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being, by sex	Global	1.1.2; 1.1.3, 1.1.4f
		1.1.2. Percentage of children under 5 years experiencing positive and stimulating home learning environments	Thematic	1.1.2; 1.1.3
		1.1.3. Percentage of new Grade 1 students with pre-school or ECCE experience	Additional	1.1.2
		1.1.4. Percentage of children with an acceptable nutritional status	Additional	1.1.3
	Participation	1.1.5. Participation rate in organized learning (one year before the official primary entry age), by sex	Global	1.1.3
		1.1.6. GER of Pre-primary	Thematic	1.1.3
		1.1.7. NER of ECCE and Pre-primary	Additional	1.1.3
	Provision	1.1.8. Number of years of (a) free and (b) compulsory pre-primary education guaranteed in legal frameworks	Thematic	1.1.2; 1.1.3
		1.1.9. Percentage of ECE services which meet quality standards	Additional	1.1.3f
	Qualified and trained	1.1.10. Pupil-qualified teacher ratio	Thematic	1.1.4
		1.1.11 Percentage of teachers qualified according to national standards	Thematic	
		1.1.12 Pupil-trained teacher ratio	Thematic	
		1.1.13. Percentage of teachers in pre-primary who have received at least the minimum organized and recognized teacher training pre-service and in-service required by type of institution	Global	
Equity	Parity indices (sex, location, age, wealth and disabilities)			

Module 2

1.2 All girls and boys complete nine years of free, publicly funded, inclusive equitable and quality basic education (primary and secondary) and acquire functional literacy and numeracy skills, as well as subject knowledge and cognitive and non-cognitive skills that enable them to develop to their full potential (4.1).	Learning	1.2.1. Proportion of children and young people (a) in Grades 2 or 3; (b) at the end of primary education; and (c) at the end of lower secondary education achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex	Global	1.2.4
		1.2.2. Administration of a nationally-representative learning assessment (a) in Grade 2 or 3; (b) at the end of primary education; and (c) at the end of lower secondary education	Thematic	1.2.4
	Completion	1.2.3. Completion Rate by levels of education	Thematic	
		1.2.4. Gross intake ratio to the last grade (primary education, lower secondary education)	Thematic	
		1.2.5. No. of districts that achieved primary education completion rate of at least 80 %	Additional	1.2.3
	Participation	1.2.6 Out-of-school rate (primary education and lower secondary education)	Thematic	1.2.3
		1.2.7. Percentage of children over-age for grade (primary education, lower secondary education)	Thematic	
		1.2.8. Net Admission Rate	Additional	
		1.2.9. Transition rate from primary to lower secondary education	Additional	
		1.2.10. Transition rate from lower secondary to upper education	Additional	
		1.1.11. Percentage of students enrolled in private institution as a total enrollment by levels of education	Additional	
	Provision	1.2.12. Number of years of free primary and secondary education guaranteed in legal framework	Thematic	1.2.1; 1.2.2
		1.2.13. Percentage of child friendly schools at intermediate and developed levels	Additional	
		1.2.14. Number of students completed in re-entry program to be integrated into primary and lower secondary programmes	Additional	

Source: Ministry of Education, Youth and Sport (MoEYS) 2018: Cambodia's Sustainable Development Goal 4-Education 2030 Roadmap. Phnom Penh, Royal Government of Cambodia (RGC).

2.3 Step 3: Endorsement of the indicator framework

Finally, as the framework is going to be a guiding document to strengthen a national education data production system, in a holistic manner, it must be endorsed by the highest level of authority to ensure appropriate support and allocate resources for its implementation.

A ministerial decree can be issued for approval, instructing all the concerned ministries, departments and agencies to apply the framework for monitoring SDG 4.

It is further important that the framework is agreed upon by the national monitoring body, for example a national statistical office, for monitoring the development agenda 2030 and the SDGs.

To find more instruments to assist with the development of NEIF:

 **UIS Capacity Development Tools⁴**

⁴ UIS Capacity Development Tools, access: <http://uis.unesco.org/en/capacity-development-tools>

3 Mapping Data Sources and Identifying Data Gaps

After establishing the education indicators within the NEIF, it is crucial to identify the sources that deliver the data for calculating the indicators.

