Developing and Utilising Geospatial Workflows to Monitor UN Sustainable Development Goals

Country Scoping and Assessment:

a Component of the Development Account Programme on Data and Statistics for SDGs

0.0 Executive summary

The Sustainable Development Goals (SDGs) are a series of 17 global goals under the 2030 Agenda for Sustainable Development. The SDGs build on the Millennium Development Goals (MDGs) and aim to go further in order to end all forms of poverty. The Goals are general but interconnected and each individual Goal has a separate list of targets to achieve. The SDGs cover social and economic development issues including poverty, hunger, health, education, global warming, gender equality, water, sanitation, energy, urbanization, environment, and social justice. Monitoring progress in the Sustainable Development Goals is a fundamental component of the post 2015 United Nations Sustainable Development Agenda since only indicator-based measurement of the progress towards the targets of the Goals allows the development of national strategies to achieve these Goals. Countries have the primary responsibility for follow-up, review and reporting on progress in implementing the Goals, which will require quality, accessible and timely data collection.

The United Nations Economic and Social Commission for Western Asia (ESCWA) recognizes both the substantial efforts and challenges of the National Statistical Offices (NSOs) in compiling data and indicators for monitoring progress on the Sustainable Development Goals. ESCWA also recognizes the benefits of using geospatial data, particularly from Earth Observations, to strengthen the SDG monitoring capacities of countries. Therefore it has launched an initiative on using GIS to gather and use Environmental Statistical Data strategically. The overall objective of this initiative, funded by the United Nations Development Account Programme on Data and Statistics for the SDGs on Phase I, is to understand the data availability and capacity of National Statistical Offices (NSOs) in three selected ESCWA member countries: Jordan, Egypt and Palestine. With this project the UN ESCWA aims to enhance awareness, increase acceptance, and trigger the adoption of the use of geospatial information technology more widely by national focal points of these countries. The European Topic Center at the University of Malaga, Spain was selected as the technical implementer given its capacity and strength in geospatial analysis and reporting. Phase 1 of this project had four objectives:

1. *Undertake a survey of available geospatial data and expertise in 3 select countries*
2. *Convene a National Workshop for stakeholders that are associated with SDGs, environmental data, and geospatial information systems, in these 3 countries.*
3. *Undertake basic training and raising awareness in these 3 countries on the importance of geospatial workflows, global initiatives and technologies, and publicly accessible data that is relevant to SDG monitoring.*
4. *Develop an overview of data and expertise availability and identify needs for establishing effective geospatial workflows for measuring and monitoring SDGs.*

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The methodology to achieve the objectives of Phase 1 of the project consisted of two parallel and complementary approaches. Firstly countries were requested to complete a survey on the availability of geospatial data and expertise. The aim of the survey was to develop an overview of the current state of perceived spatial data availability and accessibility in three selected countries (Jordan, Egypt, and Palestine) to allow for the development of customised workflows that maximise the use of existing data and fulfill any gaps. Secondly, country missions and national workshops were organised to convene the most relevant stakeholders and expertise in the context of geospatial environmental data with the aim of discussing data availability, data governance and institutional mechanisms that have been developed for SDG monitoring, and to raise awareness on the utility of geospatial technologies and global initiatives and datasets. This two-pronged approach permitted data collection through anonymous, structured responses via questionnaires as well as a more detailed analysis of on-the-ground national activities via the workshop sessions, discussions, and one on one meetings.

In the three countries, some data availability was evident across the different thematic types of datasets with the only exception of marine data where several datasets, e.g. on hydro dynamics or bathymetry, are not available in all three countries. Biodiversity and Air Quality data were also perceived to be low or unavailable in Palestine. Egypt and Palestine lack or cannot access Marine data. Accessibility of data in these countries is an issue that may be an impediment to streamlined and coherent SDG monitoring as 83% of data are restricted access or available only upon formal request. Of the 7 geospatially relevant environmental SDGs, only 4 SDGs have the necessary data for monitoring in some of the surveyed countries: SDG 2.4 (Jordan, Palestine), 6.3 (Jordan, Palestine), 11.3 (Egypt), 14.1 (Jordan), and 14.5 (Jordan, Egypt).

The results of this assessment suggest that all three countries need to build spatial data infrastructure that requires data sharing principles (i.e. interoperability, data documentation, open data access). All countries can collaborate more closely with national and international statistical and earth observation professional communities. All countries should address limitations regarding human and technical capacities (e.g. data literacy, software knowledge). These activities will need technical support from international organizations such as UNESCWA and ETC-UMA that are customized for each country and outlined in a National Geospatial Workflow (NGW) for Monitoring SDGs.

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1.0   Introduction and Background

1.1   UN Sustainable Development Goals

The Sustainable Development Goals (SDGs) are a series of 17 global goals under the 2030 Agenda for Sustainable Development. The SDGs build on the Millennium Development Goals (MDGs) and aim to go further in order to end all forms of poverty. The Goals are general but interconnected and each individual Goal has a separate list of targets to achieve. The SDGs cover social and economic development issues including poverty, hunger, health, education, global warming, gender equality, water, sanitation, energy, urbanization, environment, and social justice. Paragraph 54 of the UN General Assembly Resolution A/RES/70/1 of 25 September 2015 contains the goals and targets. The UN-led process involved all 193 of the member states and the resolution is the intergovernmental agreement that acts as the post 2015 Sustainable Development Agenda. The SDGs build on the principles agreed upon in Resolution A/RES/66/288, entitled "The Future We Want". This was a non-binding document released as a result of the Rio+20 Conference held in 2012.

1.2   Geospatial datasets and methods are an important tool to measure and monitor progress on SDGs

Monitoring progress in the Sustainable Development Goals is a fundamental component of the post 2015 United Nations Sustainable Development Agenda since only indicator-based measurement of the progress towards the targets of the Goals allows the development of national strategies to achieve these Goals. Countries have the primary responsibility for follow-up, review and reporting on progress in implementing the Goals, which will require quality, accessible and timely data collection.

Many of the issues associated with sustainable development can be analyzed, modeled, and mapped within a geographic context, which in turn can provide an integrative framework and platform necessary for global collaboration, consensus and evidence-based decision-making. However, and despite significant advances in geospatial information technologies and data availability, there is a lack of awareness, acceptance and adoption, particular at the policy and decision-making level, of the vital role of geospatial information and related enabling architectures such as spatial data infrastructures [1].

Nevertheless, the SDG framework clearly articulates the need for geospatial information, earth observations and other new sources of data, including Big Data, and provides the context to

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[1] Greg Scott & Abbas Rajabifard (2017) Sustainable development and geospatial information: a strategic framework for integrating a global policy agenda into national geospatial capabilities, Geo-spatial Information Science, 20:2, 59-76, DOI: 10.1080/10095020.2017.1325594

integrate and connect geospatial information into the global development agenda in a more holistic and sustainable manner. Given that SDG indicator development is very much addressed by national and international statistical offices, integration of statistical data with geospatial information is a fundamental contribution. Several international initiatives have been set up (e.g. UN-GGIM' Working group on Geospatial data[2], the GEO's EO4 SDG initiative[3]) to develop harmonized approaches, raise awareness of the use of geospatial data for SDG monitoring and increase skills and capabilities of its use. The use of Earth Observation data should be highlighted here, since the benefits of using this kind of data are numerous: regular and repeatable observations, multi-annual time series of observations, and cost-effective means for monitoring remote and inaccessible areas, etc. (see Anderson et al. 2017 for more details)[4].

1.3   Context and objectives of the ESCWA Initiative and this assessment

The United Nations Economic and Social Commission for Western Asia (ESCWA) is aware of both the substantial efforts of the National Statistical Offices (NSOs) in compiling data and indicators for monitoring progress on the Sustainable Development Goals, and the challenges in using geospatial data. ESCWA also recognizes the benefits of using geospatial data, particularly from Earth Observations, to strengthen the monitoring capacities of countries. Therefore it has launched an initiative on using GIS to gather and use Environmental Statistical Data strategically. The overall objective of this initiative, funded by the Islamic Development Bank in Phase I, is to understand the data availability and capacity of National Statistical Offices (NSOs) in three selected ESCWA member countries: Jordan, Egypt and Palestine. With this project the UN ESCWA aims to enhance awareness, increase acceptance, and trigger the adoption of the use of geospatial information technology more widely by national focal points of these countries. The European Topic Center at the University of Malaga, Spain was selected as the technical implementer given its capacity and strength in geospatial analysis and reporting.

Phase 1 of this project has four objectives:

1. Undertake a survey of available geospatial data and expertise in 3 select countries
2. Convene a National Workshop for stakeholders that are associated with SDGs, environmental data, and geospatial information systems, in these 3 countries.
3. Undertake basic training and raising awareness in these 3 countries on the importance of geospatial workflows, global initiatives and technologies, and publicly accessible data that is relevant to SDG monitoring.
4. Develop an overview of data and expertise availability and identify needs for establishing effective geospatial workflows for measuring and monitoring SDGs.

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[2] http://ggim.un.org/documents/Work-Plan_2018-2019.pdf
[3] http://eo4sdg.org/, http://eo4sdg.org/wp-content/themes/spacious-child/Downloads/EO4SDG%20Strategic%20Impl%20Plan%20vPB.pdf
[4] Katherine Anderson, Barbara Ryan, William Sonntag, Argyro Kavvada & Lawrence Friedl (2017) Earth observation in service of the 2030 Agenda for Sustainable Development, Geo-spatial Information Science, 20:2, 77-96, DOI: 10.1080/10095020.2017.1333230

2.0   Methodology of assessment

The methodology to achieve the objectives of Phase 1 of the project consisted of two parallel and complementary approaches. Firstly countries were requested to complete a survey on the availability of geospatial data and expertise. The aim of the survey was to develop an overview of the current state of perceived spatial data availability and accessibility in three selected countries (Jordan, Egypt, and Palestine) to allow for the development of customised workflows that maximise the use of existing data and fulfill any gaps. Secondly, country missions and national workshops were organised to convene the most relevant stakeholders and expertise in the context of geospatial environmental data with the aim of discussing data availability, data governance and institutional mechanisms that have been developed for SDG monitoring, and to raise awareness on the utility of geospatial technologies and global initiatives and datasets. This two-pronged approach permitted data collection through anonymous, structured responses via questionnaires as well as a more detailed analysis of on-the-ground national activities via the workshop sessions, discussions, and one on one meetings.

2.1   Survey on the availability of geospatial data and expertise

This survey was implemented by the ETC-UMA under the ESCWA Development Account Programme on Data and Statistics-Pillar Environment[5] and aimed to gather information about the availability and accessibility of relevant sources of spatial data for environmental SDG indicator reporting and monitoring. It was subdivided into the following sections that structure the response and subsequent data analysis:

A) Contact information in order to collect relevant information that is useful to follow up on specific responses.
B) Data availability for environmental SDG monitoring to understand which specific spatial datasets are available at the organizations and at country level for six thematic domains[6] relevant for environmental SDG indicators that were listed in the background document of the survey[7]
C) Data needs and data gaps section where the respondents indicate what data is missing to comply with the environmental SDG monitoring obligations.
D) Spatial data analysis, management and storage capacities assesses the capacities and knowledge available at the organizations to use spatial data and tools.

The survey was sent to UNESCWA focal points in the participating countries (Department of Statitsics, Jordan; Central Agency for Public Mobilization and Statistics, Egypt; Palestinian Central

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[5] Survey available in the annexes and at this link: https://ec.europa.eu/eusurvey/runner/SDG_data_needs
[6] Population, human settlements and infrastructure, Land use and land cover; Biodiversity; Water, Air quality, Marine Environment.
[7] Background document for survey in annex and available here: https://tinyurl.com/yap4faml

Bureau of Statistics) and, after completing the country missions, to the workshop participants. It was completed by a total of 43 respondents in the three countries and they belonged to:

- 17 National government institutions (Statistical Offices, Ministries, Agencies),
- 1 subnational government institution,
- 2 local government institutions,
- 1 NGOs,
- 2 Universities,
- 2 Research Institutes,
- 2 Private companies.

Jordan is the country with most responses (20), followed by Palestine (15) and Egypt (8):
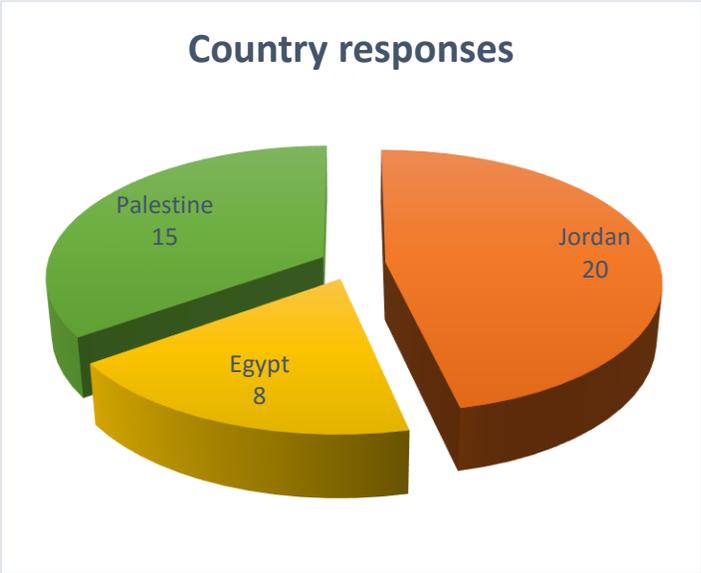
Figure 1: Survey responses per country

2.2 National workshops and bilateral meetings

As part of this project, a National Workshop was convened for stakeholders that are associated with SDGs, environmental data, and geospatial information systems, in each of the three countries. The workshop aimed to undertake basic training and raising awareness on the importance of geospatial workflows, global initiatives and technologies, and publicly accessible data that is relevant to SDG monitoring.

The national workshops followed a general structure with the following sessions.

Session 1- Setting the Scene:

- Overview of national situation including availability and access to geospatial data in the country. Discussion regarding data sharing and gaps.
- Presentation of national stakeholders

Session 2 - Using external (non national) data sets in monitoring of SDG indicators in workflows

- Data identification: overview of relevant regional and global geospatial datasets and satellite data
- Data access: how to access data and prepare them for use in SDG indicator monitoring workflow
- Data analysis: tools and methods to calculate SDG indicators based on global and satellite datasets (e.g. wetland indicators, land take, land use indicators etc.) and Presentation of objectives

Session 3 - Presentation of Geospatial SDG Workflow:

- Define and calculate SDG indicators based on available and external data,
- Downscaling procedures for statistical datasets (including examples of relevant indicators, e.g. wetland extent, land degradation.

Approximately 100 professionals from different organisations and stakeholders attended the three workshops.

Photo of the working session of the national workshop in Palestine

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3.0   Aggregated results of surveys

In the three countries, data availability was predominatley complete across the different thematic types of datasets with the only exception of marine data where several datasets, e.g. on hydro dynamics or bathymetry, are not available in the three countries. Biodiversity and Air Quality data were also perceived to be low or unavailable in Palestine. Finally, Egypt and Palestine respondents lack or cannot access Marine data.
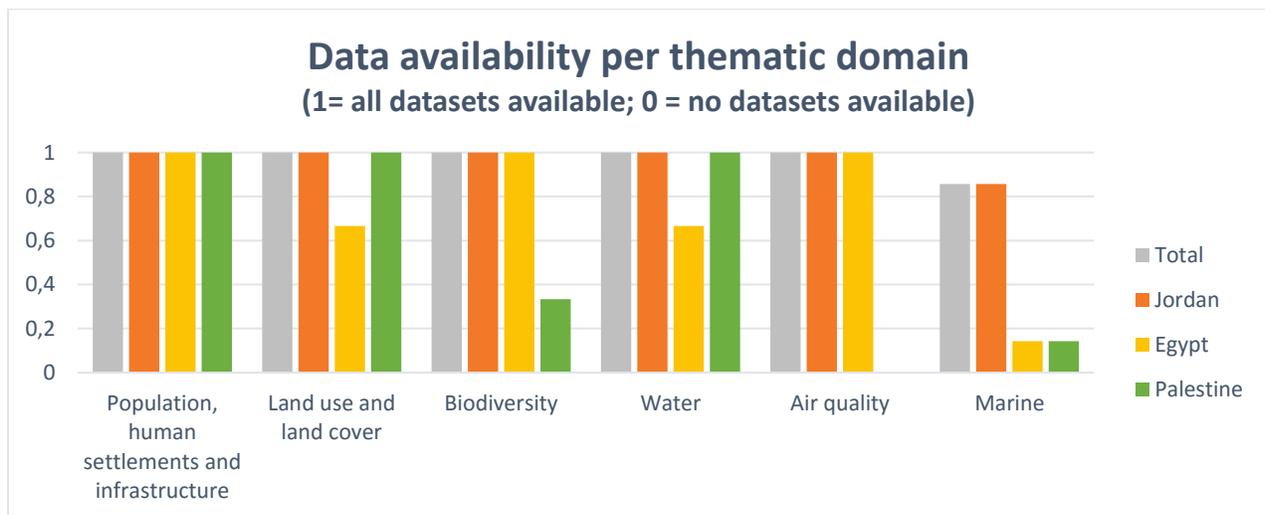
Figure 2: Perceived data availability per thematic domain in the three countries

The thematic domains of Population, Human Settlements and Infrastructure, Land Use and Land Cover and Water have the best coverage of data both at local, subnational and national level. Nevertheless, within these domains, there are several datasets that have low data availability, that are listed below (see the country-specific reports for full details):

-    Public transport,
-    Land use/Land cover change,
-    Agricultural cadastre
-    Forest inventory
-    Wetland inventory
-    Wastewater treatment data

Even though the survey results suggest that data may be available, data on biodiversity, air quality and marine themes may be low or compromised as respondents stated the existence of only few adequate data sources for these domains.

