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Background and introduction

This report is based on analysis that was developed under Work Package 8 of the MEDSPRING project « Policy, societal challenges and cooperation observatory ». After having identified a number of Euro-Mediterranean thematic observatories, mainly in the environmental domains, it was decided to organise a survey providing a comprehensive analysis of their functionalities, objectives and scope. The aim was both to understand the observatories' needs and roles in the regional Euro-Mediterranean cooperation on research and innovation and to examine the possibility to establish synergies between these and other actors of research cooperation in the Euro-Mediterranean (see deliverables D8.1 end D8.2).

The results of the catalogue of observatories and survey were presented and discussed in workshops organized in Paris, Beirut and Marseille, and in various opportunities offered by the MedSpring project. After examining the resulted yielded in these exchanges, it has been decided to focus on Water, in order to examine the issues raised in various opportunities by the Medspring project: what are the linkages between environmental issues, food security and energy? What should be the best way to tackle these issues? What is the role of environmental observatories? What are the needs of these observatories?

This permitted to organize the discussion in a meeting in Marseille where representatives from various observatories discussed these issues on the specific case of water. As a result, a typology of observatories was established and proposed to discussion. To further our knowledge about these structures, some additional interviews were conducted and a one week fieldwork in Tunisia permitted to visit a series of cases.

This report is based on all these results and presents some major trends we have observed and present some proposals to be be discussed by the European Commission and Mediterranean partner countries.

The issue : relations and collaborations between observatories

The aim of any observatory is to produce new data either by observing phenomena with the help of some device or instrument, or to gather (arrange and make accessible) data already collected. This activity is not only meticulous, difficult and time consuming, it depends upon the possible uses of the data. The difficulty does not lie only on the complexity of the tasks involved, but on the necessity to use (or define) standards that measurements will rely upon in order to make comparisons and usable data. These standards, correspond to uses that are projected for the data, and the possibility to integrate them in a coherent framework.

Small observatories, big questions

There are many reasons, from an organisational point of view that seem to be raised as strong motives for closer connections between observatories. First of all the *proliferation* of observatories. Moreover, many research units do observational work withouth being named observatories. Italian partners, a country that on the whole showed a low level of answers to

the Medspring questionnaire, explained that many units are in reality observatories that do not have this word in their title. The thing and the word do not correspond. Moeover, most observatories are a by-product of research, not a *sui generis* activity, neither monitoring units that do the continuous work of regular data collection. As a joke, some (French) people told us that "*les observatoires sont des machins français*" (Observatories are French things). The joke has its element of truth: most of the observatories we have identified are French-speaking, French or with a French partnership. This quantitative importance is probably related more to the importance of the French-speaking expertise in the Mediterranean. But it also relates to the fact that the French research system has been quite prolific in generating small structures dedicated to specific tasks.[1]

Observatories are well-fitted instruments when a specific domain or a specific issue is raised as important and needs to be identified as such. The creation of an observatory is thus raising the awareness on a specific issue.[2] The size of the observatory does not relate to the importance of the issue. For example, measuring pollution levels does not need to have very large infrastructures: it needs to have regular measurement.

Institutionally, observatories are complex from the point of view of governance, since they usually combine various institutions. They also pose an issue in terms of funding. The research system as a whole promotes projects, planned activities with a start and end date: by its nature, an observatory doe not fit easily this mode of funding, since it is created for the long run. Specific funding might thus appear to be necessary

In another, totally different field than the environment, the director of an observatory in Africa told us that funding was mainly possible because the English DFID had given a specific budgetary support: the unit is thus an exceptional observatory with an exceptional funding. Because of the need of continuity and long-term collection activity of the observatories, funders and research institutions find it more difficult to sustain than regular research activities.