The mapping of relevant SDG 4 data sources is a relatively straight-forward process and is therefore kept short.

For this purpose, UIS has created a SDG 4 Data Mapping Questionnaire to aid countries with this identification process. The questionnaire is meant to assess the availability of data that is required to produce the proposed indicators for monitoring SDG 4. Moreover, the information that can be collected with this questionnaire will assist in the identification of potential data gaps, or areas requiring further development.

The questionnaire includes a worksheet for each of the 10 targets of SDG 4 and each of these requires information on data availability for specific indicators. In addition, two annexes are included to request extra information on data sources' characteristics and the definitions established for the data items of interest.



Mapping potential data sources to monitor SDG 4⁵

(Please view: 'Matrix: SDG 4 Data Mapping Questionnaire')

⁵ UIS Capacity Development Tools, access: <http://uis.unesco.org/en/capacity-development-tools>

4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

Concept	Indicator	Q1. Does your country collect data/information required to produce this indicator? Choose answer from drop-down list -Yes (please answer Q2 to Q11) -No (please answer Q12) -Do not know (please answer Q13)	Q2. Year of last available data		Q3. Frequency of data collection? (Please specify, e.g. annual, every 2 years...)
Participation	4.3.1 (a)	Participation rate of youth and adults in formal education and training in the last 12 months			
	4.3.1 (b)	Participation rate of youth and adults in non-formal education and training in the last 12 months			
	4.3.2.	Gross enrolment ratio for tertiary education			
	4.3.3.	Participation rate in technical-vocational education programmes (15- to 24-year-olds)			

If you answered "Yes" to question 1								
Do you collect the data disaggregated by the following dimensions? Choose your answer from the drop down list (Yes, Partially, No, Do not know)					Q9. Data Source			
Q4. Age	Q5. Sex	Q6. Location (e.g. urban, rural)	Q7. Wealth	Q8. Disability	For guidance, typical source of indicator	Q9.1 Please provide the main source of data (e.g., name of survey or data registry)	Q9.2. If the indicator requires more than one data source, please provide the name of that second source needed	Q9.3. Please provide an alternative data source, if exists, that could be used to compute the indicator
					Administrative records /Household surveys			
					Administrative records /Household surveys			
					Administrative records /Household surveys			
					Administrative records /Household surveys			

Q10. Has this indicator (or related data) been officially published? Choose your answer from the drop down list : Yes, No, Do not know	Q11. If "Yes" to Q10, provide (a) name of publication or (b) URL	If you answered "No" to question 1		Q12. Does your country intend to collect these data in the near future (3 years or less)? (Yes, No, Do not know) If Yes, please provide details such as (a) the expected date and (b) responsible authority	If you answered "Do not know" to question 1 Q13. Please provide (a) the name and (b) address of the authority who may be able to provide information about this indicators or related data	Comments (if any)

Source: Matrix: SDG 4 Data Mapping Questionnaire, access: <http://uis.unesco.org/en/capacity-development-tools>

Figure 4: Example of the data mapping questionnaire for Target 4.3

4 Conducting a Data Quality Assessment for Education

In order to monitor the education sector, the NESS must effectively integrate different data sources, including administrative datasets, household surveys, learning assessments and finance and expenditure datasets. Maintaining data quality is not an easy task.

Data quality assumes a lot of importance in monitoring, particularly when monitoring aspects of equality, inclusiveness, equity, human rights, lifelong learning and other factors that determine people's lives.

The Education Data Quality Assessment Framework (Ed-DQAF) is a national level tool to define and evaluate the elements that are necessary for producing quality data by implementing a 'Code of Practice' for education statistics, which is further constituted of a set of statistical principles.

The Ed-DQAF is meant to identify weaknesses and strengths in the existing data production system. The education data quality assessment is therefore a building block in the design of a national strategy to address the new monitoring challenges in the context of SDG 4. The NEIF and the mapping of data sources help plan specific DQAFs.