Besides the availability of data, one additional fundamental aspect for the development SDG indicator monitoring workflows and guidelines is the accessibility of data (see Figure 3). Only

16.4% of the data that were reported are available under open access. A large proportion, approximately 32% of the data sets are under restricted access while 51% are available upon formal request. Per domain, Population and Biodiversity related data are those with highest share of open access data while the different datasets under the Land Cover, Water and Air Quality are mainly under restricted access.
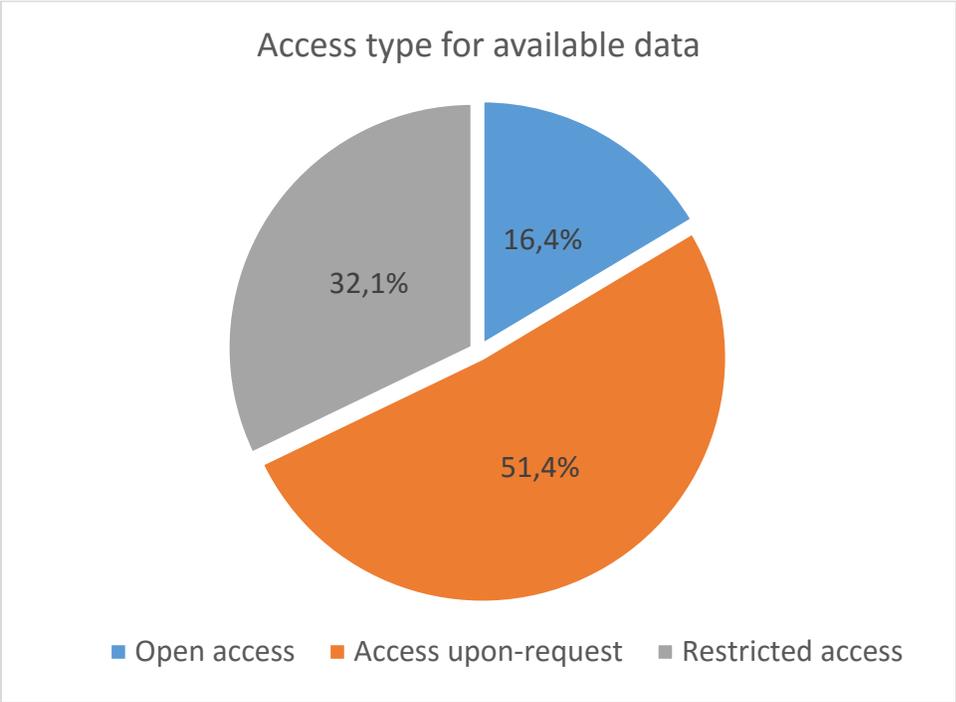
Figure 3: Access type for available data

In terms of perceived data gaps, the respondents identify much improvement that is needed particularly for water and land cover related data, but also in the context of air quality, reference and biodiversity data. It is interesting to note that respondents perceived different data gaps from the ones that were highlighted by the results of the survey (mainly biodiversity and marine). This may explain the lack of effort invested in addressing gaps in biodiversity and marine data sets.
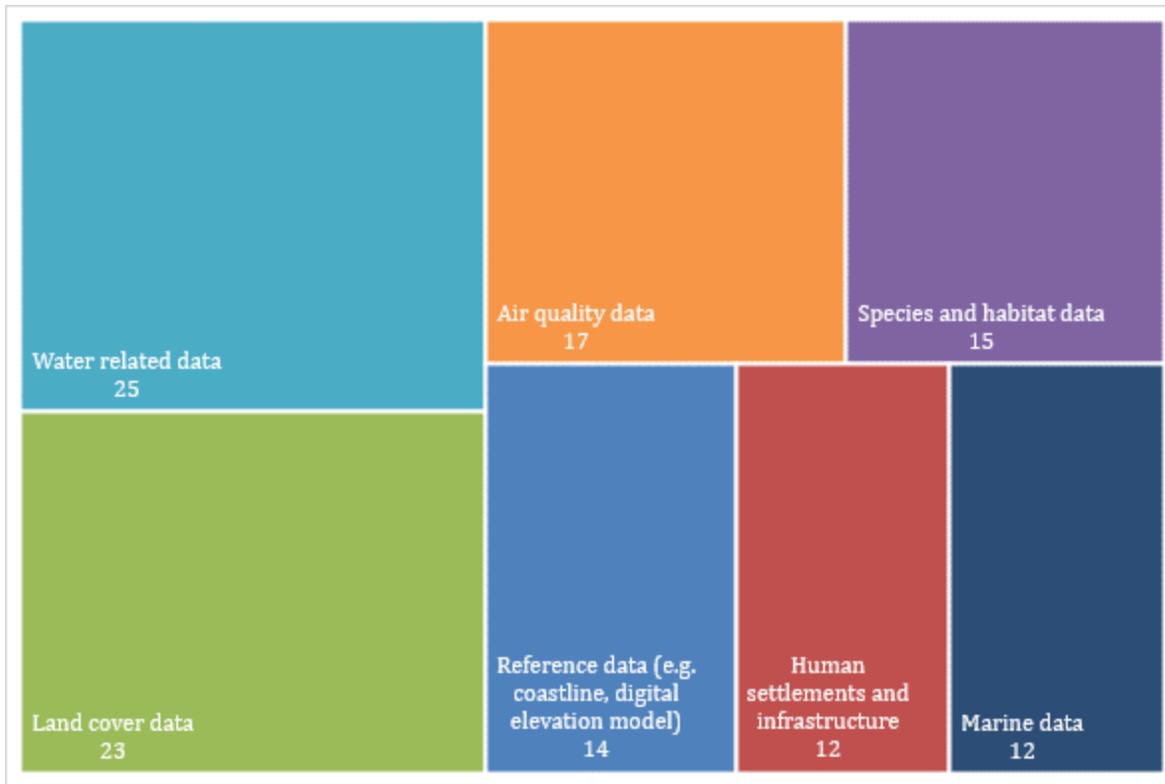
Figure 4: Data gaps identified per thematic domain

Based on percieved data availability, it is possible to make a preliminary assessment about how these data cover the needs for calculating environmental SDG indicators. The following overview shows whether adequate data are available for calculating the different SDG indicators.

Table 1: Data availability for environmental geospatial SDG indicators

⬤	Adequate data available	◯	Data available (requires further validation)	🔴	No data available	◌	unknown

2 ZERO HUNGER — End hunger, achieve food security and improved nutrition and promote sustainable agriculture		**Jordan**	**Palestine**	**Egypt**
Relevant target	**Indicators**			
2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	2.4.1 Proportion of agricultural area under productive and sustainable agriculture	⬤	⬤	◯

6 CLEAN WATER AND SANITATION — Ensure availability and sustainable management of water and sanitation for all		**Jordan**	**Palestine**	**Egypt**
Relevant target	**Indicators**			
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.1 Proportion of wastewater safely treated	⬤	⬤	🔴
	6.3.2 Proportion of bodies of water with good ambient water quality	◯	◯	◯
6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	◯	◯	◯
6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	6.6.1 Change in the extent of water-related ecosystems over time	🔴	◯	◯

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9 INDUSTRY, INNOVATION AND INFRASTRUCTURE Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation		**Jordan**	**Palestine**	**Egypt**
Relevant target	**Indicators**			
9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	9.1.1 Proportion of the rural population who live within 2 km of an all-season road	◯	◯	◯

11 SUSTAINABLE CITIES AND COMMUNITIES Make cities and human settlements inclusive, safe, resilient and sustainable		**Jordan**	**Palestine**	**Egypt**
Relevant target	**Indicators**			
11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	⦿	⦿	⦿
11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	◯	◯	◯
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate	◯	🔴	🟢
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	◯	🔴	◯
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities	◯	◯	◯

13 CLIMATE ACTION	Take urgent action to combat climate change and its impacts		**Jordan**	**Palestine**	**Egypt**
Relevant target	**Indicators**				
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population		◎	◎	◎
14 LIFE BELOW WATER	Conserve and sustainably use the oceans, seas and marine resources for sustainable development		**Jordan**	**Palestine**	**Egypt**
Relevant target	**Indicators**				
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, incl. marine debris & nutrient pollution	14.1.1 Index of coastal eutrophication and floating plastic debris density		🟢	🔴	🔴
14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	14.5.1 Coverage of protected areas in relation to marine areas (%)		🟢	⚪	🟢
15 LIFE ON LAND	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss		**Jordan**	**Palestine**	**Egypt**
Relevant target	**Indicators**				
15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	15.1.1 Forest area as a proportion of total land area		⚪	⚪	⚪
	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type		⚪	🔴	⚪
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	15.3.1 Proportion of land that is degraded over total land area		◎	◎	◎
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	15.5.1 Red List Index		◎	◎	◎

4.0 Main Conclusions and General Recommendations

The following activities are recommended in a Phase 2 of this initiative and can be supported by UNESCWA and ETC-UMA for the three countries that have been surveyed:

- All three countries should build spatial data infrastructure that requires data sharing principles (i.e. interoperability, data documentation, open data access);
- All countries should address limitations regarding human and technical capacities (e.g. data literacy, software knowledge);
- All countries should collaborate more closely with national and international statistical and earth observation professional communities.
- Egypt and Palestine need to address fundamental gaps in availability of Marine data; Palestine should also address fundamental gaps in Biodiversity and Air Quality data.
- Accessibility of data in these countries is an issue that may be an impediment to streamlined and coherent SDG monitoring as 83% of data are restricted access or available only upon formal request. This emphasizes the urgent need to develop data sharing standards and open access data platforms.
- Of the 7 geospatially relevant SDGs, only 4 SDGs have the necessary data for monitoring in some of the surveyed countries: SDG 2.4 (Jordan, Palestine), 6.3 (Jordan, Palestine), 11.3 (Egypt), 14.1 (Jordan), and 14.5 (Jordan, Egypt).
- In terms of capacity, data availability, preparedness and stakeholder willingness and cooperation, Jordan presents the best demonstration case for developing Phase 2 of this initiative, as it is likely to provide the highest national return on investment in training and technical support.

5.0　Country reports

5.1　Jordan Country Report

5.1.1　Situation Summary Developed from Mission, National Workshop and Institutional Meetings

Strengths and Opportunities

A number of opportunities have been identified in Jordan to develop geospatial workflows for SDG monitoring. Importantly, Jordan is the first Arab country to develop a comprehensive report on Environmental Statistics (available on the DOS site[8]). In addition, the Ministry of Water and Irrigation, Greater Municipality of Amman, and DOS all use GIS at some level in their workplans. Furthermore, GIS and spatial datasets are a core element of the Royal Environmental Protection Society work on Protected Areas. In addition, information is sourced both through administrative record / reporting and field surveys allowing for ground truthing and higher accuracy in some instances. Finally, a number of recent projects in Jordan have used spatial datasets and can be used as data sources or partners in developing geospatial workflows for SDG monitoring. These include:

- A project with the European Environment Agency to spatially describe 22 waste dumping sites (20 which are adhoc and unregulated) and create a Geospatial Observatory to monitor these sites.
- Debeen PA (last of the Halaby Sonobar Forests with the Persian Squirrel): GIS project was implemented to show reduction of these forests due to urban development and agriculture encroachment.
- USAID project initiated to centralise data and create a GIS Center in Jordan

Gaps and Challenges

Jordan faces a range of challenges that need to be addressed to allow for coherent and efficient use of spatial data sets in the monitoring of SDGs. SDGs are a relatively new issue for Jordan, and its application and the steps for monitoring are ambiguous and a clear roadmap is necessary to progress. There is some cynicism about achieving sustainable development, the SDGs, and this reporting workflow without political application and government will. Furthermore data exchange remains an issue between agencies. Data sharing, financing, and ownership are negotiations and there are agreements set up between agencies but formal requests and lots of follow up is required to get access to data sets (statistical or spatial). Data sharing in a timely manner is perceived to be a serious obstacle (some agencies using 2004 data because 2016 data not shared) by all stakeholders present at the national workshop. However, four important stakeholders were missing from the national workshop but were represented subsequently in the surveys: JREDS (Marine); academia / universities; private sector and IGOs, not present / not invited.

Standardisation in planning units, their definition, scale, and boundaries is a serious issue that needs to be resolved as a basic and fundamental step to advance national GIS

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[8] http://dosweb.dos.gov.jo/products/environmental2014-2015/

use and geospatial workflows. Location identifiers and block labels are different between agencies and result in code clashes. Different agencies are not able to communicate regarding the same geo referenced planning units. Thus there is a perceived lack of coordination between agencies and frequently national / international projects are implemented with different indicators and variables that increases redundancies in work, prevents comparisons or consolidated monitoring and reporting. This is especially relevant to SDG indicators.

Environmental spatial data quality was also perceived to be a challenge. A lack of accuracy, homogeneity, and georeferencing in air quality stations and data is a challenge and compromises climate change modelling and predictive scenario development. Inaccuracies in the basic indicators such as waste production, air emissions etc. are also an issue so Jordan calculates secondary variables instead such as CO_2 emissions.

Maps that are produced are static, not updated and quickly become irrelevant. Planners are still using ungeoreferenced AutoCAD files. Maps that are produced are not used by decision-makers who are perceived to be inconsistent or lack political / institutional will for follow through as few government projects are completed. Ministry of Environment has 2 ArcGIS software licences that are never used and this is indicative of the use of GIS by managers there.

Consequently, there is a perceived need for a strategic GIS at the national level and there should be a GeoData Center centralising and managing national data sets. GIS can be a powerful data-sharing platform. However, the idea was proposed but the project was opposed by different agencies because there were issues of data ownership.

Photo of the inaugural session of the national workshop

Important Discussion Points

- Three main environmental issues are priorities in Jordan: Water, Waste, and Industrial Emissions and are addressed over other environmental issues.

- The Geographic Center of Jordan currently houses the SDI and the majority of spatial data.

- The Royal Scientific Society works on Water Quality projects (drinking waters, irrigation, industrial water, surface water, aquifers) and is trying to develop a national geo-database on the distribution of landfills (40% not identified spatially).

    1) They have a project concept note on geospatial monitoring of water.
    2) Statistics are not difficult to acquire but developing the platform has been a challenge.

- Royal Environmental Protection Society addresses established and proposes PAs; develops and manage buffer zones around these areas; and deals with land use planning and EIAs.

- Population data:

    1) Local level was mentioned in survey responses as spatial coverage and raster as data format.

        a. Data exists as georeferenced Block 80-120 residences with table of statistics but not published.

        b. What is published is at the neighbourhood, subdistrict, local levels.

        c. There is a distinction between rural and urban population in the statistics (On tabular statistics).

        d. National statistics are available about refugee population in population census at the governate level. Non-Jordanians are mapped but Syrian refugees have been surveyed specifically in 2018 but not georeferenced.

    2) Settlement data: Raster/vector

        a. Data are available about refugee camps and other informal settlements?

        b. The level of detail of the raster and vector data? No raster used but Jordan has just bought 30 and 10 cm LADAR imagery at localities scale within governorates and municipality of Amman but patchy and expensive

- Protected areas

    1) Depending on the Protected Area that need updating, there is a monthly update as there are rangers and researchers and they report regularly to the Env. Protection Society.

    2) EPS uses IUCN PA categories

- Water and Waste water

1) Information content of the waste water data includes GIS datasets: location of treatment plants, and some criteria and excel spreadsheets: treatment plants, effluent quality monthly and yearly, quantity, and efficiencies.

2) The water bodies that are considered include all dam reservoirs (quality and quantity and location on maps), Dead Sea, Lake Azraq, (red sea dead sea)

3) Water for irrigation or also domestic/urban/industrial consumption are available on (excel spread sheet tables)

- Air quality data are not georeferenced but are on excel spreadsheets on the level of stations which are not representative of the entire spatial extent of the country and in some cases data are aggregated from a few stations to represent an entire governorate. However, WHO developed spatial correlation mortality models of 4 year olds with available air pollution data to see causes of mortality.

5.1.2 Assessment of Spatial Data in Jordan

Overall, Jordan reports a substantial availability and coverage of required data in all thematic areas. Some specific datasets are missing, such as a wetland inventory, data on hydrodynamics, and marine bathymetry. Some datasets are perceived as limited in completeness and extent, such as public transport, land-use change, ecosystem, habitat and species distribution. Data ownership is spread among different governmental agencies and NGOs, with a high proportion of restricted access (34%) or access upon-request (55%), which constitutes a potential obstacle for effective data sharing and SDG indicator and workflow development.