Thus, institutions are willing to link observatories, in order to pool resources, spend less, be more efficient, verify their activity is not already done elsewhere. After having finished our survey, we were strongly convinced that this need is not felt in the same way by scientists or personnel involved in making and running the observatories. Observatories are not very expensive units, they tend to be specialized in measuring variables that are quite unique, they are embedded in the scientific world and thus, their promoters know the availability of data in their domains. It might be that management and organizational issues could be made more efficiently, but efficiency doe not relate to collaborations among observatories. In the survey, nobody raised the issue for better management —quite opposite result to surveys on international cooperation, where project management has always been raised as an important issue. The main reason that scientists raise for closer collaborations, is the need to integrate specific data, information, experiments into larger intellectual frameworks, in order to tackle

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[1] and giving them a legal existence without changing the legal status either of its personnel or of the funders and institutions that are promoting the structureExamples abound in this sense. GIS (Groupement d'intérêt scientifique) or GIP (Groupement d'intérêt public) are legal forms that allow to group people around an objective, receive funding and pay salaries, that is recognized legally but does not entail a change in the legal status of the institutions that fund and support them.

[2] Historically, astronomic observatories were

big issues like climate change, declining biodiversity, energy transition, food shortages, societal challenges due to globalization.

Epistemic difficulties are due to diverse uses of indicators and measurement

But at the same time, there are epistemic reasons (related to the science) explaining some of the reasons for the apparent difficulty to connect different observatories. Observatories, as we will see are not all using measurement of variables and defining indicators in the same way. This relates to their objectives. Indicators are necessary for policy discussions; measurement of specific variables, against an international standard is, on the contrary what research observatories will seek.

While it is easy to name variables against a specific standard on a specific issue like water quality, and thus have two similar measures in two different countries, it is much more difficult to define the way a common societal issue can be measured, even more so in a comparable way (for example when is it that water quality is bad or dangerous for health, what is an acceptable level of pollutants, etc.). This particular use —as well as the measurement itself —will need a standard to be defined and accepted, a task far beyond the reach of an observatory. In some case the observatory itself can set the standard (a rare case). Usually, standards and references that serve this purpose are usually international endeavours. Thus, observatories relate to each other through their relations to these standards.

More generally all the issues that relate on the scope and the size of measurement are difficult issues. As was reminded by one participant, this explains why it is advisable to separate monitoring observatories from scientific observatories.

Observatories are complex structures with multiples uses

In most cases, the observation activity continues even after the research project that gave birth to it has finished. Thus, observatories continue to exist after the research activity that specifically defined their aims and activities has disappeared. Nonetheless, they belong to some institutional structure that maintains them, either because some costly infrastructure is involved or because the same observatory is useful to further research activities.

Observatories are also infrastructures (or "info-structures") both in terms of observational equipment and because of the data management infrastructure. Thus, observatories belong to this rapidly growing information infrastructure that characterizes the knowledge society (Bowker); as such, observatories are embedded into a complex web of information and the scope of a single and isolated observation point may rapidly form part of a complex network of research activities and data gathering warehouses.

Finally, observatories have a direct linkage to policy, since indicators also relate to policy recommendations and needs. Many of these observatories have been specifically created in order to fulfil a policy objective or are used with such a purpose. As we will see this relation to policy is paramount.

It was thus necessary to try to understand if and how all these reasons, institutional, epistemological, scientific, affect the activities of the observatories and how they in turn relate

to the identified difficulty of cooperation that was identified very early in the project. The following pages present some of the main results on these questions.

An in-depth analysis of observatories

A qualitative survey was conducted in order to elaborate a more precise analysis of the activities of different observatories that were specialized in the Water resources. The survey data collected in the survey allowed to complete our previous knowledge based on a questionnaire survey, two specific workshops with stakeholders and a series of discussions and meetings inside the MEDSPRING projects or with scientists and actors that have been involved in science policy in the Mediterranean region.[3]

Based on the previous results, we drove a qualitative survey on the assumption that observatories in the Mediterranean region should be studied as *a sub-product of research activities*, which was the main result of the questionnaire survey. This means observatories were created in the framework of some research project, by research teams whose objective was to gather data and information, and elaborate indicators and variables that could be used as a common basis for their research work, and for the research community. This 'observation activity' wants to make data visible, and gather them since, very often, data on any given subject tend to be not only diversified but also dispersed.

