


# Indicator-based assessments of progress towards the sustainable development goals (SDGs): a case study from the Arab region

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**Abstract** The recent adoption of the sustainable development goals (SDGs) confirms once again the growing importance of indicators in the context of ‘evidence-based decision making’. A sound indicator framework can turn the SDGs and their targets into a management tool to help countries develop implementation strategies, allocate resources and monitor progress. Indicator-based assessments will be a cornerstone of measuring progress on the SDGs through to 2030 at national, regional, global and thematic levels. Recent examples of indicator-based assessments and reports present useful case studies on emerging practice in the context of the SDGs, providing insights into the approaches and methods being adopted to measure and report on progress on the SDGs. In this context, this paper presents the recent experience of the United Nations in undertaking an indicator-based assessment for the Arab Sustainable Development Report (ASDR). The paper presents the innovative conceptual framework and approach used in the ASDR for benchmarking progress and analysing trends. The approach firstly takes a thematic

‘snapshot’ of progress and trends over two decades across 56 sustainable development indicators; a nested, integrated conceptual framework is then applied for a more in-depth exploration of interlinkages and dynamics among the SDGs. The approach emphasises the need to place human dignity and well-being at the core of the analysis; linkages to the natural resource base; the importance of peace, governance and institutions as crosscutting factors; and the role of the means of implementation for addressing gaps. This novel approach can be transferred and adapted to other regional contexts, and it is particularly relevant for developing regions where data gaps and the absence of targets present methodological challenges for any assessment.

**Keywords** Sustainable development goals (SDGs) · Sustainability science · Indicator-based assessment · Sustainable development indicators (SDIs) · Arab region

## Introduction

The last two decades have seen a huge proliferation of methods and indicators to measure sustainable development. Numerous organisations and countries have adopted sets of sustainable development indicators (SDIs) and composite indices (such as the Index of Sustainable Economic Welfare or the Inclusive Wealth Index) to track progress towards sustainable development, many of which have been reviewed elsewhere (Böhringer and Jochem 2007; Dahl 2012; Dasgupta et al. 2015; Managi 2016; Mayer 2008; Mori and Christodoulou 2012; Singh et al. 2009; United Nations Economic Commission for Europe 2014). The rapidly expanding landscape of SDIs has also seen a range of initiatives that attempt to harmonise the

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measurement of sustainable development (Stiglitz et al. 2010; United Nations Department of Economic and Social Affairs 2007; United Nations Economic Commission for Europe 2014).

The recent adoption of the Sustainable Development Goals (SDGs) confirms once again the growing importance of indicators in the context of ‘evidence-based decision making’. A sound indicator framework turns the SDGs and their targets into a management tool to help countries develop implementation strategies and allocate resources accordingly, and provides the basis for a report card to measure progress (Sustainable Development Solutions Network 2015).

As was the case with the Millennium Development Goals (MDGs), indicators and common reporting frameworks will form the backbone for monitoring progress at national, regional, global and thematic levels.

### Common reporting frameworks for internationally agreed development goals

In March 2016, the United Nations Statistical Commission (UNSC) adopted a proposed set of 230 indicators<sup>1</sup> as a practical starting point to monitor progress on the 17 goals and 169 targets of the SDGs. Despite the wide-ranging scope and complexity of this framework, it represents a significant initial step forward in harmonizing perspectives and interpretations of sustainable development and reaching international agreement on a set of SDIs for measuring progress.

The focus of monitoring efforts for the SDGs is at the national level; however, it is not advisable or even possible for countries to monitor all 230 indicators proposed. Each country will need to undertake a prioritisation process in which indicators are selected to align with national development priorities and strategies. National monitoring will be complemented by regional- and global-scale monitoring and reporting, where harmonisation of sets of SDIs will be needed to support aggregation and comparability. Regional reporting can provide a platform to foster knowledge sharing, peer review, and reciprocal learning across groups of countries with similar development challenges, priorities and trajectories.

Efforts have commenced at the national, regional and global levels to undertake initial baseline assessments of progress on the SDGs at different scales (United Nations 2016; United Nations Economic and Social Commission

for Western Asia and United Nations Environment Programme 2015). The foundation for such efforts has been through indicator-based assessments and publication of sustainable development reports, examined hereafter.

### Indicator-based assessments

Indicators contribute to reducing complexity and facilitating communication. Indicator-based assessment is the process by which information on indicators is interpreted and synthesised to assess progress and produce clear messages for policy makers, the public and other stakeholders (Eurostat 2014). The key challenge is delivering simple (but not simplistic) messages that are based on evidence and easily understood by the target audience.

Indicator-based assessments and sustainable development reports can adopt a range of different approaches to assess progress on agreed targets, report trends, and present and communicate outcomes (Eurostat 2014). Ultimately, the approaches and methods applied depend upon a range of factors, including the availability of clear targets and associated datasets, the audience and their needs, reporting channels available and their costs, the framework used and size of the indicator set. The use of easy-to-interpret symbols has become a key feature of such reports to enhance communication.

Several countries and international organisations began developing and using SDIs and carrying out indicator-based assessment in the middle of the 1990s, following the recommendations from *Agenda 21* (United Nations Conference on Environment and Development 1992).<sup>2</sup> Development of an indicator framework and selection of relevant SDIs to monitor progress were key challenges in these early works. Typically, the approaches used to define indicator frameworks can be classified into two categories: policy-based approaches and conceptual approaches (Eurostat 2014; United Nations Economic Commission for Europe 2014).

Policy-based approaches structure a set of SDIs based on thematic issues, often drawn from a national development strategy. The advantage of aligning measurements with policy targets is that the indicators can be easily used for monitoring progress, fostering wider use and visibility. The disadvantage is that the indicators may be biased towards specific policy priorities at the expense of other aspects, and may ignore the integrated nature of sustainable development and interrelationships among targets.

Conceptual approaches combine a reference framework (e.g. derived from thematic issues) with a model of the interactions among the various economic, environmental and social factors and targets. A conceptual framework helps to focus and clarify what to measure, what to expect

<sup>1</sup> Inter-Agency and Expert Group on Sustainable Development Goal Indicators 2016. Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators, E/CN.3/2016/2/Rev.1, New York. The total number of indicators in the original proposal was 241; however, this was later revised down to 230 indicators by removing duplicates.

<sup>2</sup> Chapter 40, paragraph 40.4.

from measurement and what kinds of indicators to use (United Nations Department of Economic and Social Affairs 2007).

A key difference between the two approaches is that a conceptual framework does not only define what to measure (i.e. the themes or topics), but also how to measure it, using a model of sustainable development processes and their interactions. The advantage of a conceptual basis is that it is backed by theory. A disadvantage is that the application of the framework may not always be clear to policy makers or the general public.

### Indicator-based assessments in a developing country context: a case study on the Arab region

Despite the growing importance of SDIs and the rapidly increasing role of indicator-based assessment of the SDGs, there is limited literature currently available relating to the methods that are applied as they are not often published or presented to peers. This complicates the task for countries, organisations and analysts who wish to benefit from previous experience and contribute to emerging best practice to support implementation of the SDGs.

Recent examples of indicator-based assessments and reports can provide useful case studies on emerging practice in the context of the SDGs, providing insights into the approaches and methods being adopted to measure and report on progress on the SDGs.