Jordanian institutions, both public administration, scientific institutions and NGOs have a high awareness of data gaps that can be overcome, especially regarding land cover, water and biodiversity data. Finally, there is a very high level of both expertise regarding the relevant technical capacities (statistics, GIS, data base management) and of potential participation of staff in follow-up training workshops.

Number of respondents	20
Type of institutions	• 8 National government institution • 1 subnational government institution • 2 local government institutions • 2 Universities • 2 private company

Data availability

Population, human settlements and infrastructure

Population data are available from local to national level, with a monthly to yearly update, and time series that go back at least to 2004. Data are available in different data formats (incl. geospatial data).

A human settlement layer is available for the country at good scale and with a yearly update.

Geospatial data for the Jordanian transport network are available at national as well as subnational level.

It was mentioned that national data on public transport data are also available, but without specifying the data content.

Population, human settlements & infrastructure

Legend:
- Local (covers only municipalities)
- Subnational (covers only e.g. provinces)
- National (covers the whole national territory)
- International (international dataset)
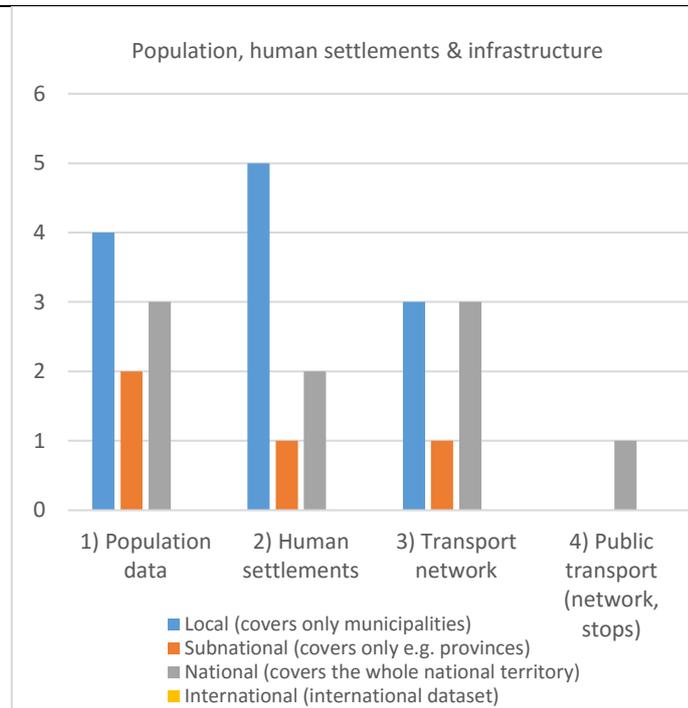
Gaps identified:

The identified gaps focus on better detail and granularity of both population, human settlement and transport infrastructure data:

➢ Data related to Infrastructure, preferable for three phases: 1) construction, 2) use/operation, and 3) end-of-life;
➢ Data related to Urban form: density, land use mix, connectivity, and accessibility;
➢ Higher granularity of populations and density data: raster images;
➢ Buildings as vector data polygons;
➢ Each kind of infrastructure should be provided with full specifications like capacity points of stationary, lines and directions of flows, dimensions.

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Land Use / Land Cover (LULC)

LULC products are available both at national and subnational level from different data providers. The most important reference dataset is the LULC 2010 by the Royal Jordanian Geographic Center, but with no further updates so far.

This is also the reason that LULC change products are not ensured for the whole national territory.

Land Use / Land Cover

- Local (covers only municipalities)
- Subnational (covers only e.g. provinces)
- National (covers the whole national territory)
- International (international dataset)

On a more detailed level, different products are available for urban land use, including vector data at national level.

Specific layers for agricultural parcels and forest land are available from the sector Ministries. Coverage and data content needs to be evaluated.

Finally there are no geospatial information for wetlands.
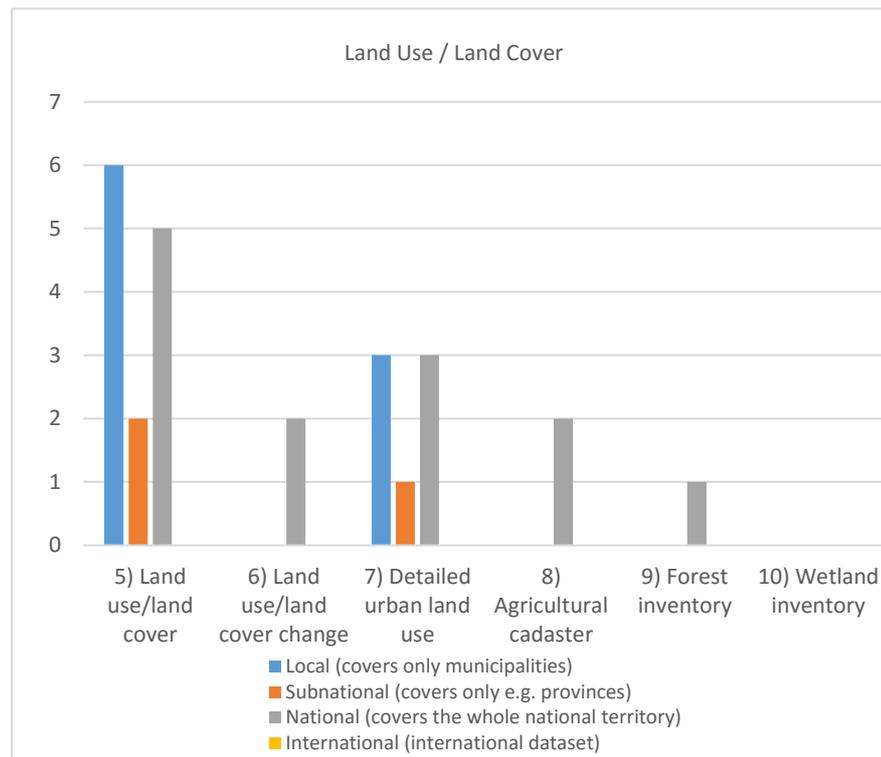
Data Gaps:

Generally, the lack of LULC change layers is mentioned as one of the most important gaps, as well as lack of use of a unified land cover classification system. The lack of a wetland inventory is also of concern to some respondents.

The single comments on data gaps are as follows:

- Updated regular Land cover mapping on national scale level is required.
- Data on areas undergoing land-use change and the associated change in carbon stocks (cropland, forests, settlements and range lands) are missing.
- A unified LULC classification system with unified nomenclature to be used among all national organizations is required.
- With regard to land cover we depend on satellite image , it's important to have it as digital layer.
- A wetland review and inventory covering the whole country is required.

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Biodiversity

Geospatial datasets for protected areas are available from different governmental and non-governmental organisations with a wide range of coverage. They are updated upon changes both at national and international level.

The surveys report ecosystem and habitat distribution as well as species abundance and distribution data are available with national coverage, although partly limited to protected areas. Data content and validity must be confirmed.
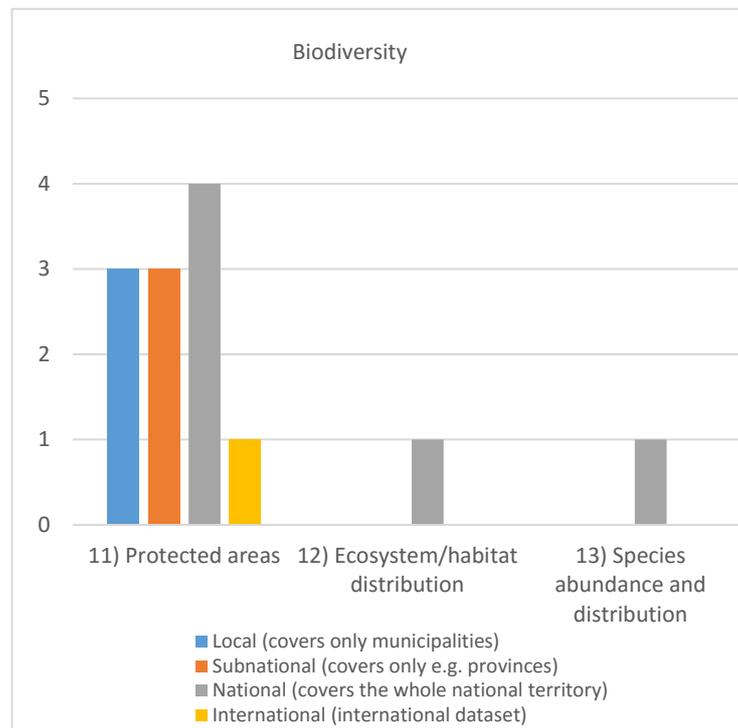
Gaps identified:

Updates and validation of existing maps is required as well as the elaboration of biodiversity specific data. The gaps are listed here:

➢ Need for mapping Terrestrial Biodiversity Hotspots
➢ Update of the national vegetation map (previously prepared by Dr. Al Eisawi) is required.
➢ Any kind of habitat and species if permanent or temporary should be projected in numbers and locations, with the assets that are necessary for their existence.
➢ A full digital cover of the species in raster format is needed, since it is only available so far at protected areas.

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Water

Data in the water domain are available, particularly from the Ministry of Water and Irrigation.

A specific layer for Wastewater Treatment Plants is available, with a yearly update and some time series.

Inland water bodies are very well covered both at national and subnational (i.e. basin) level.
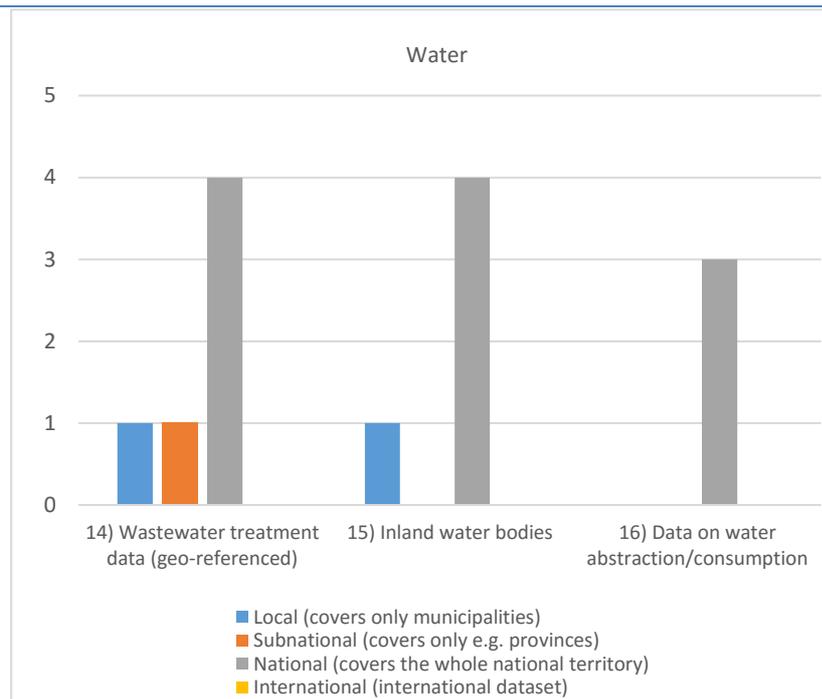
Water

Legend:
- Local (covers only municipalities)
- Subnational (covers only e.g. provinces)
- National (covers the whole national territory)
- International (international dataset)

Finally, geospatial data on water use and abstraction data (including groundwater abstraction) are available at national level from the relevant Ministry.

For all spatial layers, the data content (capacity, load, attributes for water bodies and consumption) must be reviewed and validated.

Gaps identified:

Specially, more detailed data on water abstraction as well as of water pollution is required. The single data gaps are stated as follows

➢ Water abstraction and consumption per each village
➢ Water bodies, Drainage system
➢ Spatial analysis maps for surfaces water contamination as well as ground water and the kriging maps
➢ Data on surface water, ground water, irrigation water
➢ Catchment areas, well capacities, underground water tables, regular rain
➢ Water quality parameters: pH, Salinity, Temp, Nitrate, Ammonia, Phosphate, turbidity, E. coli, Enterococcus, Chla

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Air quality

Location-specific data on <u>air quality</u> are available from the Ambient Air Monitoring Network of the Ministry of Environment. This network is the basis for the air quality layer with national coverage. The data are updated daily, allowing the availability of a time series from 2008 untill today. The data content (i.e. which parameters are registered) and quality are pending validation.

When it comes to <u>sources of air pollution</u>, there is a spatial layer of industrial establishments, but no further layers of other sources is mentioned.

Air quality

(bar chart)

- Local (covers only municipalities)
- Subnational (covers only e.g. provinces)
- National (covers the whole national territory)
- International (international dataset)

17) Air quality data (geo-referenced): Local = 2, Subnational = 3, National = 5

18) Sources of air pollution (geo-referenced): Local = 1, Subnational = 1, National = 3
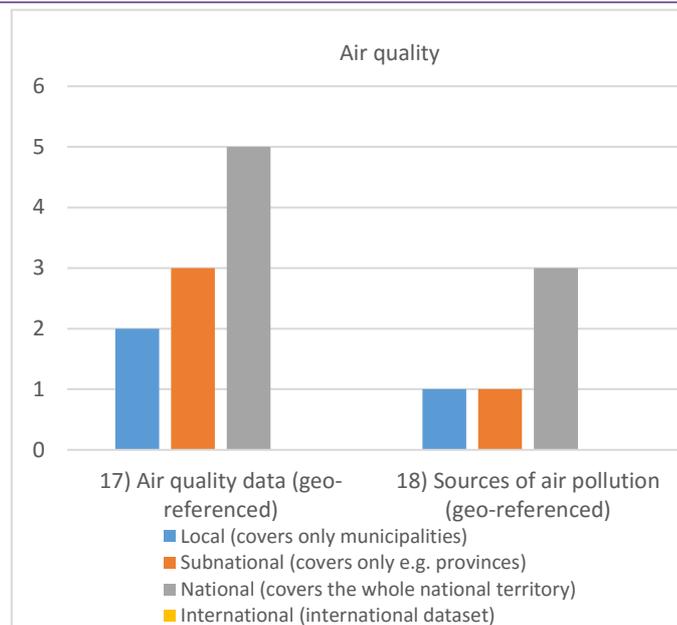
Gaps identified:

The need for enhanced spatial coverage and completeness is mentioned as one of the most important gaps. Details include the following:

➢ Need to have more monitoring stations (enhanced spatial coverage) in order to estimate an air quality index.
➢ Pollution indicators quantities in addition to their main causes, and quantification of these causes, e.g. # of cars, # of factories, i.e. who are responsible for this kind of pollution.

Marine environment

The Ministry of Environment and the Aqaba Special Economic Zone Authority have several datasets available, but data content and data characteristics must be checked further.

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Additionally, the Royal Marine Conservation Society of Jordan (JREDS) has mentioned several marine data products that are available for Jordanian marine areas.

There is no information available on hydro-dynamics and bathymetry.
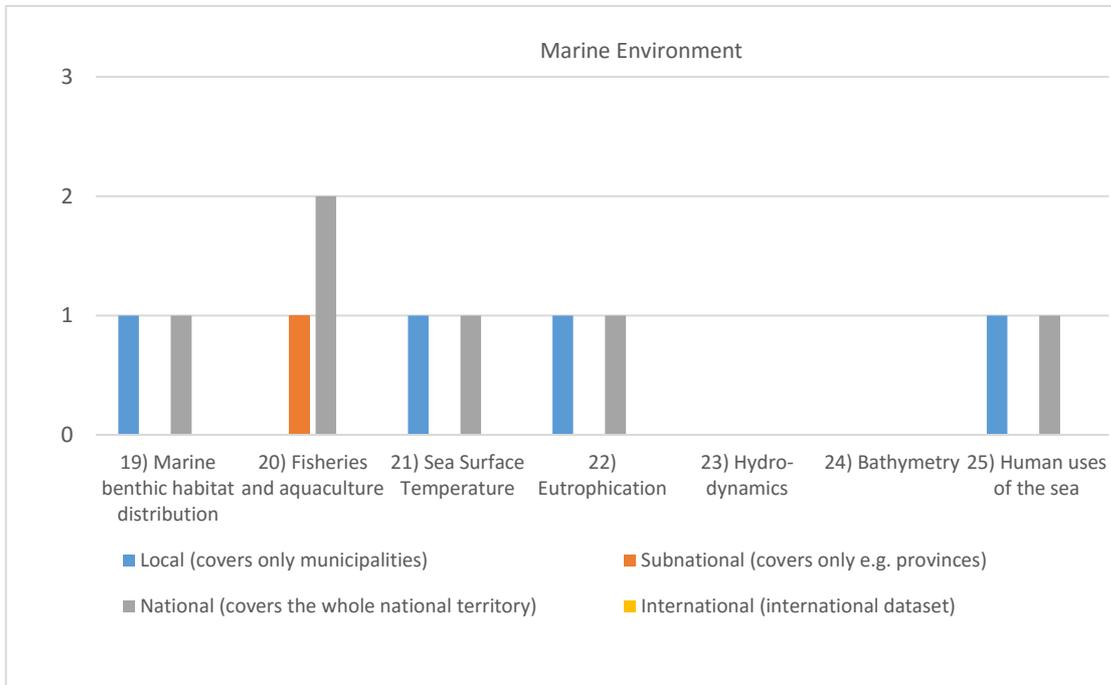
Gaps identified:

In terms of marine data, the expressed data gaps are the following:

- Fisheries data
- Data on coral reefs
- Invertebrates
- Data on substrates

Geospatial capacities

Geospatial and data management capacities in Jordanian institutions are distributed unevenly. While GIS capacities are on average high, statistical and data base management knowledge are on average medium. Finally remote sensing capacities are relatively low.