Methodological choices

MEDSPRING in its WP8 « Policy, societal challenges and cooperation observatory », wanted to establish linkages between observatories gathered in the Mediterranean region. But before answering to this question, it was necessary to examine the way the ones already identified, could or want to establish linkages with their closer partners and other observatories. As was suggested by the Concept paper for this deliverable, five such observatories were interviewed, units that had accepted to reveal their partnerships and the way they established their collaborations. They were chosen because they worked on environmental topics that involved water, a major priority of the MEDSPRING project and for the Region. The five observatories have a particular linkage with the MEDSPRING project either as partners of the project or because they had assisted to meetings organized by the project (SEMIDE, Sahara and Sahel Observatory, O-LiFE, Air quality research unit, TUBITAK National Observatory). Additionally, it was decided to do fieldwork in one of the countries involved in MEDSPRING, in order to interview some research units/observatories involved actively in measuring, gathering, and disseminating results on the environment and in particular on Water.

Tunisia was chosen for this empirical work. The main reason is because of the involvement of Tunisian partners in the project (as well as in Euro-Med scientific relations) and because, in that country, we could identify at least one observatory in each of the three types that were identified by our previous analysis based on the Questionnaire Survey.

[3] The qualitative survey was completed in March 2017.

This report is mainly based upon the results of the three workshops (Paris December 2013; Beirut, July 2015; Marseille November 2015), interviews with five observatories (September-December 2016) and a field trip in Tunis (February 2017). It is useful to present the main characteristics of these observatories before explaining the trends scenarios that could arise out of this analysis.

Using the Results from the Questionnaire Survey

It is useful to remember here what we have learned with the first survey. It was a questionnaire survey and it included many questions concerning the creation, activities, organisation, and partnerships and the collaborations of the Observatories. (See D8.1 *Catalogue of existing observatories* and D8.2 *Update of catalogue of observatories*).

The majority of observatories that have answered were *Scientific Observatories* (19 units, 54% of the sample) and *operational services* (20 units or 25% of the sample). We have less representation among Observation stations, probably because these are related to some public research institution or to a network of units.

Categories	**Number of Observatories contacted**	**Number of answers**	**Number of Observatories contacted**	**Number of answers**
SO: Scientific Observatory	29	19	37,2%	54,3%
OPS: Operational Service	20	9	25,6%	25,7%
STO: Science & Technology Observatory	8	3	10,3%	8,6%
OT: Others	12	3	15,4%	8,6%
OS: Observation Station	9	1	11,5%	2,9%
Total	**78**	**35**		

Additionally, relatively few units answered in all countries. Most answers came from France. It is not a bias of the survey since France is also the country that hosts most of the observatories that were identified as the population out of which this sample was drawn (See *D8.1 - Catalogue of existing observatories*).

Most observatories under scrutiny have a national-level scope. Also most observatories are focused on water and very few of them on food or energy. As was mentioned in the introduction food and energy are relatively less a mater of interest. The Nexus, Water-Energy-Food could be thus a way of introducing Food security as a societal challenge to the existing observational infrastructure, although stakeholders in the meetings were quite sceptic about this possibility. Nonetheless, we observe that a majority of observatories are able to tackle many issues in a transversal mode.

Societal challenges or domain of interest	Number of Observatories contacted	Number of answers	% of contacted Observatories	% of answers
Transversal issues	23	15	29,5%	42,9%
Water	27	11	34,6%	31,4%
Energy	12	5	15,4%	14,3%
Science and technology obs.	**7**	**3**	9,0%	8,6%
Food	4	1	5,1%	2,9%
other	5	0	6,4%	0,0%
Total	**78**	**35**	100,0%	100,0%

It should be mentioned that data sharing is mainly done through databases (25% of answers) although all other means of dissemination and collaboration are mentioned (seminars, publications, exhibitions, …). The majority of the surveyed observatories declare to be a unique data producer (21 respondents on 36) and the half of the surveyed observatories (18 observatories) focuses its work on the Mediterranean observatories. The 22% of respondents produce instruments and methodologies but only another 22% of the total belongs to an international network of similar observatories worldwide. Data produced by respondents are mainly used in the policy field (19 observatories) and to a lesser extent for modelling occurring elsewhere (ex. climate data, hydrological data, etc.).