4.1 The Education Data Quality Assessment Framework

UIS and the World Bank developed Ed-DQAF in 2005 by leaning on the Data Quality Assessment Framework of the International Monetary Fund (IMF)⁶. Ed-DQAF is a national level tool that provides a comprehensive evaluation of the quality of education data to meet the production challenge posed by the SDG 4 indicators – namely, producing quality national education data to global standards. Ed-DQAF is an evidence-based, diagnostic process of assessing the quality of the education data produced by different sources. It is a self-assessment process and mainly applied by national stakeholders. Ed-DQAF itself is

⁶ The International Monetary Fund Data Quality Assessment Framework – Generic Framework, access: https://dsbb.imf.org/content/pdfs/dqrs_Genframework.pdf

a tool of the DAQF, as there can be other DQAFs in other areas than education.

The Ed-DQAF assessment methodology relies on the assumption that national education statistics meet data quality standards when they are produced in a process that meets the standards and norms defined by it.

The Data Quality Assessment Framework by its dimensions⁷

Code of Practice

Ed-DQAF represents a scoring matrix to assess the quality of country-produced data and to formulate recommendations for improvements. To assess the quality of data and to provide recommendations systematically, UIS has proposed a Code of Practice (CoP) to apply in education statistics. CoP is composed of eight principles of quality that can be distinguished by addressing three pillars of: a) the institutional environment; b) the statistical data production processes; and c) education data outputs. The eight principles are to guide the evaluation and harmonization of different data sources by addressing dimensions of data quality. The three pillars help categorize the individual dimensions.

Box 4: The eight principles of the Code of Practice

Pillar 1: Institutional Environment	1. Policy and legal framework
	2. Adequacy of resources
	3. Relevance
Pillar 2: Organizational/Statistical Processes	4. Sound methodology
	5. Accuracy and reliability
Pillar 3: Education Data Outputs	6. Periodicity & timeliness
	7. Consistency
	8. Accessibility and clarity

Source: UIS, 2017: Ed-Data Quality Assessment Framework to Evaluate Administrative Routine Data Systems: Manual for the Conduct of an Evaluation by A National Technical Team, **access:** http://uis.unesco.org/sites/default/files/documents/training-workshop-manual-data-quality-assessment-framework-2017-en_0.pdf

⁷ For a description of the IMF DQAF, see: Committee for the Coordination of Statistical Activities, 2010: IMF's Data Quality Assessment Framework. Paper submitted to and presented at the Conference on Data Quality for International Organizations, Helsinki, Finland, 6 and 7 May 2010, access: <https://unstats.un.org/unsd/accsub/2010docs-CDQIO/Ses1-DQAF-IMF.pdf>; The Data Quality Assessment Framework by its dimensions: IMF, 2012, access: https://dsbb.imf.org/content/pdfs/dqrs_Genframework.pdf

Module 2

The Ed-DQAF scoring matrix is then organized in a cascading structure that proceeds from general dimensions to specific details.

The matrix does not result in a single numerical measure (or index) for data quality. Instead, the matrix provides the individual score for each item to determine the nature of the data quality of that particular item. These item scores are not used for inter-country comparison purposes but rather to put forward recommendations for improving data quality at the national level.

Each scoring level in the Ed-DQAF is applied in the following way:

- Level 4: Meets quality standards;
- Level 3: Room for improvement (Acceptable Statistics);
- Level 2: Questionable Statistics;
- Level 1: Poor Statistics.

For each level, a statement is made as to why the level was assigned.

Items scored at level 1 or level 2 should be used to propose recommendations and be regarded as the priority areas for improvement of the data quality. See the following figure for an example of the scoring matrix.