Figure 5: Level of expertise in different technical areas.

Potential participation to follow-up training workshops

A total number of 335 people are available for follow up training with a large number (one third of the total) of potential participants with a data base management and GIS background, respectively.
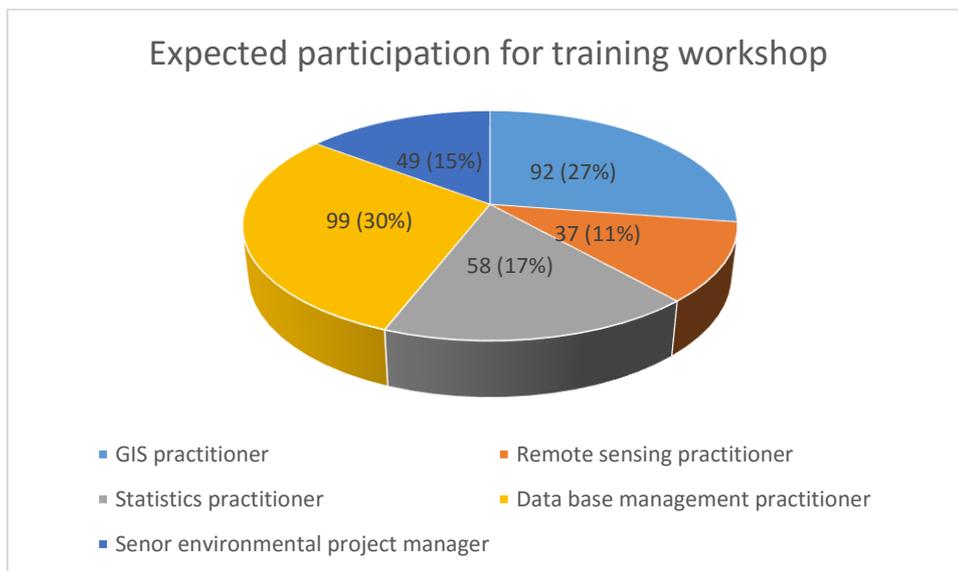
Figure 6: Distribution of potential participants to follow-up training workshops, per technical profile

5.1.3   Recommendations for follow up in Jordan

This section highlights important components that should be addressed and developed in Phase II of this project:

1. Jordan should develop a national taskforce on SDG monitoring and reporting and develop a sub taskforce on the use of spatial data to monitor SDG indicators. This will require establishing inter-institutional working groups to work on different SDG targets and each of their related indicators.
2. Ensure that the data published in the Environmental Statistics report are digitised, georeferenced, and mapped.
3. Overcome data sharing bottlenecks between government agencies as well as between governmental and non-governmental organisations, by using principles of the Shared Environmental Information System (SEIS) and establishing links with ongoing activities in the ENI SEIS II South project[9].
4. Capitalise on previous EEA projects and current USAID ones to develop geospatial workflows. These links can be made by UNESCWA, ETC-UMA, and DOS.
5. Work with thematic experts to develop a set of standards for planning units, scales, and data formats that can be used across agencies and institutions.
6. Organise training workshops to enhance geospatial capacities, i.e. use statistical data in a geospatial context and integrate statistical data with other environmental and geospatial data. This will require specific training on the lowest skill that has been reported (remote analysis) and that is strategically placed in critical institutions in the country. A method for competitively shortlisting candidates is required as the total number of people available for training is high.
7. Develop projects and conduct field surveys to validate or collect primary baseline data on the gaps that have been identified.
8. Specific data needs and gaps are outlined in the above section and should be addressed when and where possible.

5.1.4   Additional Information

More material and content can be found on the following links:

Workshop and Training Presentations:

http://www.etc.uma.es/un_escwa_etc_jordan/

Anonymous Individual Surveys:

http://www.etc.uma.es/un_escwa_etc_jordan/

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[9] https://eni-seis.eionet.europa.eu/south

Workshop Participants:

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5.2   Egypt Country Report

5.2.1   Situation Summary Developed from Mission, National Workshop and Institutional Meetings

Strengths and Opportunities

Egypt has a large number of GIS practitioners in a thriving private sector, university, and government entities that give it the capacity required to develop robust geospatial workflows. Earth observation is moving from one time project and images to persistent monitoring. Egypt is one of the first countries in the world to subscribe to this service with daily imagery available through company Planet. Egypt is one of the few Arab countries that currently uses GIS in Fisheries Management Systems and management of mineral resources and mining. CAPMAS developed an SDG Unit 2 years ago and 43% of SDG's have been developed or worked on and more workflows can be developed.

There have been discussions and movements towards developing a National Centre on Spatial Data and a recognition of the clear need and strategic value of such a centre to Egypt's information needs and national planning. A national survey of needs and priorities of 253 data institutions was undertaken in the last 5 years and can be used to rank priorities. There is clear recognition that government agencies including CAPMAS are working as much as they can; that there is a need for more free access and sharing of spatial datasets; a need to connect nationally with specialised expertise and internationally with thematic expertise not available in Egypt.

Subsequent to the workshop, national stakeholders believe that the SDG workflow is no longer insurmountable and is actually doable. They also currently acknowledge that this workflow is not one institution's responsibility but up to all the ministries and relevant stakeholders and thus there is a need for a National Taskforce to implement the workflow. Workshop participants underscored the importance of regular meetings of such a task force in order to exchange information and monitor progress. There was consensus that the Geospatial and environmental SDG workflow and roadmap should be coordinated and led by CAPMAS.

Gaps and Challenges

With a strong motivation for economic growth, Egypt is changing dramatically everyday under high investment development projects, all of them, which have geospatial components. Is the technical GIS community of Egypt ready to support this and these projects to make them sustainable? What are the costs to the Environment? How are the SDG indices monitored if at all?

The SDG Unit of CAPMAS is not known widely amongst the sectors and stakeholders using geospatial data sets. Currently no inter-institutional taskforce exists for the SDGs. One obstacle highlighted is the lack of resources and a financial budget line must be earmarked for this work but it is not clear how it will be developed. Furthermore, spatial data are only available for the Nile, Delta, coasts, and cities of Egypt with no coverage of the desert, which constitutes 90% of the surface area of the country and

represents a large gap in coverage. 1:500 scale or better is not currently accessible to GIS practitioners and there was a perception that is not available for Egypt. The national imagery subscription with Planet's Earth Observation satellites is with the Egyptian Military and thus may be considered sensitive and inaccessible.

Gap between universities and governmental institution is a key challenge that needs to be addressed. University and academic representatives perceived a difficulty in connecting with CAPMAS to engage with SDG work. Few stakeholders realized that there was a SDG Unit in CAPMAS. SDG unit is producing a mobile application to raise awareness on the subject and the existence of the Unit amongst stakeholders.

The concept of a National Spatial Data Center faces many challenges including lack of national standards for data collection, quality, types, scales, and labels; lack of compatibility between global and national standards; lack of clarity on where the information is and how to get it.

There may be lots of GIS specialists but is it enough for the needs of Egypt? Remote sensing technicians are in low supply in Egypt and the private sector may have most of staff with remote sensing expertise. Different sectors should identify their needs in Terms of References and Job Description in order to customise training and capacity building for Egypt. Difficulty for technicians to specialize in Egypt which is a challenge as it is critical to have people specialise and give them the opportunity to focus on their speciality to become very good at their speciality.

There was a recognition that there were lots of GIS and maps but use of GIS for decision-making is very low. The large number of GIS users and practitioners combined with a wide range of stakeholders makes coordination and synergy on spatial data and workflows complex. Furthermore, workshop participants communicate that what is missing in Egypt is commitment, will, and management, and a need for a coordinated strategy to use geospatial data sources jointly and for SDG monitoring (amongst other national needs).

The need for more private sector funding for applied research and spatial workflows was underscored.

Important Discussion Points
- 2 main companies, Planet and Hexagon, support EDGE Pro and a yearly conference in Egypt called Geomakani.
- Innovation in spatial applications and technologies
  - Smartphone and social media mapping; Aerial Sensors and Drones; Earth observation satellites (daily photography of countries); Processing Software (including machine learning, dynamic modelling, automation) Eg. ERDAS IMAGINE; Enterprise Solutions (connected software to input information and to visualise results for the decision maker). 4D GIS includes time (temporal); 5D GIS (real time with mobile analytics) now called Location Intelligence.
- Fire Activities Detection Service (FADS) Service / Analytics operated by Edge Pro

- o Fire activities detection services, FADS; "Feddani Service", Monitoring and Cultivation and Crop Classification: Using 3 m resolution daily photos from Planet: Provides pollution source info: source of smoke; rate of fire; areas affected; allows one to monitor changes daily: FADS provides georeferenced sources of smoke pollution; data reports; maps; and statistics
- GIS is useful but no longer enough for developing smart cities as it is a static view so needs to able to manage change and movement
    - o 5D of Location Intelligence (not GIS anymore); also useful for dynamic incident response monitoring
    - o LUCIAD important acquisition of hexagon that is able to combine any data sources, 2D, 3D, and 4D. Ability to handle dynamic data, gpy accelerated visual analytics
- o Planet (Earth Observation)
    - ▪ RapidEye in 2009: First large constellation of identical satellites: Daily imaging of any point less than 20 deg: First to go insolvent: First to offer subscription pricing.
    - ▪ Now there is a flood of new satellites
        - New space nations, and new tech: 2012 first Dove sats and now more than 150 cube satellites: can manufacture 25+ Doves per week: Skysats from google (repetitive monitoring of smaller areas, daily or 2 times a day even).
    - ▪ Planets constellation 160+ fleet
        - 5 rapid eye satellites 5 m resolution: PlanetScope dove satellites 140+ resolution of 3.1 m: 13 skysat satellites 80 cm resolution
    - ▪ Moving from one time project to persistent monitoring
        - From limited data supply to excess supply so need to change the business model to selling scalable services and solutions (robust image based services). Buying content and downloading it will disappear in 5 years and people will subscribe to services. Subscription can be daily (military) or weekly monthly or quarterly. Stereo imagery and photography allows for depth, topography etc.
    - ▪ Challenges:
        - Now: Internet pipes not big enough; Not enough image analysts; Computer hardware / storage too expensive; Imagery only small input
    - o Future: Process in cloud next to data; Prepacked algorithms; Rent what you need in cloud; Collaborative: easy to use software.
    - o Egypt is one of the first countries to subscribe to this service
        - ▪ Academic opportunity on using images for free on their website.
- Spatial Applications in Egypt (Spatial Edge- Egypt)
    - o Agricultural land registry, who owns what: Agricultural land tenure
    - o Real estate registry; Registering buildings and apartments and link registry with geo referencing
    - o Ministry of Urban Planning – Enterprise System (first in Egypt)

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- o Fishery Management System: Protection of water resources after serious threats and transactions; Monitoring irregularities and expansion of lakes and fish farms; Contribution to the development plans and fisheries;
  - o Management of Mineral Resources
  - o Nation / State Properties System
- Egyptians have build and developed the GIS systems in other Arab countries, so why is this not working in Egypt?
- 2015 NSDI Maps should be used as the base maps

5.2.2   Assessment of Spatial Data in Egypt

Although its National Workshop saw more than 40 GIS, statistical and environmental experts and participants attend, Egypt displayed the lowest number of individual and institutional responses of all countries surveyed. Nevertheless, Egypt presents complete data coverage for most thematic domains, but the marine environment. Specific missing datasets can be highlighted such as agricultural cadaster, forest inventory, species abundance/distribution layer, wastewater treatment data, apart from the marine data (except fisheries).

Data are mainly held by the Central Agency for Public Mobilization and Statistics (CAPMAS) and the Egyptian Surveying Authority (ESA). Only some specific datasets such as for water or biodiversity are held by the corresponding ministries. Given the perceived good data coverage, only few data gaps are identified. Similar to the other countries, data needs are clearest for the water related data where spatially explicit data for wastewater, water consumption and wetland extent are named as priority. Two thirds of the mentioned data are accessible upon request. Only a small share of the data (12%, mainly land cover and water related) has restricted access.

The overall level of expertise among the respondents institution is high. There is a large number of practitioners that are expected to benefit from any follow-up training initiatives.

It is important to note that given the low number of respondents to the geospatial survey in Egypt, these results may be indicative only and require more vetting and validation.

Number of respondents	8
Type of institutions	• 2 National government institution • 2 Universities • 1 research institute

Data availability

Population, human settlements and infrastructure

Data on population, human settlements and infrastructure are well covered in Egypt.

Population data are available from local to national level, with a monthly to yearly update, and time series that go back at least to 2004. Data are available in different data formats (incl. geospatial data).

A census map is available as human settlement layer for the country at various scales and with a yearly update.

Geospatial data for the Egypt transport network are available at national as well as subnational level both for roads and railways.

It was mentioned that national data on public transport data is also available, but without specifying the data content.

Population, human settlements & infrastructure

Chart axis values: 0, 1, 2, 3, 4, 5

- 1) Population data: Local 3, Subnational 4, National 4
- 2) Human settlements: Local 3, Subnational 4, National 4
- 3) Transport network: Local 3, Subnational 4, National 4
- 4) Public transport (network, stops): Subnational 1, National 1

Legend:
- Local (covers only municipalities)
- Subnational (covers only e.g. provinces)
- National (covers the whole national territory)
- International (international dataset)
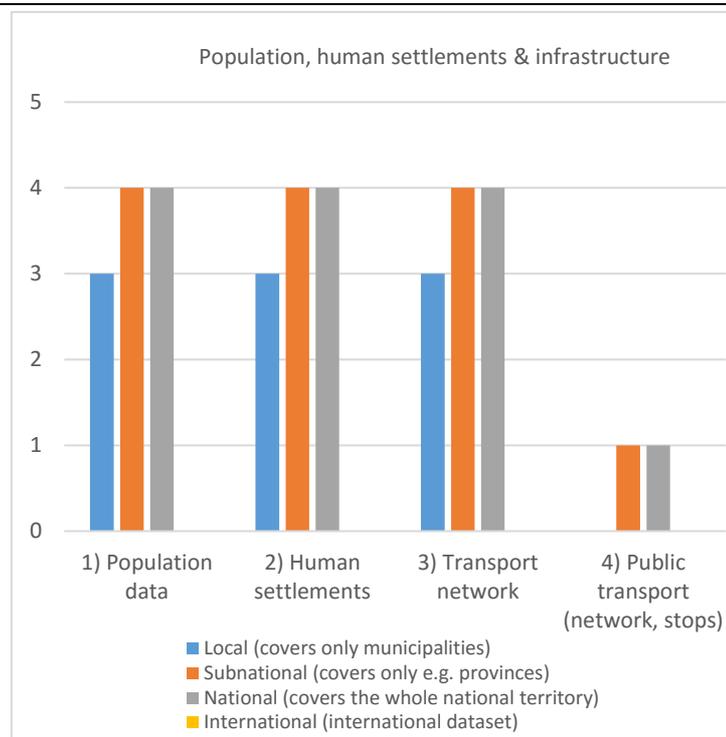
Gaps identified:

Even though a census map is available, the need was expressed to hava a data base for urban and rural settlements that does not currently exist.

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Land Use / Land Cover (LULC)

LULC products are available both at national and subnational level from different data providers (CAPMAS, ESA) with yearly updates.

Bases on these updates LULC change products are available at country level.

On a more detailed level, different products are available for urban land use, including vector data at national level.

There are no specific layers/inventories for agricultural parcels and forest land available.