Observatories are rather unique institutional creations and relatively isolated from the rest of the world (only one fifth are part of a larger international network), producing specific ("unique") data, dedicated to the Region, is an unexpected result. Since research is the principal motive for these observatories, one could expect that the data and the integration in large scientific networks would be made available internationally. It seems that the regional or national specialisation is very strong. Nonetheless, after the qualitative analysis we will somewhat qualify this aspect.

Observatories geared toward data management but with little data sharing

Not surprisingly the academic world is the main end user of the data collected by the units that responded our survey. Within this domain researchers rank first, followed by students and universities. As far as concerns the policy world, national governments are the main end users for 20 observatories and international organizations for only 12 respondents. Almost half of the surveyed observatories declare to address also to the civil society. Nonetheless, this analytical response shows that three main types of public are all closely linked: academia, non-scientific bodies and civil society, governmental entities (national and international organizations). This 'triple nexus' is particularly interesting, and as we will see is very much depending on a specific nature of each of these Observatories.

A large majority of the interviewed Euro-Med observatories are a dependency or unit of a public university or a public research institute (30%). Another 16% of respondents represents an autonomous public institution or are born out of a specific collaboration agreement between two or more institutions. The number of observatories linked to the private sector is very limited. Thus we deal mainly with a population of *public entities*, dependent upon public funds, mainly geared toward academic and research needs.

Participation to cooperation agreements with partners' institutions is much more frequent in the Observatories from EU countries than in the MPC (respectively 65% and 35%). More intriguing is the fact that only 34% of the respondents belongs to a global network. The reasons could be the lack of instruments of collaborative work, the subestimation of the networking, a 'national-oriented'approach or a budgetary issues. This rather limited participation to global networks is crucial for the question that has been raised by MEDSPRING, which is the possiblity to enhance collaborations between research units, between obseravtories.

The lack of participation to global networks is counterbalanced by direct exchanges between researchers (20%), collaborative databases (16%) and networking through internet (15%). Sharing of equipment or staff and international collaborative teams are definitively not common among the Euro-Med observatories surveyed.

Finally, most of the budgetary expenses are related to databases management, which correspond to their main activity. The users of the data seem to be on average very few. Most of these obseravtories are fitted for a very specific purpose, and disseminate to a tiny portion of the research community, or report directly to a unique « client », for reporting and Policy needs. It should be mentionned, taht in teh interviews, the meetings and the exchanges we have had, all the Observatories have clearly recognized needs to share data and experiences for data management and networking. Nonetheless, a large portion of the data is proprietary.

We are far from a situation where data sharing and pooling of knowledge and know-how is common. On the contrary, we have small units, rather specialized, focused on specific dimensions (variables), with little contacts with the rest of the scientific community. They tend to be instruments in the hands of a main user (or consumer) of the data, usually a research team, institute or university or a public entity.

An initial three-fold typology of observatories

Based on the analysis from the survey data, after the second meeting in Marseille, an intense exchange of experience permitted to propose a typology of the observatories. It appeared thus that the population of Observatories, at least those present in our meetings and those surveyed by questionnaire survey, could be distinguished in a three-fold typology. We based our typology on two main dimensions:

1) the degree to which these observatories are close (or far away) from the measurement activity of some environmental variable;

2) the use of data in relation to policy-making (or modelling).

