Environmental observation systems and technology (in situ measurement devices, modelling, satellite observations) are developing at an increasingly rapid rate and offer new tools and methods for improving understanding and the management of ecosystems and monitoring their evolution. The resulting data, growing in quantity, are produced by many different players. The challenge remains to organise access to and the sharing of these data which are often multidisciplinary, between producers, managers and users.

Better collaboration between institutions and their networking are therefore key elements in the organisation of data sharing and to be able to transform the data into high quality information which can be used by decision-makers over the long term.

Moreover, the value of the data is increasing as they go beyond observation for purely scientific purposes by providing services for maritime security and monitoring, for the research and economy sectors, in particular in coastal areas, where numerous economic activities are centred. This document presents the way in which environmental information is produced, how the institutions are structured and how the sharing of environmental information is organised.

According to the 2020 state of the environment in the Mediterranean report, pollution and climate change in the Mediterranean are "endangering populations' health and livelihoods". In such a context, the challenges related to the sharing of environmental information in the Mediterranean are considerable. They concern ensuring as many people as possible are able to access the information, as well as improving quality of life and the state of the environment. Observation therefore fulfils a range of missions, from contributing to research, to assisting public decision-making [diagram 1]. It is carried out in stages [diagram 2], by a diverse network of players: observation stations, observatories, research laboratories, government services and citizens. However, the links between these different players are not always seamless, and the data formats are not standardised. Moreover, the normative frameworks between the Contracting Parties to the Barcelona Convention are very heterogeneous in this regard. Therefore, although the networking of the information on a European and international scale has progressed over recent years, it is clear that the insertion of different regions into subregional information systems relating to marine and coastal environments remains unequal. The country profiles thereby present both the organisation of the construction of information relating to Mediterranean coastal and marine environments, and national observation capacities. They highlight existing cooperation between observation players, in order to favour the future sharing of marine environmental information in the Mediterranean.
Diagram 1: Construction of environmental information

*EIS: Environmental Information System

Diagram 2: The issues relating to environmental information sharing
National challenges

In Tunisia, 70% of economic activities, 90% of tourism and two thirds of the population are concentrated on the coast (REE, 2017). A large proportion of irrigated farming is coastal. The pressures on the marine environment are therefore particularly strong, and sustainability is at the heart of all development-related issues. Erosion, eutrophication, soil salinisation caused by the overexploitation of ground water and biodiversity loss in wetlands, are all processes linked to anthropisation, often intensified by climate change.

Tunisia has developed various environment surveillance networks and systems, such as the bathing water monitoring system, the air quality monitoring network and various information systems for coastal ecosystems. However, these data are collected and managed autonomously by an array of different players. Moreover, a large proportion of environmental information is only produced as part of short-term projects, rarely continuously for statistical purposes. Consequently, these different systems are still developed separately. The 2015 Plan Bleu report stated that "they do not contribute together to creating a real national environmental information system." The last report on the state of the environment in Tunisia was published in 2017.

National observation capacities

The themes covered by the mapped agencies, observation stations, networks and observatories show that monitoring concerns primarily issues related to the quality of the environment with regard to the theme of risks: coastal erosion, bathing water pollution, ground water pollution, monitoring of drainage basin pollution. Observations are firstly focused on health issues. Biodiversity, research within MPAs, and resource management, are less well represented, even if the study on the geographical distribution of exploitable stocks showed from the 2000s an overexploitation of benthic stocks in the Gulf of Gabes (INSTM, 2007). Biodiversity observation should be reinforced by the creation currently in progress of the MPAs of Kuriat, Zembra and Zembretta, and the Kneiss Islands. Data concerning tourism and human-territory relationships are rarely collected, which reflects a general trend in the region, but would benefit from being investigated given the importance of the tourism sector to the country’s economy, and the effects of the activity on ecosystems.

Diagram 3: Mapping of the players involved in the construction of environmental information in Tunisia

Diagram 4: Number of observation players by theme

2. https://iczmplatform.org
3. https://planbleu.org
Diagram 5: Organisation and mapping of the players involved in environmental construction in Tunisia
Mapping of the construction of environmental information