Land Use / Land Cover

Legend:
- Local (covers only municipalities)
- Subnational (covers only e.g. provinces)
- National (covers the whole national territory)
- International (international dataset)

Finally there is a wetland inventory available, but with no further specification regarding content and scale.
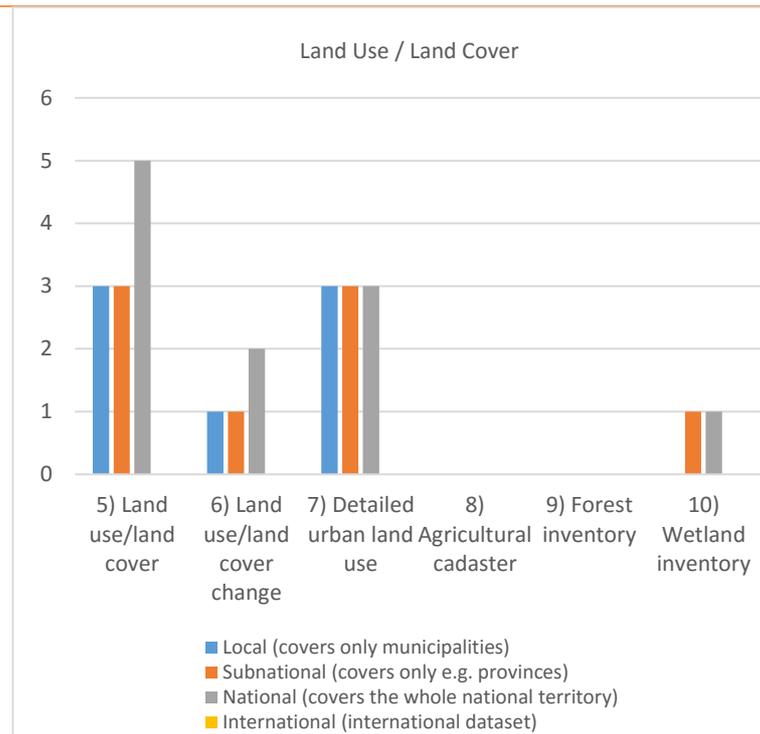
Data Gaps:

Better data on changes of land use/cover between reference years are required.

Biodiversity

Geospatial datasets about protected areas and ecosystem distribution are available, but data content and usability must be validated.

No data layer is available on species abundance and distribution.

Biodiversity
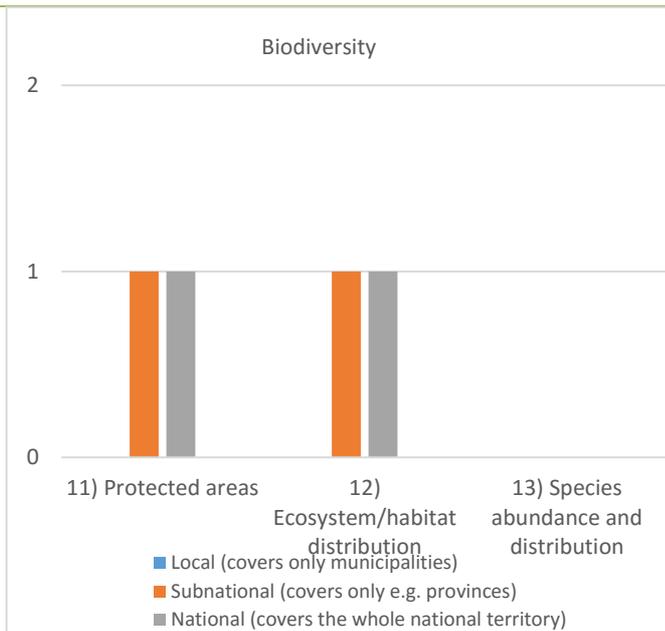
Gaps identified:

A layer for types and location of species is missing.

Water

There is no specific layer for Wastewater Treatment Plants available.

Inland water bodies are very well covered both at national and subnational (i.e. basin) level.

Finally, geospatial data on water use and abstraction data (including groundwater abstraction) is available at national level from different data holders.
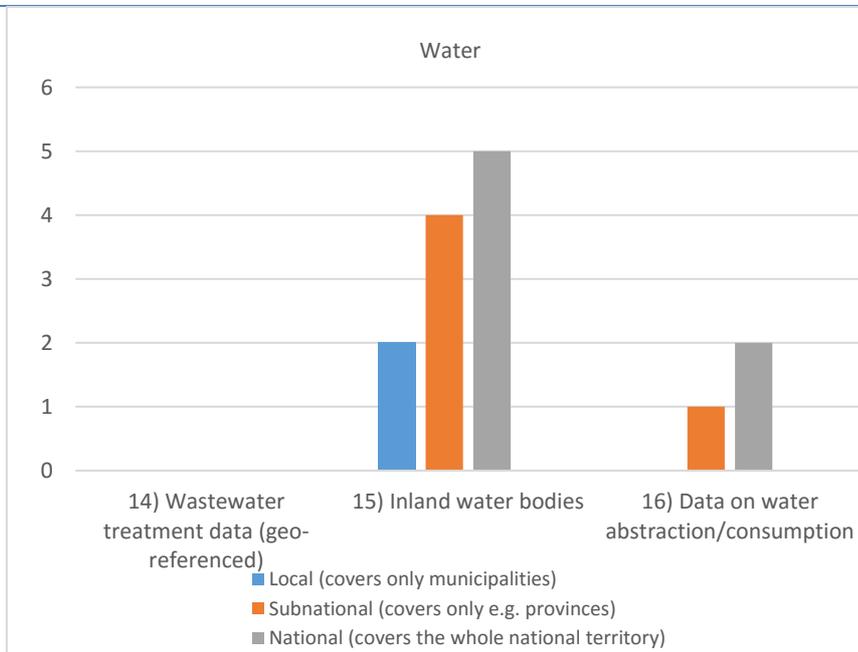
For all spatial layers, the data content (attributes for water bodies and consumption) must be checked.

Water

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Gaps identified:

Even though water is a crucial factor in Egypt's development, there are large data gaps identified, both for wastewater treatment facilities as well as regarding water abstraction:

➢ All data related to water (tabular data) such as wastewater safely treated, level of water stress, change in the extent of water -related ecosystem over time are required.
➢ Spatial layer in format of geo-database indicating location and characteristics of wastewater treatment plans is needed.
➢ Geo-referenced on water abstraction per watershed/administrative area/urban area is also missing.

Air quality

The Egyptian Environmental Affair Agency, together with the Ministry of Health manages an air quality geodatabase that is open-access and with time series.

Industrial facilities as sources of air pollution are also available as geospatial data.

Air quality

Legend:
- Local (covers only municipalities)
- Subnational (covers only e.g. provinces)
- National (covers the whole national territory)
- International (international dataset)
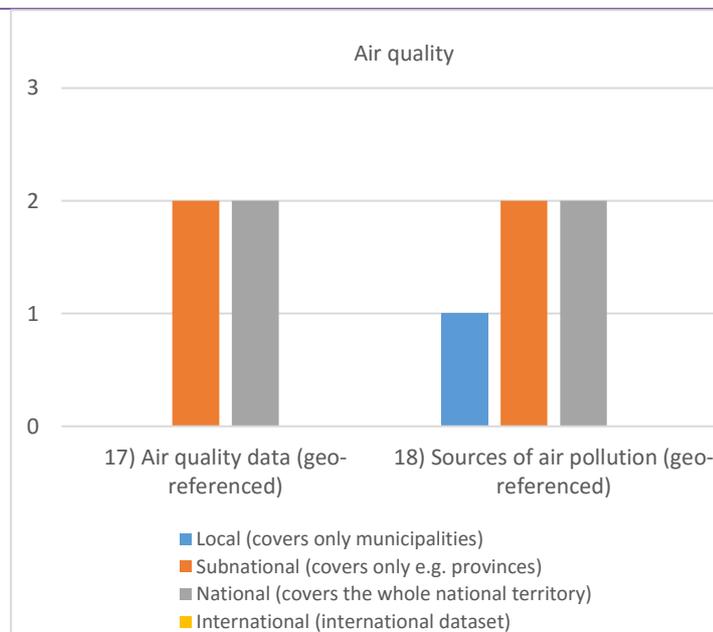
Gaps identified:

Even though data are readily available, several data gaps have been identified:

➢ Spatial layer, indicating sources of air pollution in format of geo-database.
➢ Air quality on level of municipalities and governorates.
➢ Pollution and urban climate data.

Marine environment

For marine data, only a geospatial data on fish farms in East Delta has been mentioned.

Marine Environment
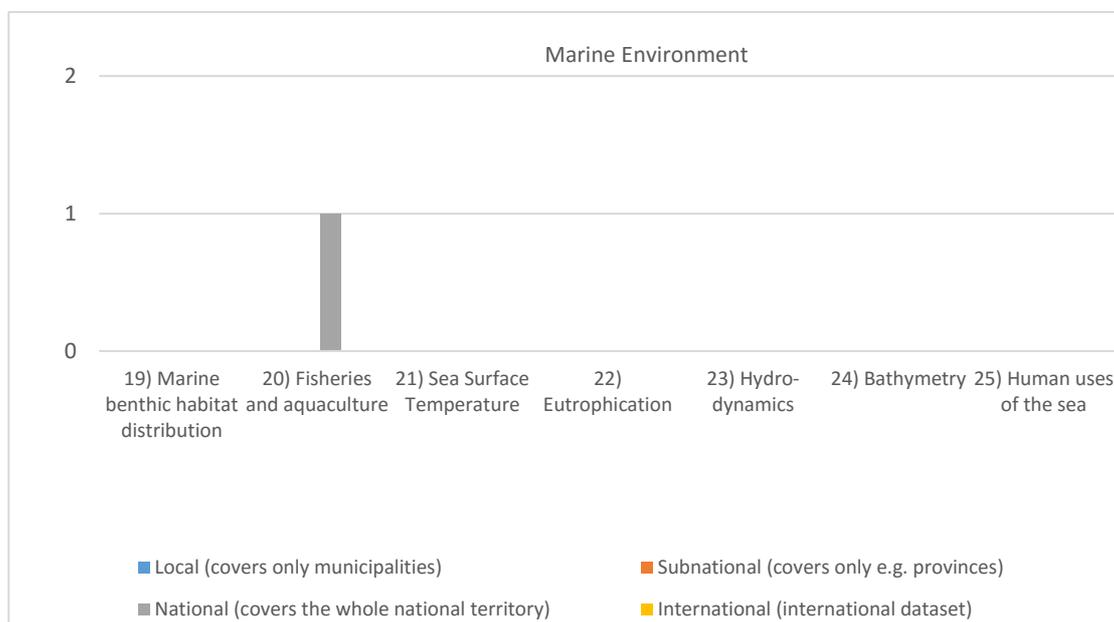
Other marine related data are not available or are not known to respondents.

Gaps identified:

Given the lack of marine data, a basic data layer for bathymetry is seen as necessary by the respondents.

Geospatial capacities

There is generally a high level of expertise of all technical areas. Only the level of expertise senior environmental project management is more fragmented and may represent a lack of senior guidance or the survey respondents not understanding the question.

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Figure 7: Level of expertise in different technical areas.

Potential participation to follow-up training workshops

The survey finally asked the potential availability of technical staff to participate in follow-up training workshops. A total number of 178 people were stated as potential participants with GIS practitioners and statistical experts adding up to more than 50% of the potential participants interested in the trainings.
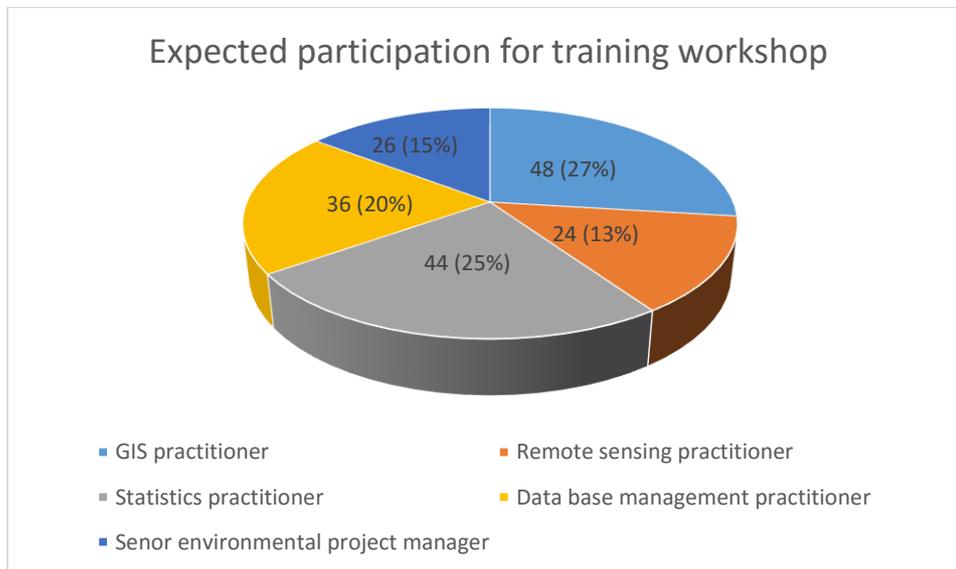

Figure 8: Distribution of potential participants to follow-up training workshops, per technical profile

5.2.3   Recommendations for follow up Egypt

This section highlights important components that should be addressed and developed in Phase II of this project:

1. Recruit, train, and maintain remote sensing expertise in government agencies and academia is necessary as there is a deficiency of this skill base outside private sector. A method for competitively shortlisting candidates is required as the total number of people available for training is high. In addition, different Egyptian sectors should identify their needs in Terms of References and Job Descriptions in order to customise training and capacity building for Egypt in other skills (than remote sensing).
2. Increase the awareness of the SDG Unit and develop cross-sector taskforce. The task force would be a good opportunity to meet with people who are working on GIS. A phone directory or contact list can be developed so people can speak with each other.
3. CAPMAS should move towards developing a National SDG Taskforce with a sub taskforce or working group on environmental SDGSs made up from a cross section of sectors and stakeholders including private sector, academia, NGOs, and other government agencies.
4. Overcome data sharing bottlenecks between government agencies as well as between governmental and non-governmental organisations, by using principles of the Shared Environmental Information System (SEIS) and establishing links with ongoing activities in the ENI SEIS II South project[10].
5. Capitalise on previous projects undertaken by international aid and the Egyptian Military that may provide high resolution and extended coverage of different areas of the country.
6. Specific data needs and gaps are outlined in the above section and should be addressed when possible.

5.2.4   Additional Information

More material and content can be found on the following links:

Workshop and Training Presentations:
http://www.etc.uma.es/un_escwa_etc_egypt/

Anonymous Individual Surveys:

http://www.etc.uma.es/un_escwa_etc_egypt/

Workshop Participants:
N/A

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[10] https://eni-seis.eionet.europa.eu/south

5.3   Palestine Country Report

5.3.1   Situation Summary Developed from Mission, National Workshop and Institutional Meetings

Strengths and Opportunities

The Palestinian Central Bureau of Statistics (PCBS) used GIS technology to conduct its Population, Housing and Establishments Census in 2017. Consequently it established a significant geospatial, computerized database and platform for monitoring Sustainable Development Goal indicators. PCBS on 12/07/2018 received an international award (Special Achievement in GIS (SAG) Award) from the Environmental Systems Research Institute (ESRI) for its outstanding work with GIS technology in serving the Palestinian Society. A number of platforms exist and can be used in developing geospatial workflows in Palestine; these include a database and registry, inventory and distribution of pollution, and Statistical Atlas (geo portal web based). In addition, there is a GIS and Data management unit in the Palestinian Water Authority and a program on Water Resources, developing and reviewing shapefiles of all water resources and use (water consumption).

The European Space Agency (ESA) has had a number of projects that addressed wetlands in Palestine and those data can be sourced and accessed for environmental SDG monitoring. There is an individual / professional will and strong interest in this workflow in the agencies and organisations that attended the workshop (see participant list). There is the practice of supplementing government capacity with academic capacity, which is a strength to building geospatial workflows for SDG reporting. Palestine has the capacity to form clear workflows (currently lacking) with the help of external thematic expertise on environmental SDGs (e.g. Land degradation, Forest, wetlands, etc.). There is a national mandate for PCBS for data reporting on SDGs and that can increase national ownership by developing partnerships to complete the SDG reporting. PCBS has developed a matrix of the SDG and targets and indicators and who is responsible for what institutionally that can be used as good planning tool for the geospatial workflow and for other countries (see attachment in additional information).

A number of international projects / organizations can synergize with developing a geospatial workflow for SDGs in Palestine and include:

- UNHABITAT addressing refugees and human settlement.
- UNICEF addressing water and sanitation.
- OCHA (UN Refugee unit but focused on Palestine).
- European Space Agency has worked in Palestine on the prequel to SWOS[11]
- GIZ projects on Climate Change and developing NSDI

Gaps and Challenges

Currently, there is a lack of data availability from institutional sources other than PCBS. PCBS collects information but there is no information available at the level of the SDGs available from its partners. PCBS has the legal mandate for data reporting on SDGs but it is difficult to get partners to send information required for useful reporting. Sometimes data are available but management of it is not clear, what to do with the data, finding data in different parts of government, and sharing information in a consistent way are

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[11] EU H2020 project "Satellite-based Wetland Observation Service" (http://swos-service.eu)

all challenges. Furthermore a number of data sources are compromised or gaps exist given the security situation in Palestine. For instance, Palestine is not in control of the water sources due to the Israeli occupation. Undocumented Israeli settlements and factories in Palestinian land that is not being measured or monitored. The workshop participants also report illegal undocumented Israeli solid waste disposal in Palestine. Consequently, the effects of the Israeli occupation on Environmental SDGs and the ability to monitor them by Palestinian authorities needs to be thoroughly evaluated.

Discussions with national participants reveal that there may be a lack of government institutional / senior management will to implement geospatial workflows. In addition, some government agencies reported that there are financial constraints to supporting these activities. There is a perceived need of thematic technical help to get the spatial workflows started. In addition, there is a lack of ArcGIS software, data time series are not available but needed; and devices, training, equipment, and servers are lacking. National workshop participants know what is needed and have implementation or mitigation plans but no finances to implement these plans. Suggestions were made to hire thematic experts for land and water etc. to strengthen these spatial workflows and SDG reporting.