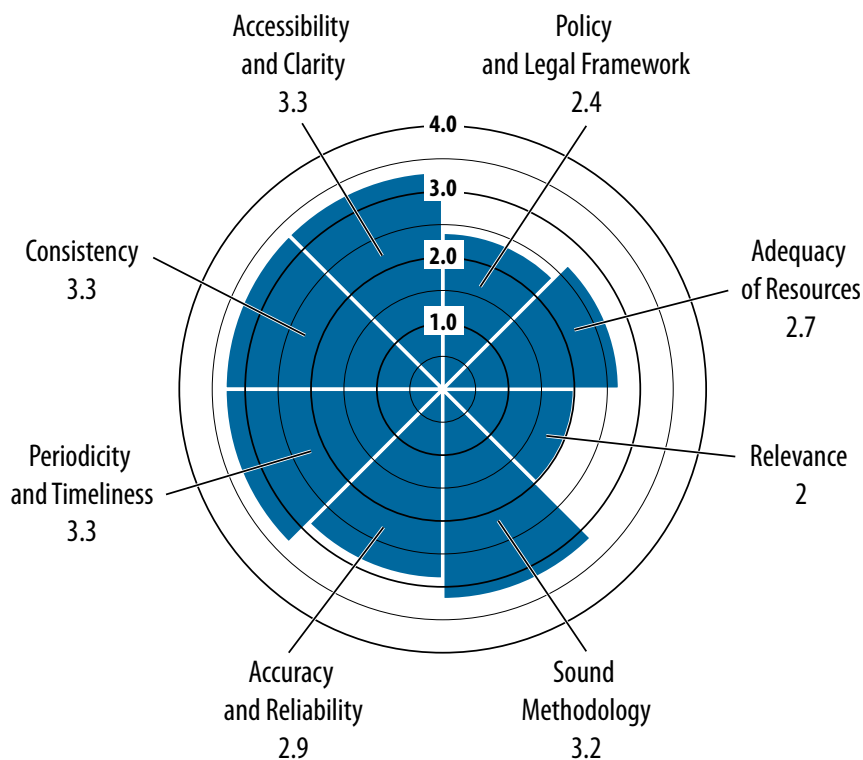
	Data Quality Assessment Framework	Level 4	Level 3	Level 2	Level 1	Evidence notes	Brief additional explanation	Recommendations for improvement	Examples for Training
1	Principle 1: Policy and legal framework								
1,1	The responsibility for collecting, processing, and disseminating statistics is clearly specified								
1	The structure in charge of the data source has a legal mandate	An Act exists and is implemented	A policy exists and is implemented	An Act or a Policy exists but is implemented in and ad hoc manner	There are no Acts, Policies or any formal arrangement for the production and dissemination of education data	Education Act, Statistical Act or any formal legal arrangements such as policies, etc.	Revision of Act to be included	Structure in charge develops an EMS policy	Act of countries
2	The structure in charge of the data source is informed of data collection conducted by other structures and is empowered to authorize and coordinate it. It seeks to reduce respondents burden.	Arrangements exist and implemented		Arrangements exist but not implemented	No formal arrangements exist	Policy or Formal arrangement in the form of documents available	Structure in charge the only source and not other data collection processes on the same data and in the same institutions	Put a policy in place	Emis Policy
3	The statistical activities is governed by methods and standards produced by the National Statistical Agency (NSO) and regular meetings take place between NSO and line ministries	Methods and standards exist and is implemented		Methods and standards exist but not implemented	NSO plays no role	NSO standards and minutes of meetings	NSO plays an overarching and leading role in the production of data sources through regular meetings, consultation and engagements	Enforce the Statistical Act	Statistical Act
1,2	Respondents' data are to be kept confidential and used for statistical purposes only								
4	Mechanisms (ACT or Policy) exist to ensure that individual data are treated with confidentiality	Mechanisms are in place and adhered to		Mechanisms are in place but not always applied	Mechanisms are not in place	Confidential related issues are included in the Act (e.g. Education Act, Statistical Act)	References about confidentiality in Act (e.g. Education Act), policies or documents(as circulars)	Include in Act or Policies	A legal document with confidentiality included (Examples)
5	Mechanisms exist to ensure that individual data are treated with confidentiality	Mechanisms are in place and adhered to		Mechanisms are in place but not always applied	Mechanisms are not in place	No abuse of individual data (Documentation and interview result with management)	Dissemination of individual data is properly managed and secured		Official documentation
2	Principle 2: Adequacy of resources								
2,1	Staff and their qualification commensurate with EMIS functions and policies for retention are in place								
6	Overall, the number of staff is adequate to perform the required tasks.	Official staff establishment exist and all positions are filled	Staff establishment exists, not all positions are filled	There is no staff establishment and staff shortages are limited	There is no staff establishment but staff shortages are major	Staff establishment document, Resource tables to motivate answer	The allocation and appointment of staff according to an official document and process	Post provisioning should be according to needs and a specific formula.UN principles should apply with specific reference to effective measures (adequate staff) to ensure compliance of respondent	Staff establishment examples, guidance on possible post provisioning. Staff resource tables to be completed by country delegates
7	The qualifications, skills and experience of the staff are adequate.	100% related qualifications and related experience	80% related qualifications and related experience	50% related qualifications and related experience	Less than 50% related qualifications and related experience	Table with staff and their qualifications	What are the related qualifications and experience for EMIS staff	Strong recommendation: They are provided formal and on-the job training in statistics and related subjects)	Staff with qualifications. Tables to be completed by countries.
8	Efforts are made to ensure the retention at any point of time of a core contingent of skilled staff (e.g. succession planning is taken into account).	Strategy exists and applied	Strategy exists and is applied in an ad hoc manner	Strategy exists and not applied	No Strategy	Strategy document			