In this manner we were able to identify, in our survey, three types of observatories:

1. **Research Observatories.** We identify, under this type, observatories that are measuring variables on the ground; these tend to be either research observatories that measure a specific variable in relation to some research project, or some well established research institution. We do not include here operational units belonging to some public entity in charge of monitoring an environmental variable for policy purposes (see next category). Research observatories produce what could be called 'first level' data, or ground level data. They are equipped with specific instrumentation that allows this kind of measurement. They tend also to be the actual product of a research programme or project, and are usually serving mainly research purposes.
2. **Policy Observatories.** These are linked to a public policy need. They are directly linked to a public entity (Ministry of agriculture, Ministry of equipment, etc…) in charge of policies related to the environment. These observatories produce regular reports on the state of the environment and use the data provided by Observatories on the ground. They have a policy mandate, and they are mostly interested in documenting the state of the environment at a national level.
3. **Strategic observatories.** These entities reports usually at an international level and tend to be the place where plans and scenarios for future developments are made, such as SEMIDE or OSS. We find very few of them —which is to be expected— and some of these could be the place where international standards are set.

As we will explain later on, this typology fits perfectly the case of the countries examined here, but should be amended to include a forgotten actor: civil society.

Analyzing the Observatories: Interviews and Fieldwork

We will present briefly, in this part the main characteristics of the five observatories that have been chosen. We will not detail their activities here – it would not serve our purpose which is to test the hypothesis of a networking activity among observatories. We want here to recollect only some conclusions based on the experience they have had in organizational terms, and in realizing their objective.

Strategic observatories

Under this category we can include 3 observatories:

- SEMIDE / ENWIS (intergovernmental NGO – quasi-NGO)
- OSS (inter-governmental)
- O-LIFE (national coordination platform, research network)

Two of these strategic observatories are international organizations: SEMIDE (*Système Euro Méditerranéen d'Information* (or EMWIS : Euro-Mediterranean Water Information System) and the *Observatoire du Sahel et de Sahara* (OSS). SEMIDE is based in France while OSS is in Tunis. Both are international initiatives, both are managing database collections, and act as reference sources. EMWIS is of particular importance for Europe since it is a Euro-Mediterranean Partnership initiative. O-LIFE is a national initiative of the National research council of Lebanon (CNRS-L) within the framework of the French CNRS and IRD, and participation of various Lebanese universities. O-LIFE is very similar in its inspiration to the well-known LTER (Long term Ecological Research Network, created in the USA). It is

proposing the creation of a network of research groups (rather than institutions), integrating various disciplines. The observatory wants to execute research on specific sites.[4] In that sense, O-LIFE can be both considered a strategic as well as research observatory.

They use data that is provided by the observatories, research institutions, ministries in the water sector. They have quite an important technical activity that consists in creating reports (in the case of OSS), manage databases and geo-locational instruments, maps, etc. There is an important demand from member countries in technical terms. "*Each country that is member sees only what is its own interest"* have we been told. The budgetary effort has to have a meaning for the particular country.

SEMIDE has a strategic role, bringing stakeholders and representatives from official organisations to the discussions on issues pertaining to water. Universities and research centres cooperate also in the studies necessary for these activities. OSS, in a similar vein, has also a role of coordination on desertification. Academic institutions also participate with common work, as is the case of a recent report coordinated by OSS with the participation of IRD. O-LIFE, by bringing together all universities involved in research on the environment has also had a coordinating role, which is the main role of its parent institution, the National council for research in Lebanon (See Hanafi and Arvanitis 2016, chapter 4). A national coordination is necessarily of a different nature than an organization such as SEMIDE or OSS that needs to moderate international negotiations of various countries and institutions. O-LIFE is thought of as a *platform of coordination of projects,* on specific sites, with a an active network of partners. Nonetheless, it still means that there is some degree of diplomacy involved, and a balance between what particular partner might want and what the observatory can offer. Moreover, in the particular case of O-LIFE, since it is a joint cooperation venture between France and Lebanon, there is quite an important task in negotiations betweens different organizations and countries. This diplomatic function is not common to observatories; it relates to the particular nature of the strategic observatories that play a coordinating apart the sole issues of measurement and indicators.