In this context, this paper presents the recent experience of the United Nations Economic and Social Commission for Western Asia (UNESCWA)<sup>3</sup> in undertaking an indicator-based assessment for the Arab Sustainable Development Report (ASDR) (United Nations Economic and Social Commission for Western Asia and United Nations Environment Programme 2015). The ASDR assessed the 22 countries of the Arab region and provides a contemporary case study on emerging international practice in indicator-based assessment and reporting for the SDGs in a developing region context, where data availability can present serious challenges for such assessments and the approach and method need to be adapted accordingly. The paper presents an innovative conceptual framework and approach used in the ASDR for benchmarking progress and analysing trends, with the objective of advancing knowledge on indicator-based assessments for the SDGs to inform future global, regional, national and thematic reporting on progress on the SDGs.

<sup>3</sup> Several of the authors this paper were lead authors of the ASDR and were responsible for the assessment reviewed in this paper.

## Methods

The method applied for the indicator-based assessment undertaken for the ASDR combined thematic and conceptual approaches aforementioned, drawing guidance from available literature (Eurostat 2014; United Nations Economic Commission for Europe 2014). The method comprised the three steps described hereafter.

### Development of the conceptual framework for the assessment

Before selecting the set of indicators to be used in the assessment, careful consideration was given not only to the priority thematic issues of interest but also the interactions within the system so that an integrated package of indicators was selected that worked in harmony with one another. To this end, a conceptual framework was developed for a coherent and consistent organisation of the indicators as a system of SDIs.

The conceptual framework comprised: a frame of reference; a conceptual model and systemic structure for the framework; and selection of criteria for selecting indicators.

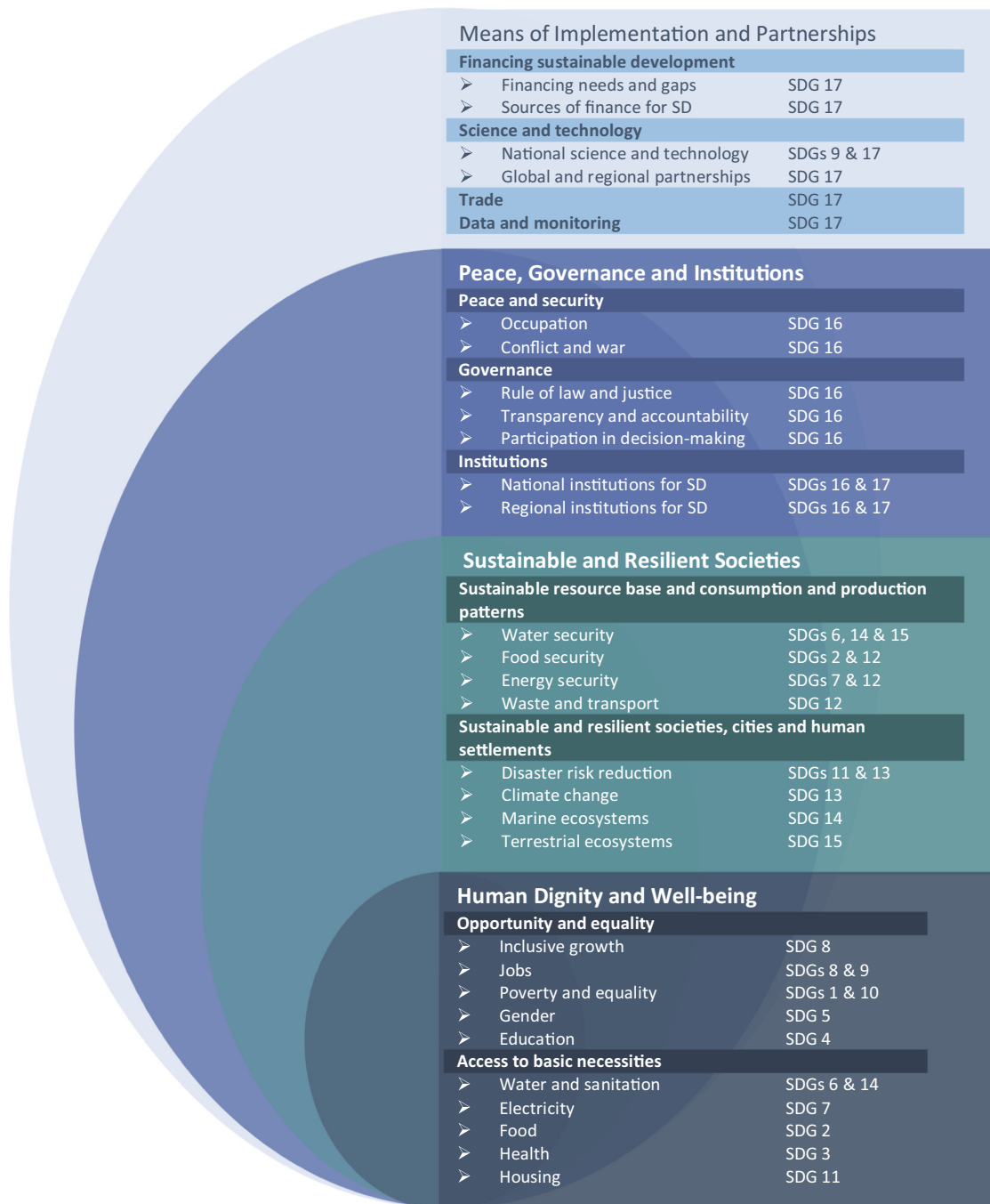
#### *Identifying the frame of reference*

A frame of reference provided the core of the conceptual framework assisting with the selection of relevant indicators and providing the basis for defining desirable trends in the evolution of indicators. For the purposes of this assessment, the 17 goals of the SDGs provided a simple and logical thematic frame of reference for the set of SDIs, while the indicative targets provided an additional means for defining desirable trends.

#### *Defining the systemic structure and conceptual model*

The frame of reference was subsequently coupled with a conceptual model of the interactions among the economic, social and environmental dimensions of sustainable development and the various SDGs and targets (Fig. 1). This aimed to provide the systemic structure for the assessment, ensuring that all important aspects would be assessed in a balanced way, also helping to avoid arbitrary indicator selection or unintended bias.

Given the lack of an agreed conceptual model of the interactions between the economic, environmental and social dimensions of the SDGs and their targets, a conceptual model for this assessment was developed through a review of the academic and expert literature, taking into consideration the Arab regional context.



**Fig. 1** Integrated conceptual framework used for the Arab Sustainable Development Report

A range of different conceptual models for sustainable development have emerged from different disciplines and include: the Driver-Pressure-State-Impact-Response (DPSIR) framework, capital-based frameworks, issue- or theme-based frameworks, accounting frameworks, aggregated indices, and other approaches for clustering indicators (e.g. headline indicators). These approaches have been reviewed elsewhere (Geniaux et al. 2006; Singh et al. 2009;

United Nations Department of Economic and Social Affairs 2007).

More recently, a range of conceptual models have also been proposed specifically in relation to the SDGs (Geoghegan 2013; Griggs et al. 2013; Le Blanc 2015; Melamed and Ladd 2013; Nilsson et al. 2013; Pinter et al. 2013; Raworth 2012; Sustainable Development Solutions Network 2013; United Nations Secretary-General 2013; Young et al. 2014).