NGOs are active on various spatial workflows but workshop comments suggest that they are not connected well with government institutions. While there are a number of MoUs with NGOs, there may be a need for closer collaboration and more MoUs where they have not been established. In addition, a number of relevant academic stakeholders did not attend and need to be involved in this workflow including but not restricted to the Environmental Research Centre, Najah University; Environmental and Soil Studies, Al Quds University; and Aquatic research Centre, Beir Zeit University.

Photo of the working session of the national workshop

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Important Discussion Points

- Palestine joined the SDG UNSD meeting with ESRI to start a project and portal to link geospatial data with SDGs
  - PCBS has worked on 10 SDGs (SDG 1, 2, 3, 5, 6, 7, 8,9,15, and 17) and published results on online geoportal. Excellent initial version of portal: Sdg-pcbs.opendata.arcgis.com
  - Palestine worked with the Irish example to develop the geoportal. (irelandsdg.geohive.ie). Palestine used the Irish example to work on this.
  - ESRI has an application called Storymap to communicate SDG data and Palestine is using it.
  - Assessment availability for 109 (out of 244). 135 indicators (Tier 2 or Tier 3) indicators are not available in Palestine.
  - Mapping these indicators may need to use governate data as locality scale may not be available.

- Mapping scales in Palestine:
  - A) State / Nation
  - B) West Bank and Gaza
  - C) Governorates: 11 Governorates in the West Bank and 5 Governorates in Gaza (most of the data on the portal is at that level)
  - Localities (aggregation, geographical area viable for residence on a permanent level) each with a distinct code, 613 localities (currently trying to added this scale to the portal).
  - Neighbourhood

- Relevant NGOs that can be involved in developing geoportal workflows:
  - ARIJ (participated at the workshop): ARIJ has worked extensively on environmental GIS applications including: Desertification and physical changes to the Dead Sea (including using remote sensing data and images). ARIJ is an NGO but works on grants and contracts as a funding structure.
  - Land Research Centre (did not participate)
  - Palestine Hydrology Group (did not participate)

- SDGs are included at the level of Palestinian national strategies with budgets.
  - Environmental SDGs are a priority in the strategies but not a lot work have been done on them according to workshop participants.
  - Environmental SDGs are currently somewhat of a gap.
    - Lots of working being done on human and social, economic, SDGs but little work has been done on environmental SDG.
- There is no information available for SDG 14 (life below water) in Palestine.

- Poverty Atlas is currently being developed by PCBS on data census from 2017; georeferenced at the level of the locality and to be finalised at the end of 2018.

- A number of individuals in the workshop suggested that the thematic priorities in Palestine in order of importance are:
  1. Israeli occupation
  2. Agriculture
  3. Poverty
  4. Environment
- Others suggested that the discussion needs to focus on technical not political issues.

- Some stakeholders perceived GIS as not a priority and imagery is not easy to get.
  - These stakeholders felt that spatial data at the Ministry of Local Governance may not be available to the other ministries easily. To be able to acquire such data, they felt that a minister has to speak to another ministry.

- SDI Project (GIZ) is doing a survey on all spatial data at the Ministries and to try to make it available for other Ministries. Finished the first phase of the project after sending out a survey.
  - Survey results in the Ministry of Local Governance.
  - The current NSDI project coordinator that is supported by GIZ is Mr. Nassar Abu Jabal in case of need of following up.
  - Working on developing a NSDI as currently none exists. There is a simplified version GeoMOLG.ps that is currently led by Ministry of Local Governance and supported by GIZ

- Palestine is building a Shared Environment Information System (focal point is EQA and PCBS), there is a strong link and relevance between SEIS and SDG in some indicators and it was started in 2010.

- ARIJ is monitoring changes in settlements and has a unit for monitoring settlements, are creating atlas of Palestine

- Gaza throws all sewage water in the sea if there is no electricity to run the waste water treatment plants. 25 % of the population in Gaza have safe drinking water compared with up to 90% in the West Bank.

- ARIJ and EQA has been undertaking remote sensing and monitoring of Dead Sea changes
- Private sector may not be very active in environmental and geospatial workflows.

5.3.2 Assessment of Spatial Data in Palestine

The national workshop and survey were limited to mostly government institutions and only 1 NGO and 1 Research institute. Universities and the private sector were not contributors to the results of this report. Palestinian institutions that responded to the surveys offer a substantial data foundation for population, settlement, infrastructure and water related data sets. On the other hand, there is a perception of significant data gaps in the thematic areas of Land Use/Land Cover, biodiversity, air quality and marine-related data, with data missing for forests, ecosystem, habitats and species distribution, air quality, and most marine data (except fisheries).

Data are mainly held by national government institutions, particularly the Palestinian Central Bureau of Statistics. An exception are data sets on land cover that are owned by research institutions and NGOs. A large proportion, 48% of the data are under restricted access. Only 25% of the data (mainly population data) are available under open access.

Even though the level of expertise in key capacities (GIS, remote sensing, statistics) is relatively insufficient, there is a large number of staff that may be potential participants to further training workshops.

Although there are important data gaps for several thematic areas, there is clear awareness of these data gaps, particularly regarding air quality, land cover and water related data. In many cases these data gaps exist due to the current security situation in Palestine and occupation of areas in the country.

Number of respondents	15

Type of institutions	• 7 National government institutions • 1 Research institute • 1 NGO

Data availability

Population, human settlements and infrastructure

Population and human settlements information is very well represented in Palestine.

A specific Census Geo-Database is available at the Palestinian Central Bureau of Statistics (PCBS), covering population data, is available from local to national level, with an update every 10 years, and time series that go back at least to 1997.

A census building layer is available as a human settlement layer at large scale (1:500) and covering the same temporal coverage as the census data.
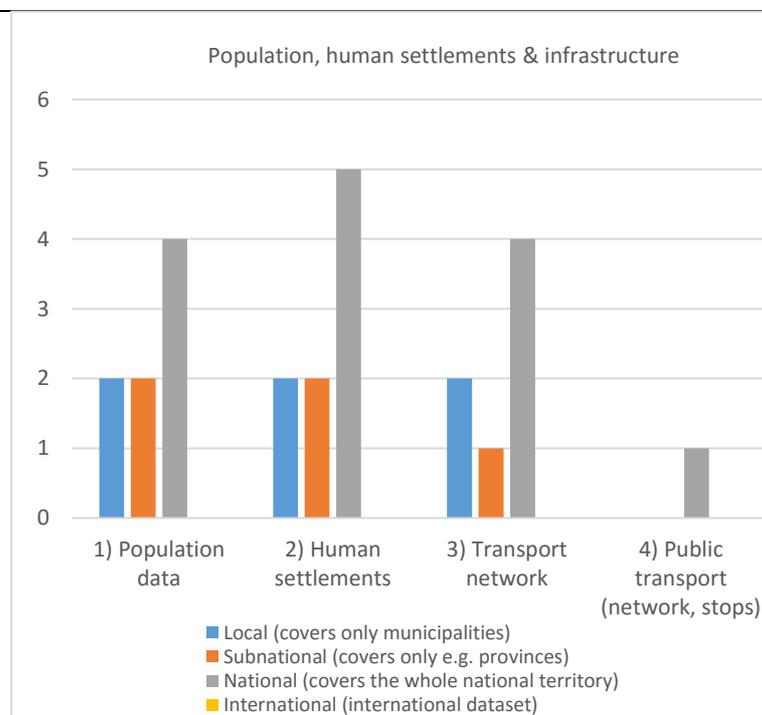
Geospatial data for the Palestinian transport network is available at national level.

It was mentioned that national data on public transport data is also available, but without specifying the data content.

Gaps identified:

No gaps were mentioned by the respondents.

Land Use / Land Cover (LULC)

A LULC product is available at national level issued by the Ministry of Agriculture with a unique reference year, 2006.

This is the reason why there is no LULC change product.

On a more detailed level, a layer for urban land use is available at a scale of 1:1000.

A specific layer for agricultural parcels and wetlands is available at the same scale.

Finally there is no geospatial information for forests.

Land Use / Land Cover

Local (covers only municipalities)
Subnational (covers only e.g. provinces)
National (covers the whole national territory)
International (international dataset)
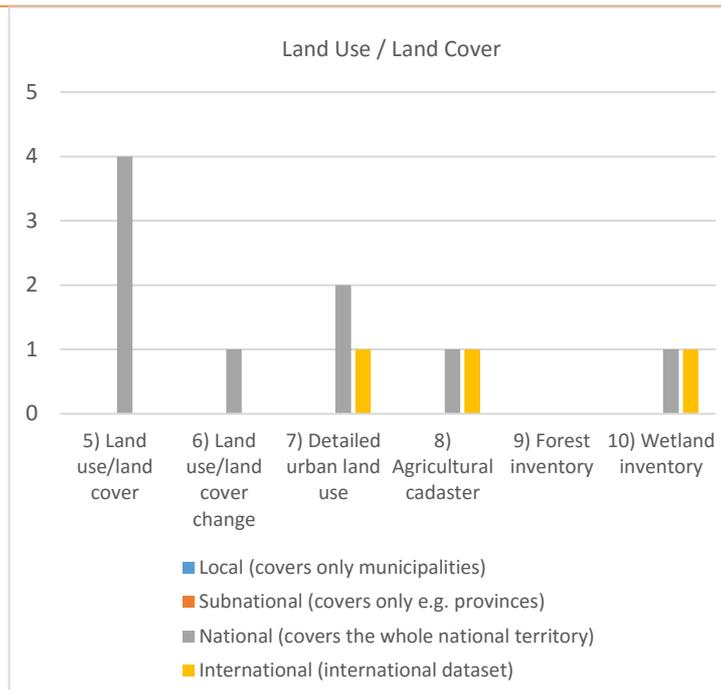
Data Gaps:

The only major data gap that is mentioned relates to agricultural cadastre that would be required on a yearly basis.

Biodiversity

A geospatial dataset about protected areas is available at country level.

No other biodiversity data available.

Biodiversity

Local (covers only municipalities)
Subnational (covers only e.g. provinces)
National (covers the whole national territory)
International (international dataset)
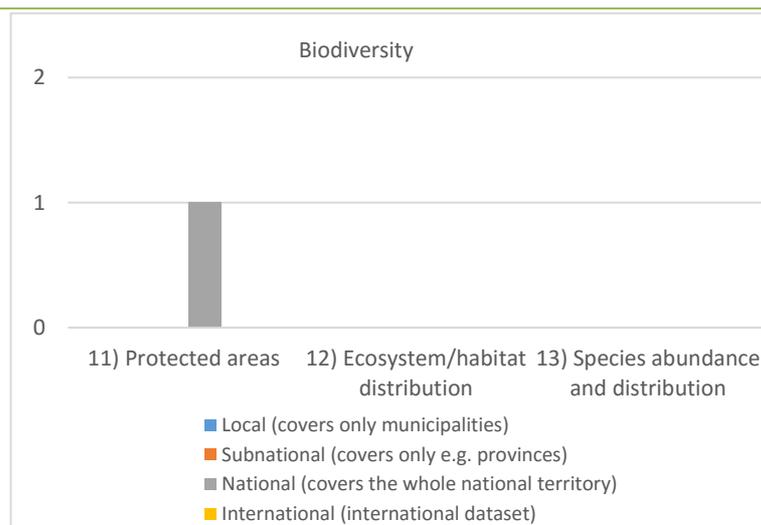
Gaps identified:

Missing species data are identified as a major data gap. The survey also identifies spatial habitat distribution data as also missing.

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Water

Data in the water domain is available, particularly from the Palestinian Water Authority.

A specific layer for <u>Wastewater Treatment Plants,</u> including number of wastewater treatment plants in Palestine, type of used treatment technology, number of served population is available, with a yearly update and some time series.

Water

4	
3	
2	
1	
0	

14) Wastewater treatment data (geo-referenced)   15) Inland water bodies   16) Data on water abstraction/consumption

■ Local (covers only municipalities)
■ Subnational (covers only e.g. provinces)
■ National (covers the whole national territory)
■ International (international dataset)
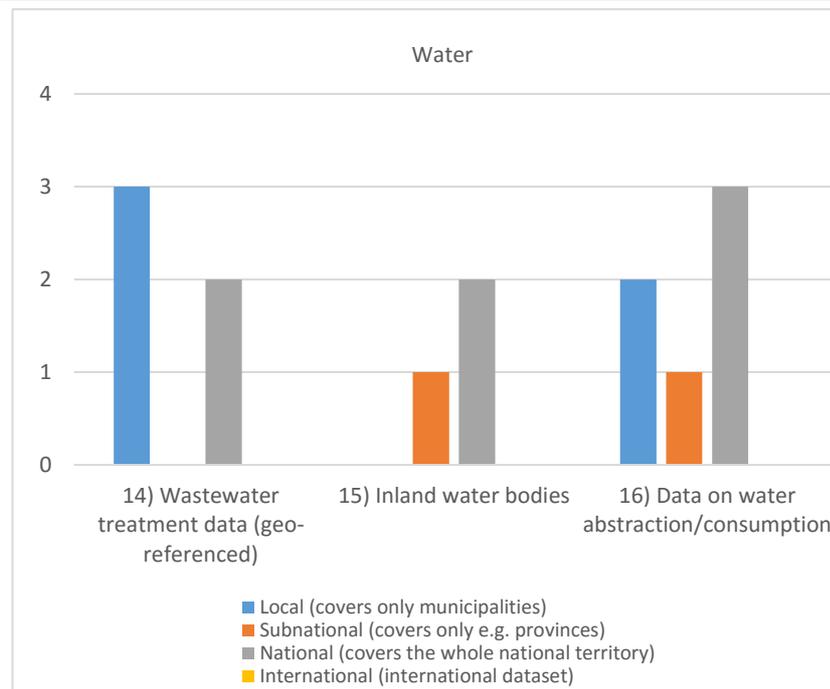
<u>Inland water bodies</u> are also covered both at national and subnational (i.e. basin) level.

Finally, geospatial data on <u>water use and abstraction</u> data (including groundwater abstraction) is available at national level.

Gaps identified:

There is a request by a specific agency to get access to data available at a different agency. In general, this underlines the need for better data sharing between agencies to ensure the efficient use of collected and reported data.

Air quality

No air quality data are available for Palestine.

Air quality

1

0

17) Air quality data (geo-referenced)   18) Sources of air pollution (geo-referenced)

■ Local (covers only municipalities)
■ Subnational (covers only e.g. provinces)
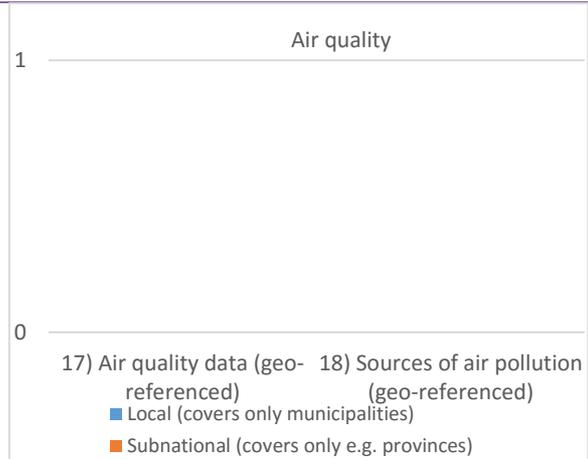
Gaps identified:

Based on the lack of air quality data there are specific data needs for Palestine:

➢ Data should be available for the minimum basic air quality indicators.
➢ There are no instruments available for measuring the emission
➢ Air quality data are needed which is related to the pollution produced by waste landfill or dumpsites, as well as other disposal methods of waste.

Marine environment

Regarding marine related data, fisheries statistics at subnational level are available with time series going back to 1998.