A second role of the strategic observatories, is precisely their designing a strategy, or developing instruments that can facilitate their objective. "Strategic" here has different meanings : develop an overall strategy for a sector, place, country; develop projects that serve a specific strategy; setting-up the agenda. The partners and negotiations can have an important impact in choice of topics to work on. An interviewee was mentioning that partner countries didn't want to deliver data, but were willing to have a technical support for data management in their own country.

Agenda setting is important since thematic choices will influence future collaborations. For example O-LIFE chose three topics: Water, biodiversity and risks associated to anthropisation. SEMIDE has more a role in defining topics, not a unique topic, such as : participatory management of water, themes related to droughts, non-conventionnal water resources… Emphasis on one topic or the other depends on funding. OSS mainly works on droughts in arid zones and its existence is a priority by itself. It organizes project on two axis: Earth and Water. Its objective is to increase knowledge on droughts and water in arid zones.

[4] http://lternet.edu

A variety of projects, depending on funding and partnerships, are developed. The presence of OSS in various international meetings is the product of this strategy.

A third role is reporting to the users and the public. Curiously enough, the questionnaire survey was showing a rather narrow range of activities in the diffusion of results. We interpreted this lack of dissemination because of the particular nature of the observatories as units mainly linked to research. Their principal is then the data themselves that are used by researchers. But, as we can see, this is a limited view. For strategic observatories, this reporting is an essential activity, as is the case of Policy Observatories.

Data management and use is a fourth and very important role. In particular, the observatories have a particular role in harmonizing the data, managing the access to data, and the ease of use of the data. For example, OSS has now more that various series of data with a long time span. They work in seeking an easy format (excel) for the dissemination of the information. Something a bit different happens to SEMIDE which has rather a role in setting a standard, in providing professional help in creating harmonized data.

These Strategic observatories play a series of other roles (training, research, technical developments…) that are not specific to them alone.

All three of our Strategic Observatories are in favour of more cooperation and interconnection between them. None have mentioned any possible topic that would point to the Nexus Water-Energy and Food. Nonetheless, they do mention possible areas of common interest, all closely related to their own activities. For example, O-LIFE mentions risks related to human use of the environment, which could interest observatories in other domains than water.

OSS is rather in favour of the interconnection of existing observatories on water, but also insists, as SEMIDE, that no new structure should be created. In fact, there is a great number of actors in the Water area. Creating a new one does not seem to be a good idea. Additionally, in the particular case of Strategic Observatories, connecting to other actors in the water sector is part of their mandate, and the issue is rather insufficient funding rather than difficulties in connecting with other structures. The PRIMA 182 and ERANET MED initiatives are interesting programmes, according to the interviewees, that should allow the design of programmes specifically targeted for the Observatories. All of them insisted on the necessity to maintain an active networking activity, and the EC could contribute to this.

Policy Observatories

We name Policy observatories those units that produce regular policy papers, policy briefs or regular reports on the environment. They are usually an entity funded by the government in charge of illustrating by the publication of adequate information and indicators on the sate of the environment or of some specific aspect. The scope is usually national, and the purpose of the National observatories is the production of indicators and regular reporting of these indicators.

Objectif de l'*Observatoire Tunisien de l'Environnement et du Développement Durable* (OTEDD
• Suivi de l'état de l'environnement aux niveaux national et régional. • Développer et mettre en place des systèmes d'informations relatifs à l'environnement et au développement durable.

- Produire des statistiques et indicateurs sur l'environnement et le développement, notamment les indicateurs de développement durable.
- Assurer le secrétariat de la Commission Nationale du Développement Durable
- Contribuer par l'information à l'intégration du concept de développement durable dans les processus de prise de décision.
- Participer à l'élaboration d'études spécifiques aux différentes problématiques environnementales.
- Assurer le point focal national du Plan Bleu.
- Assurer le point focal national du programme MAB (UNESCO).
- Assurer le point focal national du Réseau d'information environnementale en Afrique (PNUE).
- Assurer le point focal national du projet MARCOST (REMPEC).