Figure 5: Example excerpt from the Ed-DQAF scoring matrix for administrative data

Source: Data quality analysis: Administrative routine data systems, access: <http://uis.unesco.org/en/capacity-development-tools>

The final scores can be visualized as the average for each CoP principle for easier interpretation, as in the following example:

Figure 6: Graphical example of the score for each CoP principle



For more guidance on the DQAF Scoring Matrix, see:

i Ed-Data Quality Assessment Framework (Administrative Routine Data Systems)⁸

For the Matrix, see:

i Data Quality Assessment Framework Matrix⁹

⁸ UIS, 2017: Ed-Data Quality Assessment Framework to Evaluate Administrative Routine Data Systems, access: http://uis.unesco.org/sites/default/files/documents/training-workshop-manual-data-quality-assessment-framework-2017-en_0.pdf

⁹ The UIS Capacity Development Tools, Data quality analysis: Administrative routine data systems, access: <http://uis.unesco.org/en/capacity-development-tools>

(See 'Data quality analysis: Administrative routine data systems')

4.2 Phases in applying the Ed-DQAF

It is necessary to have a country team in operation that is fully trained in DQAF concepts, methodologies and processes, including tools. It is important that the team be inclusive of different education data producers. Representatives from the national statistical authorities should also be included in the team. As the DQAF exercise will include information gathering, data collection, observation visits and discussions with relevant officials, including consultation meetings, appropriate resources – both technical and financial – should be made available. Based on experiences from pilot countries, a data quality assessment can be implemented in four phases, as illustrated in Table 2.

Table 2: Four phases of DQAF

PHASES	ACTIONS	TOOLS
Preparatory	<ul style="list-style-type: none"> • Setting up a team • Training/orientation on undertaking DQAF, including tools • Planning of undertaking DQAF in the field 	DQAF Manual
Evidence Gathering	<ul style="list-style-type: none"> • A one to two weeks investigation period where the sub-groups will meet and interview the relevant staff in the different departments concerned with the data source • Collection of data collection instruments, metadata, policy documents etc. 	Interview guide Inventory list
DQAF Scoring	<ul style="list-style-type: none"> • Analysis of the data, information • Completing DQAF Assessment matrix with score and indicative recommendations • Recommendation to organize small workshop for completing the matrix 	DQAF matrix
Report Writing and Validation	<ul style="list-style-type: none"> • Preparation of the report with findings and clear recommendations • Validation of DQAF recommendations 	DQAF Manual

Source: Adapted from UIS, 2017: Ed-Data Quality Assessment Framework to Evaluate Administrative Routine Data Systems: Manual for the Conduct of an Evaluation by A National Technical Team, **access:** http://uis.unesco.org/sites/default/files/documents/training-workshop-manual-data-quality-assessment-framework-2017-en_0.pdf

4.3 Reporting on the education data quality assessment

The major findings extrapolated from the data quality analysis should be included in the report. The eight principles outlined in the CoP categorize the findings of the data quality assessment exercise. For each principle, a description of the data system should be given, detailing and summarizing the different items.