Marine Environment

2

1

0

19) Marine benthic habitat distribution   20) Fisheries and aquaculture   21) Sea Surface Temperature   22) Eutrophication   23) Hydro-dynamics   24) Bathymetry   25) Human uses of the sea

■ Local (covers only municipalities)
■ Subnational (covers only e.g. provinces)
■ National (covers the whole national territory)
■ International (international dataset)
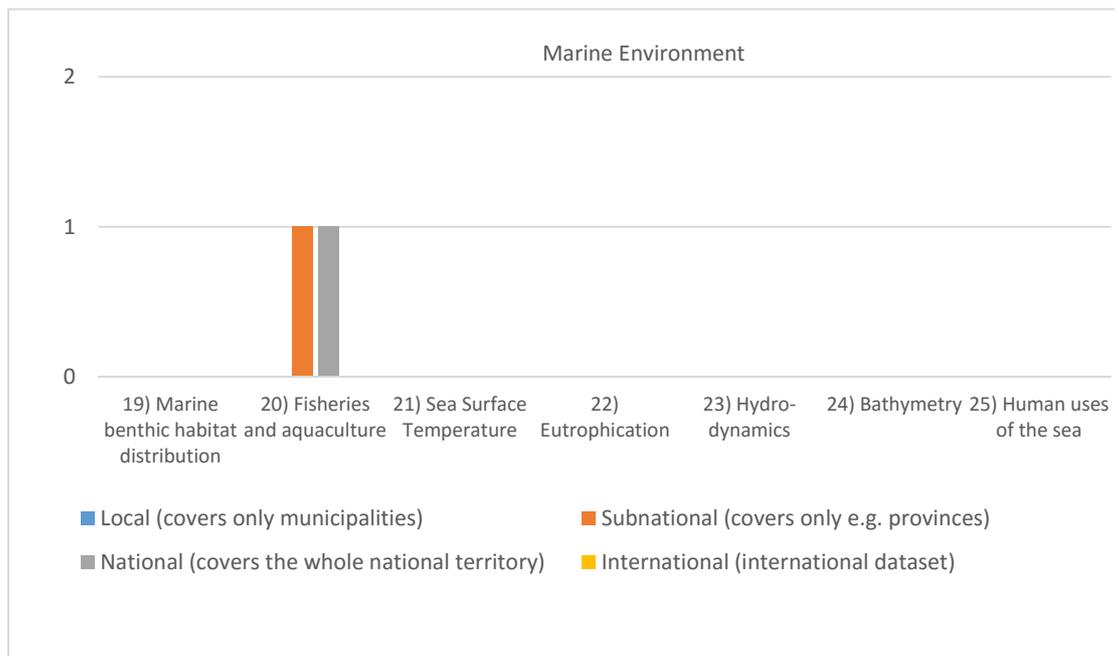
Gaps identified:

➢ Due to lack of governmental control over marine areas, no data are available.

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Geospatial capacities

The level of geospatial and data management capacities in the institutions are distributed unevenly. While there is medium to high level of GIS capacities, over 50% of the respondents express low level of expertise for remote sensing and statistics capacities. There is low-medium level regarding data base management.
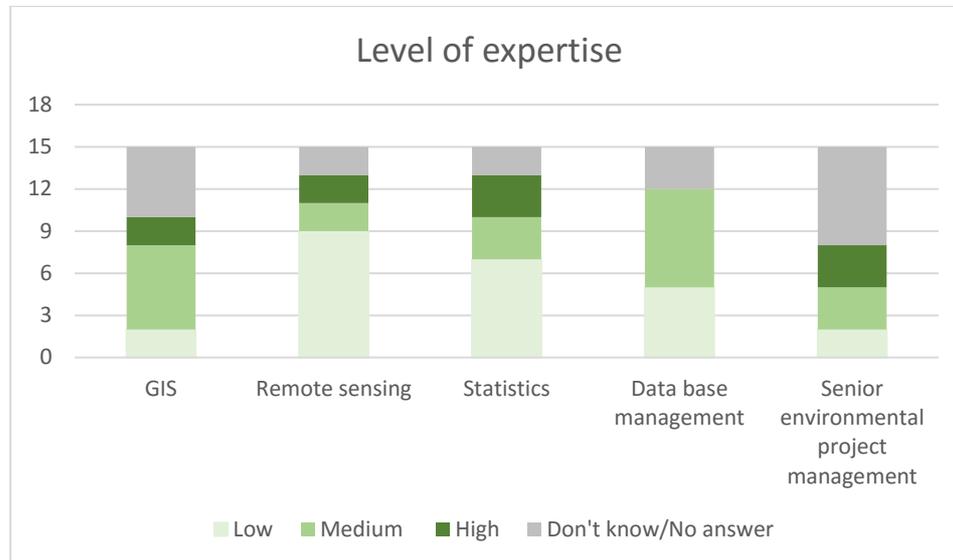
Figure 9: Level of expertise in different technical areas.

Potential participation to follow-up training workshops

The survey finally asked the potential availability of technical staff to participate in follow-up training workshops. A total number of 108 people were stated as available with a large number (more than one third of the total) of potential participants with a statistics background. Two other major groups of potential participants have a GIS background as well as expertise in senior environmental project management.
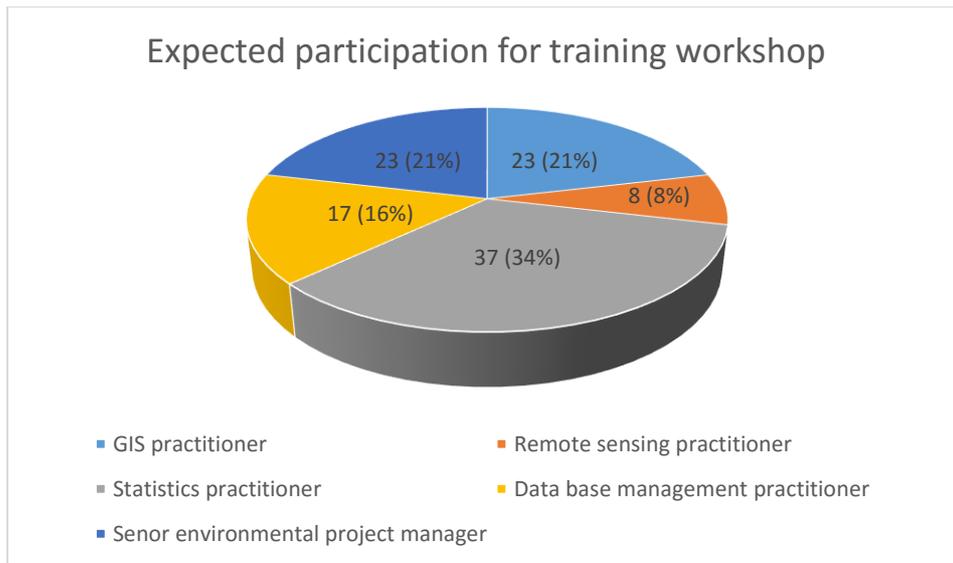
Figure 10: Distribution of potential participants to follow-up training workshops, per technical profile

5.3.3   Recommendations for follow up in Palestine

This section highlights important components that should be addressed and developed in Phase II of this project:

1. Although there is a SDG taskforce from different institutions, working groups need to be developed for each Target under the Goals and especially of the environmental SDGs (7 SDGs) that are relevant to geospatial datasets and can be calculated.
2. Establishing inter-institutional task forces to work on all environmental SDG targets and the related indicators is critical.
3. A workflow should be developed for each environmental Target and subtarget based on the available information.
4. Overcome data sharing bottlenecks between government agencies as well as between governmental and non-governmental organisations, by using principles of the Shared Environmental Information System (SEIS) and establishing links with ongoing activities in the ENI SEIS II South project;[12]
5. Organise training workshops to enhance geospatial capacities, specifically use of statistical data in a geospatial context and integrating statistical data with other environmental and geospatial data (national and international).
6. UN ESCWA and ETC-UMA need to connect with the GIZ project in Palestine as it contains very relevant work programmes to this project (NSDI).
7. Utilise Spatial Data Explore alternative data sources for identified data gaps (particularly, air quality and marine data).
8. The specific data needs and gaps have been outlined in the above section and should be addressed when possible.

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[12] https://eni-seis.eionet.europa.eu/south

5.3.4   Additional Information:

More material and content can be found on the following link:

Workshop and Training Presentations:

http://www.etc.uma.es/un_escwa_etc_palestine/

Anonymous Individual Surveys:

http://www.etc.uma.es/un_escwa_etc_palestine/

Workshop Participants (attached below):

Use of geospatial information for the monitoring and reporting on Environmental SDG Workshop

13/05/2018

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16	Hadeel Khamees	Quality Environment Authority	Al Bireh-Shorafa Street		0568860040	hadeelikhmaiz@gmail.com
17	Dalia Emleh	Quality Environment Authority	Al Bireh-Shorafa Street		0597991130	Dalia_ameh@hotmail.com
18	Yosria Ramadan	Ministry of local Government	Ramallah		0594227818	swmolog@gmail.com
19	Mohamed Shaheen	Palestinian Central Bureau of Statistics	Ramallah	022982700		mshaheen@pcbs.gov.ps
20	Shatha Barghouti	Ministry of public Work and Housing			0599283218	shathabr@hotmail.com
21	Aisar Tumeh	Palestinian Central Bureau of Statistics	Ramallah	022982700	0599312237	atumeh@pcbs.gov.ps
22	Safieh Ibrahim	Palestinian Central Bureau of Statistics	Ramallah	022982700	0598061479	sibrahim@pcbs.gov.ps
23	Reham Muala	Palestinian Central Bureau of Statistics	Ramallah	022982700	0598100663	rmualla@pcbs.gov.ps

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Developing and Utilising Geospatial Workflows to Monitor UN Sustainable Development Goals

Country Scoping and Assessment:

a Component of the Development Account Programme on Data and Statistics for SDGs

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Annex

A. Survey template

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A

Survey on availability and accessibility of relevant sources of spatial data for SDG indicator reporting

> Fields marked with * are mandatory.

Survey on availability and accessibility of relevant sources of spatial data for SDG indicator reporting in Selected Arab Countries under the ESCWA Development Account Programme on Data and Statistics-Pillar Environment

The present survey aims to gather information about the availability and accessibility of relevant sources of spatial data for environmental SDG indicator reporting and monitoring. It is structured as follows:

A) **Contact information** in order to collect relevant information that is useful to follow up on specific responses.

B) **Data availability for environmental SDG monitoring** to understand which specific spatial datasets are available at your organization and, if yes, details about each dataset.

C) **Data needs and data gaps**: section where you can indicate what data is missing to comply with the environmental SDG monitoring obligations.

D) **Spatial data analysis, management and storage capacities** assesses the capacities

and knowledge available at your organization to use spatial data and tools.

For any further questions, please get in touch with Christoph Schröder (christoph.

schroder@uma.es) and Wafa Aboul Hosn (aboulhosn@un.org)

A) Contact information

In this first section, we would like to kindly ask you to provide the following contact information, in order to correctly register your responses and to be able to follow-up on any question we would like to address to you.

Kindly provide the following information:

* Country
- ○ Egypt
- ○ Jordan
- ○ Palestine
- ○ Bahrain

First name

Family name

Email address

Telephone number (with country code)

* Organization/administration you work for.
Please, include Division/Department/Unit.

Position

Please, include the title of your position as well as the major responsibilities (e.g. strategic planning of data collection, data base management)

B) Data availability for environmental SDG monitoring

We have identified the most relevant spatial datasets that can be used for monitoring of environmental SDG indicators. We would like to get an overview of the availability of these datasets at your organization. Please, have a look at the background document "SDG target and indicator list" which contains an overview of environmental SDG indicators that are addressed in this survey.

Please, specify which of the listed spatial data are available at your organization

Population, human settlements and infrastructure

1) Population data: e.g. census data with spatial reference (i.e. census area) for which spatial layers exist.
2) Human settlements: e.g. a data layer that identifies human settlements (i.e. urban areas, rural settlements, single dwellings, etc.)
3) Transport network: e.g. map of roads, railways, waterways, incl. ports).
4) Public transport (network, stops): e.g. spatial layer of urban and inter-urban public transport networks and stops.

	Available	Not available
*1) Population data	○	○
*2) Human settlements	○	○
*3) Transport network	○	○
*4) Public transport (network, stops)	○	○

Land use and land cover

5) Land use/land cover: land cover and land use maps, using landcover/use classification systems
6) Land use/land cover change: LULC change layer, indicating changes of land use/cover changes between reference years
7) Detailed urban land use: specific land use data for urban areas.
8) Agricultural cadaster: spatial layer with cadaster information about agricultural parcels.
9) Forest inventory: spatial layer including delineation and extent of forest (taken from forest inventory, incl. tree species)
10) Wetland inventory: spatial layer including delineation and extent of wetlands.

	Available	Not available
*5) Land use/land cover	○	○
*6) Land use/land cover change	○	○
*7) Detailed urban land use	○	○
*8) Agricultural cadaster	○	○
*9) Forest inventory	○	○
*10) Wetland inventory	○	○

Biodiversity

11) Protected areas: spatial layer indicating location, extent and type of protected area (both terrestrial and marine).

12) Ecosystem/habitat distribution: spatial layer indicating location, extent and description of habitats and ecosystems.

13) Species distribution: spatial layer indicating location, extent and description of species.

	Available	Not available
*11) Protected areas	○	○
*12) Ecosystem/habitat distribution	○	○
*13) Species abundance and distribution	○	○

Water

14) Wastewater treatment data: spatial layer, indicating location and characteristics of wastewater treatment plants (e.g. capacity, load treated).

15) Inland water bodies: spatial layer, indicating location, extent and type of water body (e.g. lake, river, reservoir).

16) Data on water abstraction/consumption: geo-referenced data on water abstraction per watershed/administrative area/urban area

	Available	Not available
*14) Wastewater treatment data (geo-referenced)	○	○
*15) Inland water bodies	○	○
*16) Data on water abstraction /consumption	○	○

Air quality

17) Air quality data: geo-referenced data indicating level of air quality (e.g. NOx, PM, Ozone).

18) Sources of air pollution: spatial layer, indicating sources of air pollution such as industrial facilities..

	Available	Not available
*17) Air quality data (geo-referenced)	○	○
*18) Sources of air pollution (geo-referenced)	○	○

Marine

19) Marine benthic habitat distribution: spatial layer indicating location, extent and type of marine benthic habitats.

20) Fisheries and aquaculture: data on catch/effort (at port level), fishing activities and aquaculture (location).

21) Sea Surface Temperature: spatial layer indicating the sea surface temperature (changes).

22) Eutrophication: spatial layer indicating the level of eutrophication and nutrient enrichment.

23) Hydro-dynamics: spatial layer indicating wave dynamics.

24) Bathymetry: spatial layer indicating bathymetry.

25) Human activities: any spatial information about human marine uses such as maritime traffic, litter, pollution, invasive species.

	Available	Not available
*19) Marine benthic habitat distribution	○	○
*20) Fisheries and aquaculture	○	○
*21) Sea Surface Temperature	○	○

* 22) Eutrophication	○	○
* 23) Hydro-dynamics	○	○
* 24) Bathymetry	○	○
* 25) Human uses of the sea	○	○

B-1) Population data

B-1.1 Please, indicate the official name of the dataset(s)

B-1.2 Please, indicate the data owner.

B-1.3 Please, indicate the data holder.

B-1.4 Please, specify the data format

Multiple responses possible

☐ Raster data
☐ Vector data
☐ Tabular data (linked to administrative units)
☐ WMS
☐ Other (please specify)

Other (please specify):

B-1.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)
☐ Subnational (covers only e.g. provinces)
☐ National (covers the whole national territory)
☐ International (international dataset)
☐ Other (please specify)

Others, please specify:

B-1.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-1.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-1.8 Is a time series of this dataset available?

◯ Yes (please specify time series below)

◯ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-1.9 How is the access to the data regulated?

◯ Open access

◯ Access upon-request

◯ Restricted access

◯ Other (please, specify below)

Other, please specify

B-2) Human settlements

B-2.1 Please, indicate the official name of the dataset(s)

B-2.2 Indicate the data owner

B-2.3 Indicate the data holder

B-2.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

[ ]

B-2.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

[ ]

B-2.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

[ ]

B-2.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

[ ]

B-2.8 Is a time series of this dataset available?

- ◉ Yes (please specify time series below)
- ◉ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-2.9 How is the access to the data regulated?

- ◉ Open access
- ◉ Access upon-request
- ◉ Restricted access
- ◉ Other (please, specify below)

Other, please specify

B-3) Transport network

B-3.1 Please, indicate the official name of the dataset

B-3.2 Indicate the data owner

B-3.3 Indicate the data holder

B-3.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

B-3.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

B-3.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-3.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-3.8 Is a time series of this dataset available?

- ◯ Yes (please specify time series below)
- ◯ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-3.9: How is the access to the data regulated?

- ◯ Open access
- ◯ Access upon-request
- ◯ Restricted access
- ◯ Other (please, specify below)

Other, please specify

B-4) Public transport

B-4.1 Please, indicate the official name of the dataset

B-4.2 Indicate the data owner

B-4.3 Indicate the data holder

B-4.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

B-4.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

B-4.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-4.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-4.8 Is a time series of this dataset available?

◉

Yes (please specify time series below)

◎ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

[ ]

B-4.9: How is the access to the data regulated?

◎ Open access

◎ Access upon-request

◎ Restricted access

◎ Other (please, specify below)

Other, please specify

[ ]

B-5) Land use/land cover

B-5.1 Please, indicate the official name of the dataset

[ ]

B-5.2 Indicate the data owner

[ ]

B-5.3 Indicate the data holder

[ ]

B-5.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

[ ]

B-5.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

B-5.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-5.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-5.8 Is a time series of this dataset available?

◉ Yes (please specify time series below)

◉ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-5.9: How is the access to the data regulated?

◉ Open access

◉ Access upon-request

◉ Restricted access

◉ Other (please, specify below)

Other, please specify

B-6) Land use/land cover change

B-6.1 Please, indicate the official name of the dataset

B-6.2 Indicate the data owner

B-6.3 Indicate the data holder

B-6.4 Please, specify the data format

Multiple responses possible

☐ Raster data
☐ Vector data
☐ Tabular data (linked to administrative units)
☐ WMS
☐ Other (please specify)

Other (please specify):

B-6.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)
☐ Subnational (covers only e.g. provinces)
☐ National (covers the whole national territory)
☐ International (international dataset)
☐ Other (please specify)

Others, please specify:

B-6.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-6.7 Specify how often the data is recorded or produced:

☐ Yearly
☐ Monthly
☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-6.8 Is a time series of this dataset available?