The main differences among these approaches relate to the way that they conceptualise key dimensions of sustainable development, the interlinkages among these dimensions, interpretations of key concepts such as ‘development’ and ‘sustainability’, the way that issues are to be measured, and the concepts by which they justify the selection and aggregation of indicators.

While these approaches vary in their structure and components, they are broadly consistent in proposing a ‘nested’ approach for the SDGs which places the economy within society, and society in turn within the Earth’s life-support systems, also emphasising linkages to crosscutting issues such as governance and means of implementation. They also emphasise key sustainability science concepts such as limits and thresholds, integration, systems thinking, decoupling and resilience.

The initial conceptual model was underpinned by key concepts drawn from the literature, and then refined through consultations with regional stakeholders and experts to ensure that it was adequately embedded in the regional context.<sup>4</sup> In particular, the links between effective institutions, governance, and peace and security were highlighted given their strong interplay in the region. Means of implementation such as finance, technology and capacity were additional key regional priorities that needed to be given adequate emphasis within the framework.

The final conceptual model comprised four integrated themes (Fig. 1): (1) the social foundations for human dignity, human rights and well-being, built upon inclusive economic prosperity; (2) sustainable and resilient societies centred on a sustainable resource base; (3) improved governance, social justice and participation, peace and security and sound institutions; (4) adequate means of implementation, effective partnerships for finance, technology and capacity building, and global solidarity and resilience.

#### *Predefining the criteria for indicator selection*

Selection criteria were then developed by the authors to ensure that indicator selection was impartial and transparent. For the purposes of this study, the criteria adopted were:

1. alignment with the conceptual framework and the breadth of SDG thematic issues and interactions;
2. commonality across existing sets of SDIs (global and Arab regional) and the MDGs;
3. availability of time series data over the last two decades;

<sup>4</sup> Several stakeholder meetings were held over the period 2013–2015 with regional governments, organisations and experts which discussed the SDGs and regional priorities as well as the proposed conceptual model for SDGs in the Arab region.

4. data quality and reliability (official data sources).

#### **Selection of the set of SDIs for the assessment**

The selection of the set of SDIs for the assessment was undertaken by applying the selection criteria listed above as well as through consultation with regional experts and stakeholders to ensure applicability to the regional context. As the set of 230 indicators adopted by the UNSC in 2016 for monitoring the SDGs had not yet been developed when this assessment was undertaken, an initial list of potential SDIs was compiled from a range of existing sources (Sustainable Development Solutions Network, 2015; United Nations et al. 2012; United Nations Economic and Social Commission for Western Asia and League of Arab States 2013; United Nations Economic Commission for Europe 2014), using the 17 SDGs as the frame of reference. Consideration was first given to adequately addressing the breadth of the 17 goals as well as capturing key interactions within the conceptual model (criteria 1). Preference was then given to indicators that were common across the multiple indicator sets from which the initial list was drawn (criteria 2).

An analysis was then undertaken of an initial set of 93 SDIs to assess data availability and quality (criteria 3 and 4). Data collection for the gap analysis was undertaken for the 22 Arab countries over the period 1990–2014<sup>5</sup> and was limited to official databases of the United Nations system as well as other international organisations (e.g. World Bank) to ensure data quality and standardisation. Once official data had been collected for each indicator, an analysis was undertaken of data gaps and time series with each indicator allocated to one of four categories: ND (no data), 1P (1 data point), 2P (2 data points), or 3P (3 or more data points). The main objective was to ascertain data gaps or insufficient data to establish a trend over time (which would require at least 2 data points for each indicator over two decades). Percentages across the categories were calculated for the Arab region as a whole, for each of the four Arab sub-regions,<sup>6</sup> and for each of the goals.

Based on this analysis and consultation with regional experts, a final set of 56 indicators was selected to be used as the core set of SDIs for the indicator-based assessment.

<sup>5</sup> The gap analysis was undertaken towards the end of 2014 and as such data up until 2014 were collected for this analysis. Data for 2015 were subsequently collected as part of the indicator-based assessment as it became available.

<sup>6</sup> Gulf Cooperation Council (GCC): Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates; Least Developed Countries (LDCs): the Comoros, Djibouti, Mauritania, Somalia, the Sudan and Yemen; Maghreb: Algeria, Libya, Morocco and Tunisia; Mashreq: Egypt, Iraq, Jordan, Lebanon, Palestine and the Syrian Arab Republic.

## Indicator-based assessment

The basic steps for the indicator-based assessment involved defining a desired evolution for each indicator (based on the frame of reference and conceptual model), measuring the observed evolution of the indicator, and comparing the observed evolution versus the desired evolution; subject to the output of this comparison, each indicator was attributed a positive, negative or neutral category (or an intermediate category in between). The method used at these different stages was developed and adapted to address the limited time series available for many indicators across the Arab region as well as the absence of quantitative targets in most cases, which placed several limitations on the assessment.

### *Defining the desired evolution for each indicator*

The desired evolution (i.e. upwards or downwards) for each indicator was initially defined based on the frame of reference (i.e. the 17 SDGs and their 169 targets) as well as the conceptual model. In most cases, the desired evolution in terms of progressing towards sustainable development was self-evident; few cases arose where this was still open to interpretation (e.g. total and urban population). In such cases, the trend was indicated without interpretation of the desirability of the evolution.

### *Determining the method for assessing the observed evolution and status of the indicators*

The literature describes four categories of methods that can be used to compare the observed versus the desired evolution of indicators, which vary depending upon the availability of target values and years: (1) target value and target year available; (2) target value available but no target year defined; (3) no target value defined and rate of change available; (4) no target value defined and direction available (Eurostat 2014; Hulliger and Lussmann 2010).

A challenge for the SDGs is that targets are yet to be selected and quantified by governments and this limits the options for assessing progress. For the purposes of this study, the method adopted was to compare the observed evolution of the indicator (derived from its observed evolution over the past two decades for the Arab region and each of the four sub-regions) against the desired evolution of the indicator.

Given the limited availability of data for many indicators and gaps across countries in the region, the following method was applied:

- To establish a trend over the last two decades, two data points for two specific years were required—the first yearly data point in the 1990s (earliest available year)

and the second yearly data point in the 2000s (most recent available). If two data points could not be established for the 1990s and 2000s, a long-term trend could not be established. However, in some cases where data were insufficient, a short-term trend was established using two data points if they spanned greater than a 5-year period.

- To establish a regional or sub-regional average for any indicator, at least 50% of the population had to be represented in both years. For aggregation at the Arab regional level, this required 50% of the Arab population across the 22 Arab countries. For sub-regions, this required 50% of the population of the sub-region.

### *Assessing and visualising the evolution of the indicators over time*

Values for the 1990s and 2000s were used to plot an average trend for the 22 countries of the Arab region (and the four sub-regions) for each of the indicators in the form of a clustered bar graph. Weighted averages were calculated for each indicator through the corresponding weighting factor specified in the United Nations Statistics Division (UNSD) metadata for MDG indicators or, failing that, by a corresponding weighting factor.

For example, for “access to improved water source (percentage of population)”, a weighting factor of total population was used, as the indicator reflects a trend over the entire population for each country; whereas for the indicator “Foreign Direct Investment (FDI) net inflows as a percentage of GDP”, GDP in constant 2005 United States dollars was used as the weighting factor. For some indicators, it was more intuitive to calculate a simple average. For others, cumulative totals were calculated rather than (or in addition to) weighted averages (e.g. for total arable land and total number of displaced persons). The report indicated where cumulative totals were used rather than weighted or simple averages to ensure correct interpretation.