When providing recommendations, this part of the process should also identify good practices and opportunities to improve the current situation for optimal adherence, with accepted statistical standards. Based on the findings of the analysis, it is suggested that recommendations are categorized as follows:

- **INSTITUTIONAL AND POLICY ENVIRONMENT** (Acts, policies, etc.) and coordination among the relevant structures in charge of data sources should be presented. Suggest strengthening the official texts governing the production of statistics and stating the responsibilities and roles of the different concerned ministries and the NSO. Provide Examples of Acts and policies to be implemented.
- **ORGANIZATIONAL/STATISTICAL PROCESSES:** Recommendations on data collection processes should be emphasized, e.g. questionnaire design, questionnaire dissemination, data capturing, quality controls at different levels of the data collection chain, dissemination schedule, data use and dissemination, documentation (operational manual), etc.
- **TECHNICAL CAPACITY** (data system and dissemination): Focus on the functionality of the system that is required within the ministry of education and sub-national levels to improve data quality.
- **HUMAN RESOURCE CAPACITY:** Adequate training and capacity building strategies should be included as part of the recommendations.

The following example shows how the data quality assessment illustrates the weaknesses and strengths of the education data system in the country and it provides clear recommendations to improve the situation.

Figure 7: Example of DQA findings

	Standards not met	Some standards met	Most standards met	All standards met
Principles and indicators				
Principle 1: Policy and legal framework				
Roles & Responsibility				
Confidentiality and protection				
Principle 2: Adequacy of resources				
Staff qualification & retention				
Computing and physical facilities				
Financial resources				
Principle 3: Relevance				
Consultations with data's users				
User satisfaction				
Principle 4: Sound Methodology				
Statistical standards				
Scope				
Classification systems				
Archiving of source data				
Principle 5: Accuracy and reliability				
Coverage				
Sources validated				
Statistical techniques				
Principle 6: Periodicity and timeliness				
Periodicity and timeliness				
Principle 7: Consistency				
Consistency within a dataset				
Consistent over a reasonable period				
Consistent with other sources				
Principle 8: Accessibility and clarity				
Adequate dissemination				
Metadata available				
Support to users				

Table 3: DQA recommendations

<p>Institutional and policy environment</p> <p>Establish a multi-sectoral education data coordination group (education data platform) and harmonize the efforts in a coordinated manner.</p> <p>Develop policies and strategies for quality learning assessments at different levels of education programmes.</p> <p>Increase financial resources for strengthening production of timely and reliable education data.</p>	<p>Organizational/statistical processes</p> <p>Review, develop and update data standards for all the sub-sectors.</p> <p>Develop methodological documents with clear calculation methods and data sources, interpretation and data use.</p> <p>Develop Standard Operation Procedures (SOP) for education data production for all the sub-sectors.</p> <p>Review and improve the school annual census questionnaire in line with SDG4 data demand.</p>
<p>Technical capacity (data system and dissemination)</p> <p>Develop an integrated education data collection system with a modular approach to cover basic education, higher education, TVET, ECE and NFE.</p> <p>Develop an integrated database to store and retrieve data collected through various modules.</p> <p>Provide necessary physical facilities, (working spaces with needed tools). Install backup and security systems for the safety of the data.</p> <p>Establish a system to disseminate the data in appropriate formats and to engage users and stakeholders in data improvement activities.</p>	<p>Human resource capacity</p> <p>Train a core technical group in the technical areas of software development, networking and security and database management.</p> <p>Organize data awareness training events for all the line ministries and departments to ensure understanding of data standards and methodologies, as well as interpreting data for various purposes.</p> <p>Develop staff retention plans to ensure a minimum core team remains available for educational statistical activities/programmes at different levels – a team which can continuously instruct new staff.</p>

5 Results-Based Management in the National Strategies for the Development of Education Statistics

After going through the mapping of indicator data and sources, developing the NEIF and exploring the Data Quality Assessment, we come back to the NSDES where the DQA results will serve to design the NSDES' results framework.

Results-based management to develop monitoring strategies

You may already have noticed – developing the NSDES requires a change of thinking towards results instead of interventions. Generally, results-oriented planning shifts the direction of thinking towards how to achieve results? Conventional planning approaches, on the contrary, often start with the interventions and required resources: “If X activities are implemented, using Y resources, then Z result will be achieved.” – The focus here is on implementation.

Box 5: The NSDES results chain




Result level 1 - Impact: This is the long-term change in social or economic conditions.