The construction of environmental information in Tunisia is in the process of being developed, but is still far from standardised. The OTEDD (Tunisian Observatory for the Environment and Sustainable Development), part of the ANPE (National Agency for the Protection of the Environment), oversees the organisation and processing of information relating to sustainable development. It is responsible for writing reports on the state of the country’s environment. It does not yet undertake the centralisation of information on sustainable development. In 2017, the Ministry of the Environment and Sustainable Development published an online “Environment Open Data” catalogue, currently comprising only 42 data sets, mainly provided by the ministry, and not updated since its creation. The National Institute of Statistics (INS) has also managed an environmental information system since 1999 (Plan Bleu, 2015), although it is not accessible online. The air quality monitoring network is managed by the national environmental protection agency (ANPE) and data concerning the regions of Bizerte, Grand Tunis, Grand Sahel, Sfax, Gafsa and Gabes have been accessible to users via a platform since 2018. The ANPE has created a water information system, the SINEAU, as part of a project piloted by SEMIDE, which will eventually comprise three sub-systems managed by the Directorate General for Water Resources (DGRE), the ANPE, and the Directorate General for the Organisation and Conservation of Agricultural Land (DGACTA). This information system makes Tunisia a pilot country in the approach proposed by the SEMIDE for the reinforcement of cooperation on water information systems in the Mediterranean. The monitoring of surface water and groundwater and the quality of the marine environment and bathing water is organised, managed and financed by different institutions, without the data being centralised and shared in a single information system. The current monitoring actions of the Coastal Observatory of the coastal protection agency (APAL) are primarily focused on risks (coastal erosion, pollution), coastal development and bathymetry. They normally feed into the SIAD, the data of which are not available online. Its action in terms of biodiversity currently appears to be underdeveloped: its project for the creation of a coastal ecosystem observatory has not yet taken shape, and the two main mapped networks established to monitor biodiversity (stranding of cetaceans; Kuriat Island turtles) are operated by the national institute for sea sciences and technologies (INSTM), with funding from the RAC/SPA. The INSTM is thereby the main player in the collection and analysis of coastal and marine data, thanks to its infrastructure (research vessel, seven coastal observation stations). It shares the data with the SEIS, the IODE, and MEDPOL, which makes the infrastructure the most integrated into international information sharing networks, while the OTEDD plays the role of focal point with the Plan Bleu, the UNESCO Man and Biosphere (MAB) programme, and the AEIN of the UNEP. The INSTM, with the Faculty of Sciences of Sfax, is also the main provider of data to the MEDACES (Mediterranean Database on Cetacean Strandings), as well as SeaDataNet [diagram 5]. Finally, it is the national oceanographic data centre of the IODE of UNESCO, and the focal point of GOOS Africa. Tunisia is thereby integrated into a diverse range of structures and international data networks [diagram 6], through the activity of the INSTM. It is part of the African Environment Information Network (AEIN-UNEP) which has been developing over the last ten years. Marine observation is also being rolled out through the ODYSSEA project, detailed below.

Central role of the INSTM in the collection and analysis of coastal and marine data

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Short-term funding which hinders the continuity and coherence of coastal and marine observation

Observation funding

Public funding of environmental observation comes mainly from the Ministry of the Environment and Sustainable Development, the Ministry of Agriculture and the Ministry of Health. They supply data to agencies which now play a key role (such as the ANPE, with an annual budget of between 2.5 and 10 million euros, and the APAL, whose annual operating budget in 2010 was 1 million euros), as well as institutes (INS, with an annual budget of 8.9 million euros, and the INSTM), whose infrastructure is essential for data collection. Finally, it is clear that the financing of the development and observation of the marine and coastal environment in Tunisia depends on international organisation programmes (Plan Bleu, RAC/SPA, EU) and development agencies, both national (AFD) and international (KOICA: Korea International Cooperation Agency). Financing through successive projects is identified

Diagram 6: Insertion of Tunisia into the main international marine data networks and structures. When the structure has an information system, its name is given between brackets along with a hypertext link to the data portal.
as a factor in the development as well as the instability of initiatives to put in place observation systems. It is necessary to work on developing observation in Tunisia towards less frequently studied areas (biodiversity, socio-economic data, human-territory relationships) while at the same time improving the networking of existing monitoring schemes. The OTEDD seems to be the best placed infrastructure to coordinate this implementation in the area of sustainable development, the APAL in the field of coastal development, with the support of INSTM infrastructure.

Observation structure scales

Environmental observation in Tunisia is mainly carried out on a national scale [diagram 7]. It operates through local agencies, such as the regional branches of the APAL coastal observatory and the eight coastal centres of the INSTM. This testifies to the relatively poor diversification of the structures which collect and construct environmental information and the rather loose networking of the territory. One structure should soon be operational on the scale of the Mediterranean basin: the Gulf of Gabes observatory, currently being set up as part of the ODYSSEA project described below. The Grand Tunis Urbanism Agency operates on a local scale, and gathers mainly socio-economic data concerning the urban development of the Grand Tunis District.

Focus on ODYSSEA

ODYSSEA is a project financed by the European Union (via the Horizon 2020 programme) in order to participate in the creation and networking of nine Mediterranean observatories in Greece, Egypt, Spain, Turkey and Tunisia. It has a budget of 8.4 million euros. It is specialised in oceanographic forecasting. It aims to supply existing data infrastructure (such as EMODnet, GOOS, Copernicus). The ODYSSEA Project was launched in Tunisia on 15 February 2018 in partnership with the APAL, for a five-year period, through the creation of the ODYSSEA Gulf of Gabes Observatory. The Gulf of Gabes accounts for more than 30% of Tunisia’s coastline, comprises several RAMSAR sites, the only coastal oasis of the Mediterranean, and the mouth of 12 oueds. A sizeable proportion of the country’s trawler activity operates here. This observatory must oversee relations between the health, fishing and tourism sectors. It functions with two components: a monitoring module (drones, lasers which can collect data from the water surface, the water column and the benthos of ODYSSEA observatories), and a modelling module, with an IT programme which will enable forecasts to be made. The project is notable for the dimension of its deployment of observation infrastructure (construction of an observatory), its coastal and off shore presence, and its networking dimension.

Scale of observation of the mapped structures

Diagram 7: Scale of observation of the mapped structures

5https://odysseaplatform.eu