The formulas used to calculate the regional and sub-regional weighted averages were as follows:

For 1990s :

$$\frac{\sum(1990s \text{ value of indicator} \times 1990s \text{ weight value})}{\sum(1990s \text{ weight value})} \quad (1)$$

For 2000s :

$$\frac{\sum(2000s \text{ value of indicator} \times 2000s \text{ weight value})}{\sum(2000s \text{ weight value})} \quad (2)$$

Graphic visualisation through ‘weather’ symbols was then used to depict sustainable development trends over the past two decades for each indicator at the Arab regional and four sub-regional levels. The symbols were used to interpret the desirability of trends across each indicator, highlighting whether regional or sub-regional trends could be considered favourable, unfavourable or neutral (or moderate intermediate values). The evaluation and presentation with symbols was undertaken primarily as a communication aid—i.e. to depict the analysis in a simple and user-friendly format. Trends were interpreted using the six categories of weather symbols and rules provided in Table 1.

#### *Benchmarking the current status of indicators as a measure of progress*

In addition to the analysis of trends using the weather symbols, a further analysis was undertaken to provide an indicative measure of progress towards SDGs. Given the absence of agreed SDG targets for the thematic issues reviewed, regional average values observed for each indicator were benchmarked against a global average value or MDG target, where these were available or applicable. Note that MDG targets were used for this initial baseline assessment because SDG targets are yet to be quantified and adopted by countries in the region. For each indicator, ‘traffic light’ symbols (red or green) were used to interpret whether or not the region had achieved a MDG target or compared favourably to a world average. Based on this, the current regional status or progress was benchmarked using the two categories of traffic light symbols and rules in Table 2.

#### *Integrated narrative review of sustainable development trends, progress and interlinkages*

A comprehensive narrative review was then prepared which complemented the snapshot assessment by describing and interpreting the sustainable development status, trends, progress and interlinkages. The structure of the narrative review reflected the integrated conceptual framework (Fig. 1).

Source material for the narrative review was commissioned from regional thematic experts from United Nations organisations as well as national, regional and international consultants. In total, 15 thematic issues briefs were prepared by ten United Nations organisations and specialised agencies, 11 expert reports were prepared by regional and international consultants, and five national assessment reports were prepared by national consultants from each country. The United Nations Regional Coordination

Mechanism as well as a series of regional consultations and expert meetings was used to coordinate and review inputs.<sup>7</sup>

This source material was used by the lead authors to prepare the integrated narrative review for the ASDR. The conceptual framework (Fig. 1) was used to intuitively cluster inter-related priority thematic issues addressed in the review into four integrated chapters in the report. Trends and progress for relevant indicators from the core set as well as additional selected indicators reviewed by experts were presented as graphs and analysed within these integrated chapters to provide a combined narrative and statistical summary of past trends, current progress, inter-linkages and interrelations among the various goals and targets of the SDGs.

## Results and discussion

### Conceptual framework for the ASDR indicator-based assessment







Drawing from the expert literature reviewed and stakeholder consultations, the conceptual model developed for the ASDR (Fig. 1) recognised:

- The need to place people at the centre and focus on human well-being outcomes at the core of the analysis, based upon human dignity and well-being.
- The link between those core objectives and the natural resource base—i.e. that achieving some human well-being outcomes (inclusive economic growth, and access to water, food, energy) will depend upon, and have significant impact on, the environment and natural resources. For societies to be resilient and sustainable, economies will need to be transformed and decoupled from environmental decline, and ecosystems will need to be sustainably preserved.
- The importance of peace, governance and effective institutions as goals in themselves and as crosscutting factors contributing to sustainable development.
- The role of means of implementation, such as finance, technology, trade and data, and the importance of partnerships, for addressing existing gaps.



Many indicator-based assessments simply adopt a thematic-based approach for reviewing trends and progress, which limits their ability to explore the integrated nature of sustainable development and interactions, trade-offs and synergies among thematic issues. The development of an integrated conceptual model was, therefore, a critical

<sup>7</sup> Chapters 3, 4, 5 and 6 of the ASDR provide the outcome of the narrative reviews. Annex 1 to the ASDR provides additional information on the preparatory process for the report.

**Table 1** Graphic visualisation through weather symbols for assessing desirability of trends

Symbol	Explanation	Rules for evaluating trends
	Trend is clearly favourable in relation to the SDGs	>30% positive
	Trend is clearly unfavourable in relation to the SDGs	>30% negative
	Trend is moderately favourable in relation to the SDGs	10%-30% positive
	Trend is moderately unfavourable in relation to the SDGs	10%-30% negative
	No clear trend or little change	-10 to +10%
	Insufficient data available for a trend analysis	

**Table 2** Graphic visualisation using traffic symbols and rules for assessing status and progress

Symbol	Explanation	Rules for trends
	Indicates that the Arab region has achieved the MDG target or is doing better than, or is equal to, the world average for the indicator	$\geq$ Global Average or Target
	Indicates that the Arab region did not achieve the MDG target or is doing worse than the world average for the indicator	$<$ Global Average or Target

component of the assessment that enabled the clustering of closely related goals and indicators to draw attention to these interlinkages while reflecting the special context of the region.

Another advantage of conceptual categorisation is that it supports analysis of the well-being of current versus future generations, or between people living in one country or sub-region and those living in others, which are characteristics that underpin sustainable development. It is much more difficult to evaluate these trade-offs using thematic categorisation. Conceptual categorisation also provides a more intuitive connection to the modelling community, as it is more closely linked to economic theory and systems thinking. This facilitates the use of models for scenario analysis and assessment of policy and investment options to support implementation of the SDGs.

The conceptual model in Fig. 1 could be applied by countries or organisations for future indicator-based

assessments of the SDGs at national, regional or global scales. However, it will not necessarily be directly transferable because different assessments need to address the context to which they apply, including the prioritisation of thematic issues of most relevance in specific settings. The conceptual model could also be further developed by incorporating quantitative targets once these are adopted, which would greatly enhance the evaluation of interlinkages and the depth of the analysis.

#### System of SDIs used for the indicator-based assessment

The review of existing sets of SDIs produced an initial set of 93 indicators that provided coverage of all 17 SDGs and aligned with the conceptual model for the assessment. Figure 2 provides the outcomes of the gap analysis that was used to further refine the system of SDIs based on data



availability and quality. These results are displayed here to highlight some of the challenges faced for the assessment in terms of data gaps and absence of sufficient time series.

The values for Fig. 2a–e represent the percentage of indicators that fall into each of the categories in terms of official data available. For the Arab region as a whole, only 64% of indicators had sufficient data to enable the calculation of a basic trend (i.e. at least 2 data points). At a sub-regional level, data gaps were particularly prevalent in the LDCs, where nearly half (43%) of indicators had no data or a single data point.

An analysis was also undertaken in relation to the 17 proposed SDGs to provide an indication of data availability across different thematic areas (Fig. 2f). The values represent the percentage of countries that had data available for indicators across each of the goals. The aim was to highlight goals for which there was limited data available at present, which might limit the analysis. Significant data gaps were evident in goals relating to poverty (SDG 1), inequality (SDG 10), ecosystems, land and biodiversity (SDG 15), human settlements (SDG 11), oceans and marine resources (SDG 14) and climate change (SDG13). This highlights data gaps in several areas that are key challenges for the region.