Result level 2 - Outputs. These are the supply-side deliverables, as in products or services that stem from a development intervention in the short/medium-term. A distinction between an output (a specific good or service) and an outcome can be that the output is a change in the supply of goods and services (supply side), whereas the outcome reflects changes in the utilization of goods and services (demand side).

Result level 3 - Outcome: This is a medium-term change in development conditions, measured in terms of institutional performance and/or changes in the behavior of a specific group of people or organization. An outcome is the intended benefit to a specific community, group of people, or organization that is measurable and specific.

Intermediate outcomes: These are sometimes used to specify results proximate to an intended final outcome, but are more measurable and achievable in the lifetime of a programme than the intended final outcome.



Remember!

NSDES is a policy instrument that helps bring together education data producers and users to strengthen the National Education Statistical System.

The NSDES, however, employs a results-based management (often called RBM) approach that entails planning ‘in reverse’.

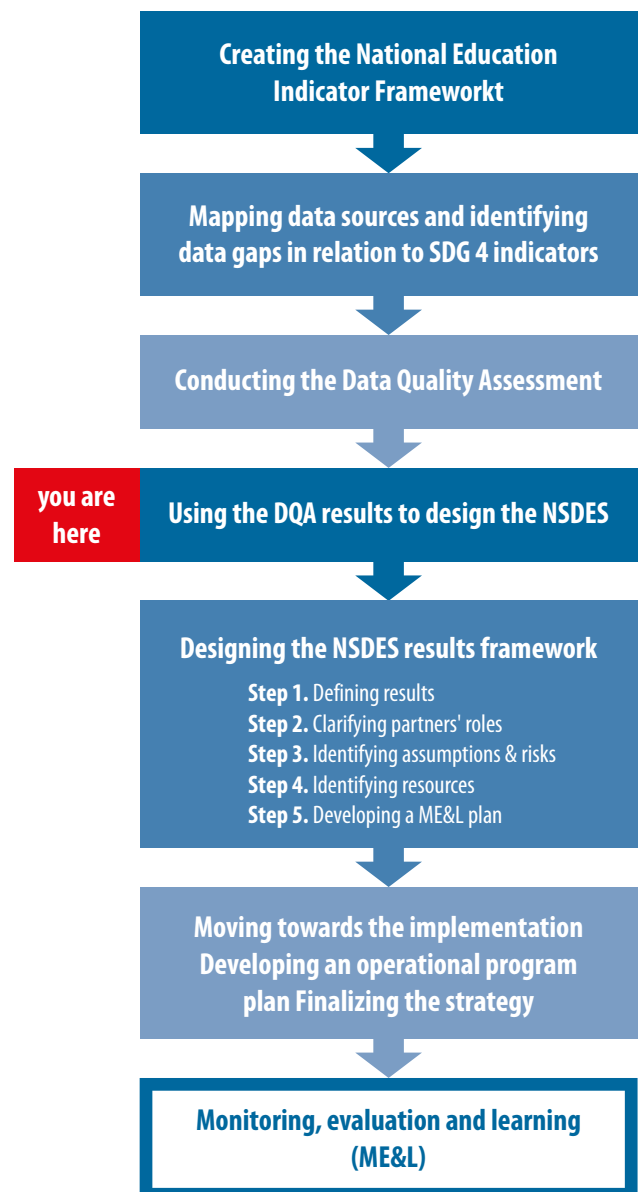
That means, to start making plans from the impact-level result (the overall goal to achieve) and move to the immediate objective-level results (the outcome[s] that trigger the goal) before detailing with the interventions (activities as expressed in services or products).

A result is change that can be described and measured. Results can be intended, or unintended changes, positive or negative. It is expected that a results-oriented strategy and/or programme will lead to positive and intended change. However, this is not always the case. As change can sometimes lead to unintended, or negative consequences, it is important that the intervention is carefully monitored and adjusted in line with the programme’s monitoring data. Typically, results-based management strategic planning and programming foresee three main levels of result: impact; output; and outcome results.

Impact-outcome-output level changes are derived from a cause-and-effect relationship, which is set in motion by a development intervention or programme.