○ Yes (please specify time series below)

○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-6.9: How is the access to the data regulated?

○ Open access

○ Access upon-request

○ Restricted access

○ Other (please, specify below)

Other, please specify

B-7) Detailed urban land use

B-7.1 Please, indicate the official name of the dataset

B-7.2 Indicate the data owner

B-7.3 Indicate the data holder

B-7.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

> [ ]

B-7.5 Specify the spatial coverage of the data:

Multiple responses are possible

- [ ] Local (covers only municipalities)
- [ ] Subnational (covers only e.g. provinces)
- [ ] National (covers the whole national territory)
- [ ] International (international dataset)
- [ ] Other (please specify)

Others, please specify:

> [ ]

B-7.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

> [ ]

B-7.7 Specify how often the data is recorded or produced:

- [ ] Yearly
- [ ] Monthly
- [ ] Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

> [ ]

B-7.8 Is a time series of this dataset available?

- ( ) Yes (please specify time series below)
- ( ) No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

> [ ]

B-7.9: How is the access to the data regulated?

- ( ) Open access
- ( ) Access upon-request
- ( ) Restricted access
- ( ) Other (please, specify below)

Other, please specify

B-8) Agricultural cadaster

B-8.1 Please, indicate the official name of the dataset

B-8.2 Indicate the data owner

B-8.3 Indicate the data holder

B-8.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

B-8.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

B-8.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-8.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

[ ]

B-8.8 Is a time series of this dataset available?

○ Yes (please specify time series below)

○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

[ ]

B-8.9: How is the access to the data regulated?

○ Open access

○ Access upon-request

○ Restricted access

○ Other (please, specify below)

Other, please specify

[ ]

B-9) Forest inventory

B-9.1 Please, indicate the official name of the dataset

[ ]

B-9.2 Indicate the data owner

[ ]

B-9.3 Indicate the data holder

[ ]

B-9.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

_____

B-9.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

_____

B-9.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

_____

B-9.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

_____

B-9.8 Is a time series of this dataset available?

○ Yes (please specify time series below)

○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

_____

B-9.9: How is the access to the data regulated?

○ Open access

- ⦿ Access upon-request
- ⦿ Restricted access
- ⦿ Other (please, specify below)

Other, please specify

B-10) Wetland inventory

B-10.1 Please, indicate the official name of the dataset

B-10.2 Indicate the data owner

B-10.3 Indicate the data holder

B-10.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

B-10.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

B-10.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-10.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-10.8 Is a time series of this dataset available?

- ○ Yes (please specify time series below)
- ○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-10.9: How is the access to the data regulated?

- ○ Open access
- ○ Access upon-request
- ○ Restricted access
- ○ Other (please, specify below)

Other, please specify

B-11) Protected areas

B-11.1 Please, indicate the official name of the dataset

B-11.2 Indicate the data owner

B-11.3 Indicate the data holder

B-11.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

B-11.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

B-11.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-11.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-11.8 Is a time series of this dataset available?

◉ Yes (please specify time series below)

◉ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-11.9: How is the access to the data regulated?

○ Open access

○ Access upon-request

○ Restricted access

○ Other (please, specify below)

Other, please specify

B-12) Ecosystem/habitat distribution

B-12.1 Please, indicate the official name of the dataset

B-12.2 Indicate the data owner

B-12.3 Indicate the data holder

B-12.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

B-12.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

B-12.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-12.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-12.8 Is a time series of this dataset available?

- ○ Yes (please specify time series below)
- ○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-12.9: How is the access to the data regulated?

- ○ Open access
- ○ Access upon-request
- ○ Restricted access
- ○ Other (please, specify below)

Other, please specify

B-13) Species distribution

B-13.1 Please, indicate the official name of the dataset

B-13.2 Indicate the data owner

B-13.3 Indicate the data holder

B-13.4 Please, specify the data format

Multiple responses possible

☐ Raster data
☐ Vector data
☐ Tabular data (linked to administrative units)
☐ WMS
☐ Other (please specify)

Other (please specify):

B-13.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)
☐ Subnational (covers only e.g. provinces)
☐ National (covers the whole national territory)
☐ International (international dataset)
☐ Other (please specify)

Others, please specify:

B-13.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-13.7 Specify how often the data is recorded or produced:

☐ Yearly
☐ Monthly
☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-13.8 Is a time series of this dataset available?

○

Yes (please specify time series below)

⊙ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-13.9: How is the access to the data regulated?

⊙ Open access

⊙ Access upon-request

⊙ Restricted access

⊙ Other (please, specify below)

Other, please specify

B-14) Wastewater treatment data

B-14.1 Please, indicate the official name of the dataset

B-14.2 Indicate the data owner

B-14.3 Indicate the data holder

B-14.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

B-14.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

[ ]

B-14.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

[ ]

B-14.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

[ ]

B-14.8 Is a time series of this dataset available?

◉ Yes (please specify time series below)

◉ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

[ ]

B-14.9: How is the access to the data regulated?

◉ Open access

◉ Access upon-request

◉ Restricted access

◉ Other (please, specify below)

Other, please specify

[ ]

B-15) Inland water bodies

B-15.1 Please, indicate the official name of the dataset

B-15.2 Indicate the data owner

B-15.3 Indicate the data holder

B-15.4 Please, specify the data format

Multiple responses possible

☐ Raster data
☐ Vector data
☐ Tabular data (linked to administrative units)
☐ WMS
☐ Other (please specify)

Other (please specify):

B-15.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)
☐ Subnational (covers only e.g. provinces)
☐ National (covers the whole national territory)
☐ International (international dataset)
☐ Other (please specify)

Others, please specify:

B-15.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-15.7 Specify how often the data is recorded or produced:

☐ Yearly
☐ Monthly
☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-15.8 Is a time series of this dataset available?

○ Yes (please specify time series below)

○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-15.9: How is the access to the data regulated?

○ Open access

○ Access upon-request

○ Restricted access

○ Other (please, specify below)

Other, please specify

B-16) Water abstraction / consumption

B-16.1 Please, indicate the official name of the dataset

B-16.2 Indicate the data owner

B-16.3 Indicate the data holder

B-16.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

```

```

B-16.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

```

```

B-16.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

```

```

B-16.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

```

```

B-16.8 Is a time series of this dataset available?

- ○ Yes (please specify time series below)
- ○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

```

```

B-16.9: How is the access to the data regulated?

- ○ Open access
- ○ Access upon-request
- ○ Restricted access
- ○ Other (please, specify below)

Other, please specify

B-17) Air quality

B-17.1 Please, indicate the official name of the dataset

B-17.2 Indicate the data owner

B-17.3 Indicate the data holder

B-17.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

B-17.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

B-17.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-17.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-17.8 Is a time series of this dataset available?

- ○ Yes (please specify time series below)
- ○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-17.9: How is the access to the data regulated?

- ○ Open access
- ○ Access upon-request
- ○ Restricted access
- ○ Other (please, specify below)

Other, please specify

B-18) Sources of air pollution

B-18.1 Please, indicate the official name of the dataset

B-18.2 Indicate the data owner

B-18.3 Indicate the data holder

B-18.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

[ ]

B-18.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

[ ]

B-18.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

[ ]

B-18.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

[ ]

B-18.8 Is a time series of this dataset available?

◉ Yes (please specify time series below)

◉ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

[ ]

B-18.9: How is the access to the data regulated?

◉ Open access

○ Access upon-request
○ Restricted access
○ Other (please, specify below)

Other, please specify

[ ]

B-19) Marine benthic habitat map

B-19.1 Please, indicate the official name of the dataset

[ ]

B-19.2 Indicate the data owner

[ ]

B-19.3 Indicate the data holder

[ ]

B-19.4 Please, specify the data format

Multiple responses possible

☐ Raster data
☐ Vector data
☐ Tabular data (linked to administrative units)
☐ WMS
☐ Other (please specify)

Other (please specify):

[ ]

B-19.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)
☐ Subnational (covers only e.g. provinces)
☐ National (covers the whole national territory)
☐ International (international dataset)
☐ Other (please specify)

Others, please specify:

[ ]

B-19.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-19.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-19.8 Is a time series of this dataset available?

◯ Yes (please specify time series below)

◯ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-19.9: How is the access to the data regulated?

◯ Open access

◯ Access upon-request

◯ Restricted access

◯ Other (please, specify below)

Other, please specify

B-20) Fisheries and aquaculture

B-20.1 Please, indicate the official name of the dataset

B-20.2 Indicate the data owner.

B-20.3 Indicate the data holder.

B-20.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

B-20.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

B-20.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-20.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-20.8 Is a time series of this dataset available?

- ⦿ Yes (please specify time series below)
- ⦿ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-20.9: How is the access to the data regulated?

○ Open access

○ Access upon-request

○ Restricted access

○ Other (please, specify below)

Other, please specify

B-21) Sea Surface Temperature

B-21.1 Please, indicate the official name of the dataset

B-21.2 Indicate the data owner

B-21.3 Indicate the data holder

B-21.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

B-21.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

B-21.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-21.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-21.8 Is a time series of this dataset available?

- ○ Yes (please specify time series below)
- ○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-21.9: How is the access to the data regulated?

- ○ Open access
- ○ Access upon-request
- ○ Restricted access
- ○ Other (please, specify below)

Other, please specify

B-22) Eutrophication

B-22.1 Please, indicate the official name of the dataset

B-22.2 Indicate the data owner

B-22.3 Indicate the data holder

B-22.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

B-22.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

B-22.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-22.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-22.8 Is a time series of this dataset available?

- ○

Yes (please specify time series below)

○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

[ ]

B-22.9: How is the access to the data regulated?

○ Open access

○ Access upon-request

○ Restricted access

○ Other (please, specify below)

Other, please specify

[ ]

B-23) Hydro-dynamics

B-23.1 Please, indicate the official name of the dataset

[ ]

B-23.2 Indicate the data owner

[ ]

B-23.3 Indicate the data holder

[ ]

B-23.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

[ ]

B-23.5 Specify the spatial coverage of the data:

Multiple responses are possible

☐ Local (covers only municipalities)

☐ Subnational (covers only e.g. provinces)

☐ National (covers the whole national territory)

☐ International (international dataset)

☐ Other (please specify)

Others, please specify:

B-23.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-23.7 Specify how often the data is recorded or produced:

☐ Yearly

☐ Monthly

☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-23.8 Is a time series of this dataset available?

⊙ Yes (please specify time series below)

⊙ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-23.9: How is the access to the data regulated?

⊙ Open access

⊙ Access upon-request

⊙ Restricted access

⊙ Other (please, specify below)

Other, please specify

B-24) Bathymetry

B-24.1 Please, indicate the official name of the dataset

B-24.2 Indicate the data owner

B-24.3 Indicate the data holder

B-24.4 Please, specify the data format

Multiple responses possible

- ☐ Raster data
- ☐ Vector data
- ☐ Tabular data (linked to administrative units)
- ☐ WMS
- ☐ Other (please specify)

Other (please specify):

B-24.5 Specify the spatial coverage of the data:

Multiple responses are possible

- ☐ Local (covers only municipalities)
- ☐ Subnational (covers only e.g. provinces)
- ☐ National (covers the whole national territory)
- ☐ International (international dataset)
- ☐ Other (please specify)

Others, please specify:

B-24.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

B-24.7 Specify how often the data is recorded or produced:

- ☐ Yearly
- ☐ Monthly
- ☐ Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

B-24.8 Is a time series of this dataset available?

○ Yes (please specify time series below)

○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

B-24.9: How is the access to the data regulated?

○ Open access

○ Access upon-request

○ Restricted access

○ Other (please, specify below)

Other, please specify

B-25) Human uses of the sea

B-25.1 Please, indicate the official name of the dataset

B-25.2 Indicate the data owner

B-25.3 Indicate the data holder

B-25.4 Please, specify the data format

Multiple responses possible

☐ Raster data

☐ Vector data

☐ Tabular data (linked to administrative units)

☐ WMS

☐ Other (please specify)

Other (please specify):

[ ]

B-25.5 Specify the spatial coverage of the data:

Multiple responses are possible

- [ ] Local (covers only municipalities)
- [ ] Subnational (covers only e.g. provinces)
- [ ] National (covers the whole national territory)
- [ ] International (international dataset)
- [ ] Other (please specify)

Others, please specify:

[ ]

B-25.6 Specify resolution or scale of the data set

e.g. 1km resolution, 1:10.000 etc.

[ ]

B-25.7 Specify how often the data is recorded or produced:

- [ ] Yearly
- [ ] Monthly
- [ ] Other (please, specify below)

Other (please specify)

(e.g. every 5 years)

[ ]

B-25.8 Is a time series of this dataset available?

- ○ Yes (please specify time series below)
- ○ No

Please, specify the time series:

e.g. 2000-2006-2012, 2000-2018

[ ]

B-25.9: How is the access to the data regulated?

- ○ Open access
- ○ Access upon-request
- ○ Restricted access
- ○ Other (please, specify below)

Other, please specify

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C) Data needs and data gaps

* Please, select the thematic areas where data is needed to meet the requirements of the SDG monitoring obligations, and specify the detailed data gaps and needs (e.g. format, temporal/spatial resolution).

- ☐ Reference data (e.g. coastline, digital elevation model) (please, specify below)
- ☐ Human settlements and infrastructure
- ☐ Land cover data (please, specify below)
- ☐ Species and habitat data (please, specify below)
- ☐ Water related data (please, specify below)
- ☐ Air quality data (please, specify below)
- ☐ Marine data (please, specify below)

Reference data, please, specify:

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Human settlements and infrastructure, please, specify:

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Land cover data, please, specify:

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Species and habitat data, please, specify:

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Water related data, please, specify:

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Air quality data, please, specify:

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Marine data, please, specify:

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┌─────────────────────────────────────────────────┐
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│                                                 │
└─────────────────────────────────────────────────┘
```

What other institutions do you see relevant for data provision for the SDG workflow?

Please, indicate the name of the institutions, the data they can provide and, if possible, provide contact information.

```
┌─────────────────────────────────────────────────┐
│                                                 │
│                                                 │
│                                                 │
└─────────────────────────────────────────────────┘
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D) Spatial data analysis, management and storage capacities

Please, indicate the available capacities for analysis and management of spatial data as well as environmental assessment from 1 (beginner) to 3 (proficient user)

	1	2	3	Don't know/No answer
Expertise in:	○	○	○	○
*GIS	○	○	○	○
*Remote sensing	○	○	○	○
*Statistics	○	○	○	○
*Data base management	○	○	○	○
*Senior environmental project management	○	○	○	○

How many people of your organization are expected to participate if a training workshop on monitoring SDG progress is held?

Please, avoid double counting: only indicate practitioners in one of the following boxes, even though he /she is practitioner in various fields.

*GIS practitioner

Expert in Geographic Information Systems and geographic data analysis

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┌─────────────────────────┐
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└─────────────────────────┘
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*Remote sensing practitioner

Expert in remote sensing and satellite image analysis

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┌─────────────────────────┐
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*Statistics practitioner

Expert in statistics and advance statistical analysis

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┌─────────────────────────┐
│                         │
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* Data base management practitioner

Expert in data base design and management

[   ]

* Senor environmental project manager

Expert in environmental assessments and environmental monitoring projects

[   ]

What kind of GIS software is used in your organization?

☐ Commercial product (please specify below)

☐ Open source product (please specify below)

☐ None

Please, specify the software:

[   ]

Are you participating in any ongoing project dealing with GIS use for the environment?

◉ Yes (please specify below)

◉ No

Please specify the topic and the partners

[   ]

Other comments

Mention any further issue you would like to raise in the context of the survey

[   ]

Many thanks for filling this questionnaire.

B. Background material for survey

Developing Geospatial Workflows for Monitoring UN Sustainable Development Goals
UNITED NATIONS ESCWA | EUROPEAN TOPIC CENTER UMA

B

Supplementory document for Survey on availability and accessibility of relevant sources of spatial data for SDG indicator reporting

Sustainable development goal	Relevant target	Indicators
Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	2.4.1 Proportion of agricultural area under productive and sustainable agriculture
Goal 6. Ensure availability and sustainable management of water and sanitation for all	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.1 Proportion of wastewater safely treated
	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.2 Proportion of bodies of water with good ambient water quality
	6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
	6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	6.6.1 Change in the extent of water-related ecosystems over time
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	9.1.1 Proportion of the rural population who live within 2 km of an all-season road
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable	11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing
	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
	11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate
	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
Goal 13. Take urgent action to combat climate change and its impacts	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
		13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities including marine debris and nutrient pollutic	14.1.1 Index of coastal eutrophication and floating plastic debris density
	14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	14.5.1 Coverage of protected areas in relation to marine areas (%)
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	15.1.1 Forest area as a proportion of total land area
		15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
	15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	15.3.1 Proportion of land that is degraded over total land area
	15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	15.5.1 Red List Index