Taking into consideration the outcomes of the gap analysis and other selection criteria, the final set of SDIs comprised 56 indicators and was structured using the 17 SDGs as the main reference frame as well as 31 sub-themes which further clustered the indicators according to their thematic area of focus. The sub-themes aligned with the conceptual model developed for the assessment and assisted with aligning the various indicators with the themes of the conceptual model for the integrated narrative review. We refer the reader to the published version of the ASDR to view the full list of indicators (United Nations Economic and Social Commission for Western Asia and United Nations Environment Programme 2015).

## Outcomes of the indicator-based assessment

### *Snapshot of sustainable development trends and status in the Arab region*

The assessment of the system of 56 SDIs produced a summary table or ‘snapshot’ of trends and progress in the Arab region and its four subregions, including graphic visualisation (i.e. ‘weather’ and ‘traffic’ symbols) to interpret the desirability of the trends and to benchmark progress against global averages or MDG targets. Figure 3 provides a sample of the snapshot table for indicators relating to SDG 1 (poverty) and SDG 4 (quality education).

In Fig. 3, the traffic light symbols show the current status of the Arab region as a whole—i.e. it compares the Arab regional average against a global average value or

MDG target (where a green light is better than or equal to; a red light is worse than). Subsequently, the weather symbols show the trend in the indicator over the last two decades at both the Arab regional level and the sub-regional level—a sun representing a clearly favourable or improving trend, and a lightning strike indicating a clearly unfavourable or worsening trend.

As an example, an indicator that has a red traffic light and a lightning weather symbol would mean that the Arab region is currently below (or worse than) the global average or MDG target, and that the trend has been clearly worsening over the last two decades. Such issues could be considered priorities for the region given the poor progress to date and the declining trend over time.

Based on this method, priorities of particular concern for the Arab region as a whole (i.e. that have a red light and a lightning weather symbol) would include issues such as the current refugee situation in the region, income poverty rates, cereal imports dependency, and greenhouse gas emissions (total). Added to these, one could also include priority issues that have shown a clearly unfavourable trend over the past decades (e.g. energy consumption per capita; deaths due to disasters; political stability and absence of violence/terrorism; net ODA received) or where the current status falls well below the global average or target (percentage of underweight children; arable land area; value of food production per capita; under 5 mortality rate; etc.).

Alternatively, a green traffic light and a lightning weather symbol would highlight that the Arab region is currently above (or better than) the global average, however, that the trend has been clearly worsening over the last two decades. Key areas of success in the Arab region (i.e. with a green light and a positive trend) include immunization, pupil-teacher ratios, access to improved sanitation, access to electricity, gross capital formation, and mobile phone subscriptions.

### *Graphic visualisation of trends and progress: benefits and constraints*

Overall, the graphic symbols used in the assessment and depicted in Fig. 3 facilitated understanding and interpretation of the trends for each indicator and performance or status in relation to a relevant benchmark, expediting analysis of outputs. Such visualisation provides a creative way to assist the reader in understanding complex statistical information. They are a powerful way to engage users in SDIs and statistics more broadly, particularly where a large number of indicators are assessed.

It is acknowledged that the evaluation of trends and allocation of weather symbols for specific indicators is a somewhat subjective exercise, while the benchmarking of progress using traffic lights is also limited due to the

absence of quantitative targets in most cases. However, subjectivity of the assessment is greatly reduced using the set of SDGs and their indicative targets as well as the conceptual model developed for this assessment to establish the desirable direction of trends. The value of such visualisation tools lies in their ability to easily communicate progress and trends and facilitate discussion and engagement in the statistics among various stakeholders.

The choice of graphic symbols is not constrained to traffic lights and weather symbols as adopted for this study; other symbols commonly used to visualise results, include ticks and crosses, faces, hands and arrows. Regardless of the symbols used, their purpose and description should be clear, intuitive and easy to understand. For the ASDR, the methodology for applying and interpreting the symbols was published along with the assessment outputs to ensure transparency.

However, while such a snapshot is useful for communicating progress and trends and highlighting key thematic challenges (and successes), it is of limited use in exploring interlinkages among these issues; such interlinkages will impact sustainable development outcomes and priorities, and should be considered in any assessment of sustainable development. Another challenge faced in the thematic analysis was the placement of crosscutting issues such as gender. For example, indicators relating to female literacy or employment correspond to thematic goals (on education and employment) as well as the goal for gender.

The absence of quantitative targets and the limited data available represented key challenges for the assessment. The adoption of both weather symbols for assessing the desirability of trends as well as the traffic symbols to benchmark current progress in the region provided an innovative approach for overcoming these challenges which could be transferrable to other developing regions with similar challenges. For developed countries, it is likely that quantitative targets could be used to support more sophisticated assessment of progress. Future assessments in the Arab and other developing regions should be able to benefit from the adoption of clear targets, which is likely to take place over the coming years.

It is also worth highlighting that the assessment of trends was disaggregated to the sub-regional level. This was important as there are significant differences between the development status and priorities of the four sub-regions within the Arab region. Disaggregation to the sub-regional level ensured that the assessment revealed more accurate trends that can be hidden by regional averages.

#### *Narrative assessment of Arab regional progress, trends and interlinkages*

While individual indicators assessed in the snapshot under each SDG provide information on trends and progress, it is