The cause-and-effect sequence is the **Results Chain** – sometimes referred to as the results logic, or intervention logic, or logic model. The causality between results extends further to the attribution between inputs-activities and the results that are generated in the form of outputs, outcomes and impact. A results chain should also clearly represent the change achieved through the cause-and-effect relationship between inputs-activities and the results.

Figure 8: The process of designing an NSDES



Source: Adapted from UIS, 2017: Ed-Data Quality Assessment Framework to Evaluate Administrative Routine Data Systems: Manual for the Conduct of an Evaluation by a National Technical Team, **access:** http://uis.unesco.org/sites/default/files/documents/training-workshop-manual-data-quality-assessment-framework-2017-en_0.pdf

It is important to note that the terminology and level of detail used to describe the elements of a results chain can differ from programme to programme, depending on the scope of the intervention.

In the case of NSDES, the results chain needs to take into account the capacity-building function of a strategy to develop education statistics in a given country; the NSDES results chain also needs to anticipate the eventual integration of the NSDES into broader strategic planning frameworks such as the country's education sector plan and the umbrella multi-sector National Strategies for the Development of Statistics. The following table explains the corresponding elements in the NSDES results chain and the generic logic model; Figure 8 illustrates the NSDES results chain.

Table 4: Description of applying RBM to NSDES

GENERIC RESULTS CHAIN	NSDES RESULTS CHAIN
<p>Higher-order result/impact. The long-term effects near, or at the top of the results chain in terms of improved social, or economic conditions. Generally, a standalone intervention alone will not achieve the higher-order result; but a programme should identify the country development goal it seeks to influence.</p>	<p>Development goal The high-level country development goal, or sectoral development goal; e.g. SDG 4, the national poverty-reduction goal, and/or the NSDS goal. It may be achieved through a combination of development interventions, including NSDES.</p>
<p>Programme development objective The intended benefits to a specific community, group of people, or organization that are to be realized through the programme.</p>	<p>NSDES Vision statement/goal This seeks to influence the above development goal, or sectoral development goal. The vision/goal should clearly indicate the target group of the NSDES capacity-building intervention and what they will be doing better, or differently as a result of the programme.</p>
<p>Programme outcome (final and intermediate) The change in institutional performance or behaviour change among users of outputs that demonstrates the uptake, adoption, or use of the programme outputs by the targeted stakeholders. An intermediate outcome specifies a result that leads to the intended final outcome, but is more measurable and achievable in the lifetime of a project than the intended final outcome.</p>	<p>Strategic objective(s) of capacity development. These are the final outcomes of the NSDES that are intended to be achieved by the end of the programme's first phase. They are informed by DQA recommendations and describe the benefits to the targeted stakeholders (e.g. education data platform) in relation to one or more of four targeted NSDES components. Intermediate outcomes specify the results leading to a specific final outcome. They are intended to be achieved in one to three years of an overall five-year programme life-cycle.</p>
<p>Outputs The supply-side deliverables, including the events, products, or services that result from the intervention.</p>	<p>NSDES programme outputs Knowledge, products and services.</p>

Figure 9: The NSDES results chain



Note: The NSDES results chain outlined above is itself a generic logic model, and open to modification. For example, in some country contexts the intermediate outcome results-level may not be required, while in other more complex situations it is.

Source: Adapted from UIS, 2017: Ed-Data Quality Assessment Framework to Evaluate Administrative Routine Data Systems: Manual for the Conduct of an Evaluation by A National Technical Team, **access:** http://uis.unesco.org/sites/default/files/documents/training-workshop-manual-data-quality-assessment-framework-2017-en_0.pdf

To support Member States in developing their NSDES, the UIS has developed a practical toolkit

Using the DQA results to design the NSDES

- Tool 1: Prioritizing recommendations and setting strategic objectives

Designing the NSDES results framework

- Tool 2: Results matrix template and guidance
- Tool 3: Risk matrix template and guidance
- Tool 4: Monitoring and Evaluation (M&E) matrix template and guidance

Moving towards the implementation

- Tool 5: Costed programme plan template/Annual Work Plan (AWP) template

 **The NSDES toolkit: <http://uis.unesco.org/en/capacity-development-tools>**
(Click on Practical Tools under: 'From assessment to recommendations: Drafting the National Strategy for the Development of Education Statistics (NSDES)')