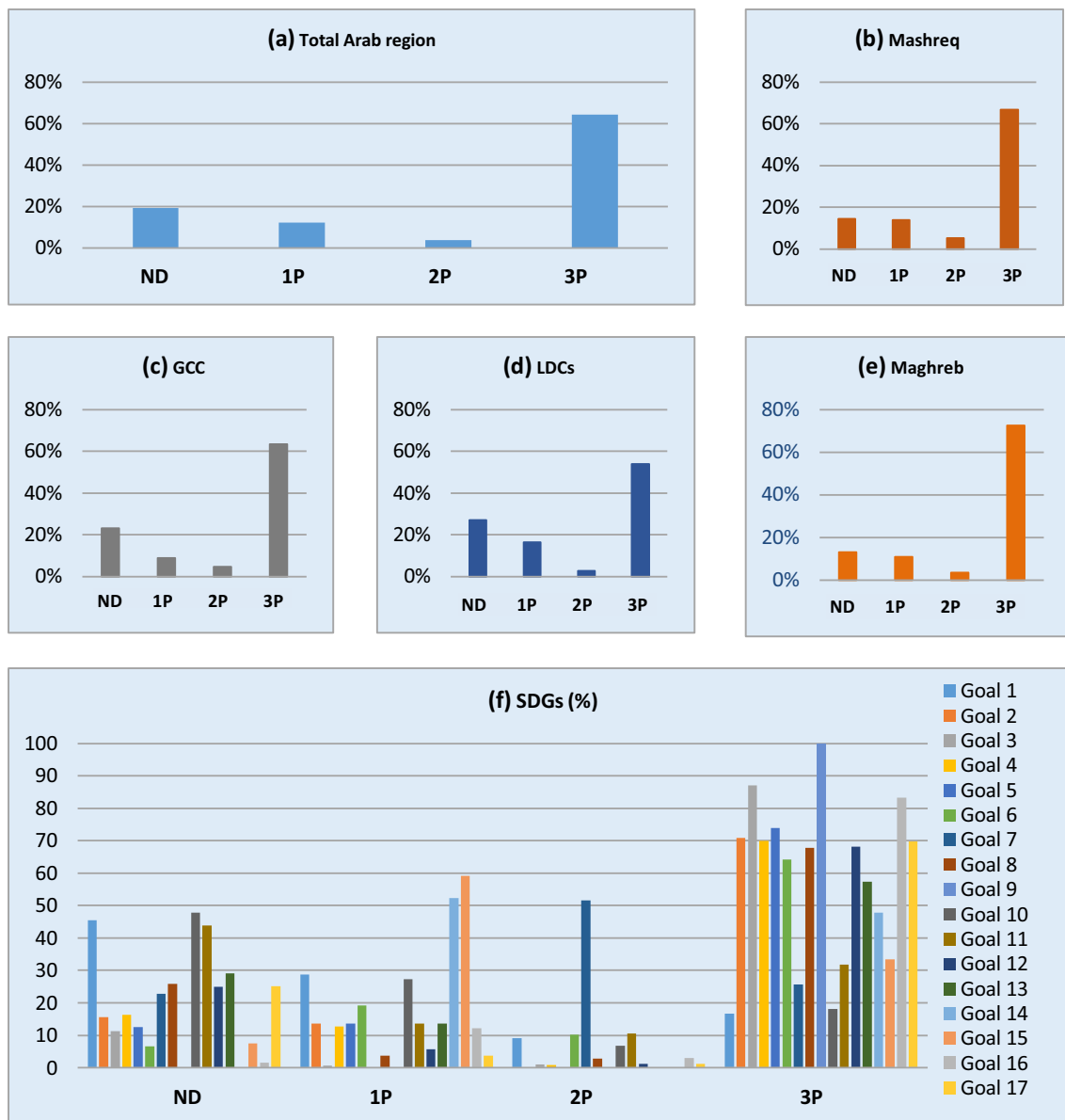
often necessary to look at a cluster of indicators to get the full picture of progress, challenges and opportunities. Following the snapshot table of trends and progress on the SDGs in the Arab region, the remaining chapters of the ASDR were structured based upon the four tiered themes of the conceptual model presented in Fig. 1: human dignity and well-being; sustainable and resilient societies; peace, governance and institutions; means of implementation and partnerships.

Structuring the narrative review in this manner enabled an in-depth analysis of the interrelations and dynamics amongst goals that exemplify the interlinked nature of the SDGs, and the sustainable development challenges and opportunities faced by countries in Arab region. This enabled exploration of interlinkages, trade-offs and synergies among the various thematic issues addressed by the SDGs that would not have been otherwise possible. Such clustering also aligns with nexus-based approaches to sustainable development, where closely related priority issues are explored in an integrated framework (e.g. food–energy–water nexus).

Figures 4 and 5 provide summary diagrams of selected SDIs that are clustered according to the conceptual model adopted for the assessment. Figure 4 focuses on the human dignity and well-being theme, while Fig. 5 includes the three remaining themes relating to sustainable societies, peace and governance, and means of implementation. The figures also include graphic visualisation of each indicator to provide a more integrated interpretation of progress and trends in the Arab region across the clustered themes. These diagrams enable a closer examination of progress and trends across closely related thematic issues within different clusters, as well as assessing interlinkages between the themes.

The conceptual model (Fig. 1) highlights that achieving human dignity and well-being is central to sustainable development efforts. This means that economic growth should be inclusive and provide opportunities for all people to achieve their full potential through decent work, the eradication of poverty, quality education, and the reduction of income and gender inequality. In addition to opportunity and equality, human dignity and well-being also require access to the basic necessities of life, including water and sanitation, energy, food, health and housing.

Based on Fig. 4, it can be seen that the current status in terms of ‘opportunity and equality’ in the region is currently off track, with the region consistently falling short of global averages or MDG targets (11 out of 12 indicators for which benchmarks were available show red traffic lights). However, the vast majority of these indicators also showed favourable trends over the past two decades, highlighting a more positive story for the region. It is worth noting that as these are regional averages they hide sub-regional trends,



**Fig. 2** Gap analysis of SDIs in the Arab region. The gap analysis assessed data availability across 93 SDIs for the Arab region (a) and four sub-regions (b–e), as well as for each SDG (f) over the period 1990–2014 (for the final published ASDR, the gap analysis was updated and revised to incorporate data for 2015 and to focus on

regional indicators. However, this was undertaken subsequent to the indicator-based assessment and primarily for communication purposes). Data availability for each indicator was categorized into one of four categories: *ND* no data, *1P* 1 data point, *2P* 2 data points, *3P* 3 or more data points

where often strong progress in some countries (e.g. in the GCC) are somewhat offset by poor progress in others (e.g. LDCs).

The overall picture for ‘access to basic necessities’ is more positive, with five out of nine indicators comparing favourably with world averages or MDG targets. Trends over the past two decades were also favourable for six of these indicators with little change for the remaining three. This highlights that good progress has been made in the Arab region in providing access to basic necessities, in particular water, sanitation and health. A reason for this

could be the clear linkage of these issues with targets and indicators of the MDGs. However, these achievements also mask issues of quality of service (health), reliability (electricity) and sustainability (water). Moreover, a high level of disaggregation is required for these indicators if the countries are truly to identify who is being “left behind” in terms of development, which is the main spirit of the SDGs.

Laying the foundations for human dignity and well-being will require sustainable societies where the natural resource base upon which human well-being depends is

SDGs	Sub-Themes	SD Indicator	Status Arab Region	Trend Arab Region	LDC's	Mashreq	Maghreb	GCC	Description
Goal 1: No poverty	Income poverty	A1.1 - Percentage of population below 1.25\$ (PPP) per day							The Arab region did not achieve the MDG target of halving the percentage of population below \$1.25, although the value for the region (7.4 per cent) is better than world average (14.5 per cent). The regional trend is clearly unfavourable, with a 34.5 per cent increase. The trend was also unfavourable for all sub-regions except the Maghreb, which showed a moderately favourable trend with a 12 per cent decrease. GCC values were zero in both years
	Income poverty	A1.2 - Percent of Population Living Below National Poverty Line	No world average						The Arab regional trend for this indicator shows insignificant change. At the sub-regional level, the trend was moderately unfavourable for the Mashreq, while the Maghreb showed a clearly favourable decrease of 42.9 per cent. GCC values were zero in both years.
Goal 4: Quality Education	Education Level	A4.1 - Net Enrolment Rate in Primary Education							The Arab region did not achieve the MDG target of universal enrolment in primary education, although the value for the Arab region (91.4 per cent) is better than the world average (89 per cent). The Arab region exhibited a favourable trend (15 per cent increase), as did the LDCs (53.1 per cent increase), Maghreb (31.2 per cent increase) and GCC countries (25.4 per cent increase). The Mashreq saw no significant change.
	Education Level	A4.2 - Gross Intake into Last Year of Primary Education							The Arab region did not achieve the MDG target of 100 per cent gross intake into the final year of primary education, although the value for the region (94.5 per cent) is higher than the world average (92.3 per cent). The region showed a moderately positive trend with a 14.7 per cent increase, particularly in the Maghreb (42.8 per cent). For the Mashreq, no significant trend was visible, and data were not available to establish a trend in the LDCs or GCC countries.
	Literacy	A4.3 - Adult Literacy Rate (Total)							The Arab region did not achieve the MDG target of universal literacy, despite the clearly positive trend (41.4 per cent increase). The regional value of 78.1 per cent literate adults is still below the world average (85.2 per cent). The trend was clearly favourable across sub-regions (31.3 per cent for GCC countries, 34.5 per cent for the Mashreq, and 54 per cent for the Maghreb), except for the LDCs, where data are insufficient to establish a trend.
	Quality of education	Government expenditure on education (percentage of GDP)	No world average						Arab Governments spent 17.6 per cent less on education, with the decreasing trend being most visible in the LDCs (31 per cent decrease), followed by the GCC area (27.2 per cent decrease). No clear trend was visible for the Mashreq and data were insufficient to establish a trend for the Maghreb.
	Quality of education	Pupil-teacher ratio, primary							The pupil-teacher ratio for the Arab region (20.5) is better than the world average (24.2), and the regional trend is generally improving (ratio decreasing by 23 per cent). All the sub-regions exhibited moderately favourable trends (LDCs -21.4 per cent, Mashreq -21.1 per cent and Maghreb -19.2 per cent), except for the GCC sub-region, where the improvement was substantial (-32.6 per cent).

**Fig. 3** Sample of snapshot table used in the Arab Sustainable Development Report. *Traffic light symbols* illustrate the favourability of the most recent indicator values at the Arab regional level compared to a global average value or MDG target value. Weather

symbols display the favourability of trends across each indicator over the past two decades at the Arab regional level and its four sub-regions

maintained in the long-term. That means ensuring an ongoing source of water, energy and food security; keeping the environment healthy and promoting sustainable consumption and production patterns. Resilient societies will address risks to their people, assets and infrastructure arising from natural disasters, pollution, natural resource depletion and climate change, and conserve marine and terrestrial ecosystems to achieve a healthy and productive environment.

Figure 5 highlights that favourable trends relating to improving access to such basic necessities has come at a cost for the region in terms of sustaining the natural resource base. Consumption of water is far outstripping natural water availability, with per capita water resources well below global averages and declining significantly over the past two decades. Similarly, limited availability of arable land and water has led to declining food self-sufficiency in the region, with increasing dependency on food imports. This will in turn have implications for access to food and nutrition in the region as well as food stability, given the increasing vulnerability of the region to fluctuating global food prices. Increased access to electricity has led to rapidly increasing consumption of energy per capita; however, this still falls below global averages. The region is behind the world in terms of renewable energy and

energy intensity, which links to slow up-take of modern clean technologies in the region. In turn, emissions of greenhouse gases doubled over the two decades and are above global averages, associated mainly with unsustainable consumption patterns in the GCC sub-region.

Extreme weather events in the region, especially droughts, storms and floods, have also become more frequent and intense in the past several decades, and have taken an increasing toll on people and infrastructure, notably in the LDCs. The region is likely to experience rising temperatures and a growing variability in precipitation which in turn will have a major impact on agricultural communities and may lead to rural migration.

The achievement of peace, good governance and effective institutions is a critical crosscutting issue for the Arab region and will have a key role to play in the achievement of all of the SDGs. The importance of these issues in the Arab region, plagued by political instability, internal conflicts, war and ongoing occupation, has become clearer still in recent years.

The set of SDIs used for the assessment had limited coverage of themes relating to governance and institutions. This was primarily due to limited data availability relating to these issues for the Arab region, as well as fewer available indicators with adequate time series. Moreover,

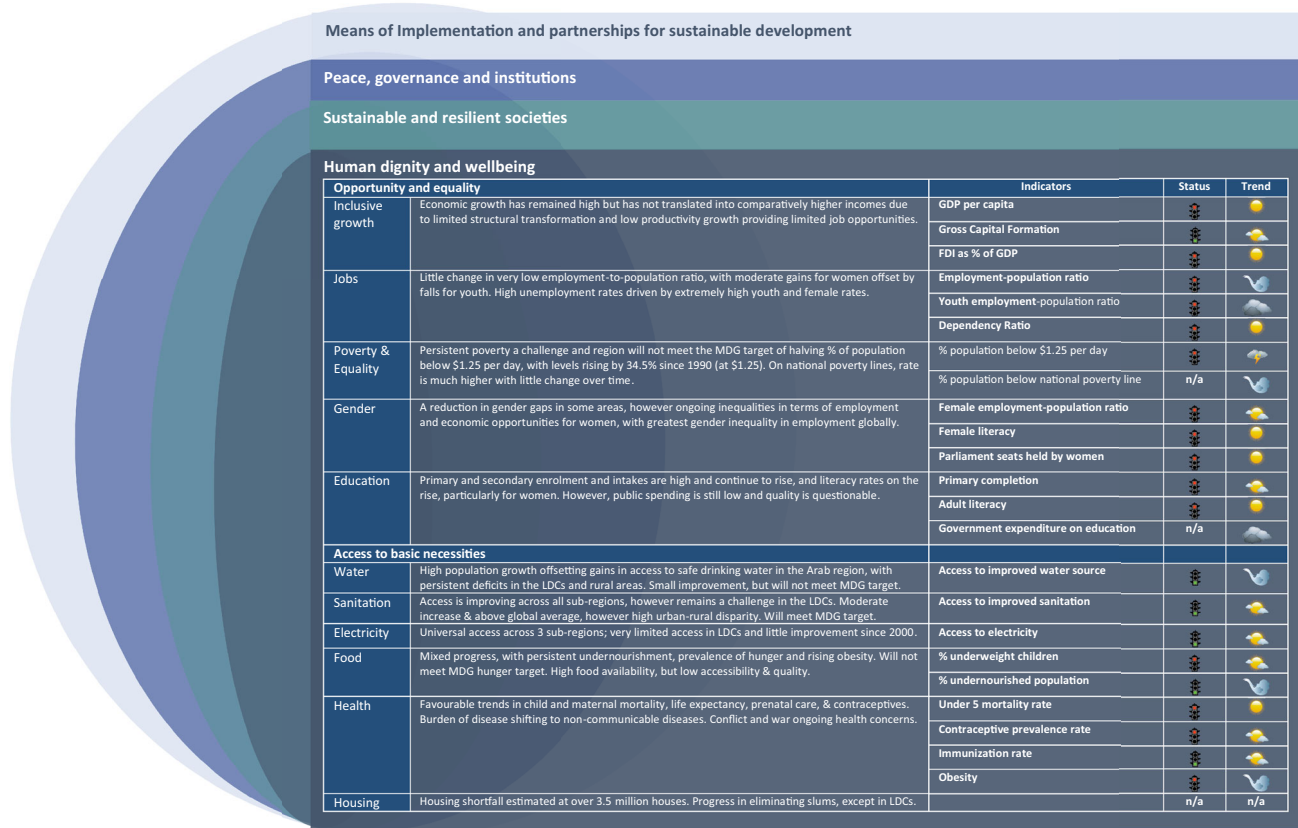


Fig. 4 Clustered assessment of status and trends for human dignity and well-being

many of the indicators reviewed relating to institutional effectiveness and governance are based on perceptions, which can pose problems in terms of their reliability and interpretation. Governance and institutional indicators often combine variables into composite indices that can be complex and difficult to interpret. Despite these challenges, the narrative review undertaken for the ASDR also reviewed several governance indices which highlighted a range of governance deficiencies, including problems related to the separation of powers<sup>8</sup> for countries in the region as well as perceptions of corruption.<sup>9</sup> This demonstrates how the narrative component of an indicator-based assessment can use a range of additional indicators and indices to complement the core set of SDIs, particularly in priority areas where perceived gaps remain.

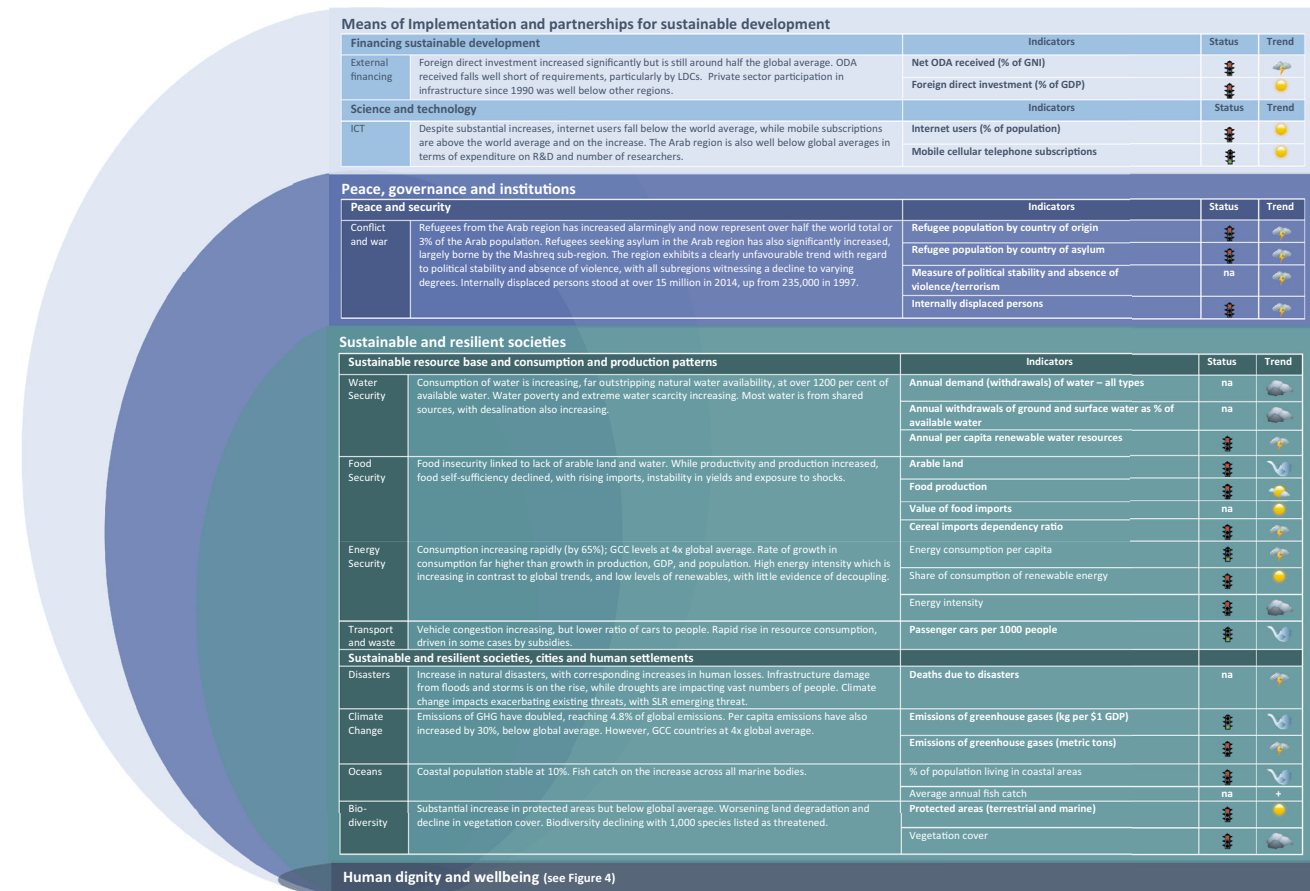
The main indicators relating to governance that were incorporated into the set of SDIs used in the ASDR related to conflict and stability. The worsening trends relating to

peace and security are clearly evident in the assessment in Fig. 5, which highlights the alarming trend in refugees and displaced persons, with numbers well above global averages. Such trends would have a detrimental impact on almost all other indicators reviewed, potentially reversing development gains made over the last decades and seriously undermining any progress towards the SDGs in the region.

Finally, to address regional challenges relating to unemployment, low incomes and below average GDP per capita, the mobilisation of significant financial resources and science and technology is needed to spur economic growth. While FDI has increased favourably over the last two decades, it still falls below global averages. Similarly, while ODA inflows to the region have also increased, there remains a considerable gap between available funds and what is needed to address ongoing development challenges relating to health, education, employment and other factors. In terms of domestic finances, military expenditure in the region is also high compared to world averages (three times the global average as a percentage of GDP), which places constraints on funding for sustainable development.

<sup>8</sup> The region scored 3.5 out of 10 points on the Bertelsmann Stiftung Transformation Index, which was below the global average of 5.3.

<sup>9</sup> Transparency International’s Corruption Perceptions Index (CPI) studied the MENA region which includes most of the Arab countries.



**Fig. 5** Clustered assessment of status and trends for sustainable societies, peace and governance and means of implementation

## Conclusions

This paper reviewed a novel approach developed and applied for an indicator-based assessment of the SDGs in the Arab region, combining both thematic and conceptual approaches to enable a policy-based and integrated assessment of progress and trends over the past two decades.

The approach and conceptual framework are transferrable to other regions and could be easily adapted and further developed to support future indicator-based assessments at the global, regional, national and thematic levels. In particular, the study provides a practical framework and innovative methods that are suitable for application in developing regions which face challenges and limitations in terms of data availability and lack of quantitative targets for benchmarking progress.

The ‘snapshot’ of graphic symbols used to visualise trends and progress over the past two decades in the region represents a powerful way to present data on sustainable development indicators and statistical information. The value of such visualisation tools lies in their ability to

easily communicate progress and trends, enhancing understanding and discussion.

Recognising that a visual snapshot alone is inadequate for exploring interlinkages among thematic goals in an integrated manner, this is complemented by a more comprehensive narrative review and synthesis that adopted an integrated conceptual framework to cluster closely related issues and explore interlinkages and dynamics. Structuring the narrative review in this manner enabled in-depth analysis of the interrelations and dynamics amongst goals and the challenges and opportunities faced by countries in Arab region.

In terms of progress on opportunity and equality in the Arab region, the assessment revealed that despite favourable trends over the past two decades, the region is consistently falling short of global benchmarks. In terms of access to basic necessities, progress was clearly evident in areas of water, sanitation, electricity and health. However, such improvements have come at a cost for the region in terms of sustaining the natural resource base, with consumption of water far outstripping availability, increasing dependency on food imports, and a doubling of

greenhouse gas emissions. Alarming trends related to refugees and displaced persons highlight the critical challenges of peace, political stability and security facing the Arab region, and have the potential to undermine progress on all other SDGs. Financing shortfalls also remain a challenge for the region, with investment falling below global averages and ODA unable to meet the large shortfalls in the region.

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