In our fieldwork in Tunisia we met with the *Observatoire Tunisien de l'Environnement et du Développement Durable* (OTEDD), the only National Observatory that we met dealing with water. There are various other national observatories in Tunisia and the other MPCs. There is also a unit inside the Agency for the Environment in Tunisia that manages a network on Water quality. This last one is not a strictly speaking a policy Observatory: it works on a limited geographical area producing new data on the quality of a small but important river that flows through the capital of the country. There are some more Policy Observatories in Tunisia, as for example the *Observatoire National de l'Agriculture* (ONAGRI), which is an important structure in Tunisia.[5] Also, concerning water, the Ministry of Agriculture in its Water Direction produces statistics concerning water; in other words, it is monitoring without having the name of observatory.

Outside the water and environmental sector, we visited the *Observatoire National des Sciences et des Techniques* (ONST), or rather what remains of it. ONST, which produced the first complete set of statistics on research and innovation in the country, as well as the first innovation survey, was set-up before 2011, and was dismantled quite rapidly under the Ben Ali government. It has stayed without any actual activity since 2010. The case of this Policy observatory is very symptomatic of the uneasiness with which governments have been when dealing with data. ONST and its director, Hatem M'henni, have been instrumental in evaluating the research policy of the government. Its has also developed a series of research lines, and provided material for interesting economic analysis for many Tunisian scholars.[6] Results of the research system were quite impressive in that country but not exactly along the lines of President Ben Ali's direction. In fact, the all "economy of knowledge" that was supported by the government and the World Bank, did not really translate in visible results in the data managed by the ONST. Very soon, the government decided to close this quite impertinent and independent structure that was funded by public money. One year later the Revolution had also been incapable of producing a roadmap for research and innovation (M'henni et Arvanitis, 2012).

[5] and also partner of CIHEAM.

[6] See for example the work done for ESTIME : (M'henni, 2006; M'henni, Ben Othman, Ghozzi, Ben Salah, et al., 2007; M'henni, Ben Othman, Ghozzi, Salah, et al., 2007; Gabsi, M'henni et Koouba, 2008; Arvanitis et M'henni, 2010)

The story of ONST shows a fundamental weakness of a Policy observatory dependent on the government. The ONST was initially considered as an autonomous structure, like is OTDD today. Nonetheless, concretely most expenses were covered by the governmental budget and thus independence cannot be guaranteed. To our knowledge, there has been only on effort in MENA countries to create an independent Policy observatory, in Morocco, dealing mainly with bibliometrics.
The central activity for a Policy observatory is to produce indicators, that is statistical (or numerical) data related to some issue. Environmental indictors are not yet as standardized as in economics (something that happen in that later field because of the post-war creation of a statistical apparatus for the reconstruction of Europe (Godin, 2005).[7] The interpretation of an indicator should be left to the user, although in itself, the indicator is based on some underlying vision.[8] Additionally, as far as policy matters are concerned, indicators relate to some policy objective (availability of water, quality of water, etc…), less in he explanation of these trends and objectives and more concerned in providing figures that can document these tendencies.

What the interviews reveal, is that there is great difficulty in producing these indicators, far beyond the sole technical difficulties. Most problems relate to availability of data, since these observatories rarely produce original data. In most cases, the data comes from some official source (for example the Ministry of agriculture in Tunisia). This connection of the unit producing the indicator with the institutions producing the data is of strategic importance.

Yet, in practical terms, these Observatories have to secure funding and are in the obligation to formulate projects in order to obtain external funds. They also need to formulate projects because of their 'natural' clients, that is the users of their indicators. In the case of OTDD, as in most Policy observatories, specific reports are produced on the environmental issues, as well as an annual report on the State of the environment.

The practice of a regular "State of the Environment" is well established common in Tunisia, although it is not a simple task. The development of specific reports on environmental issues appears to be also frequent. The nature of these publications is unclear: are they scientific publications. Are they public reports expressing the position of the public administration on policy issues? In that case, who's opinion do they reflect? In more practical terms, this kind of publications is essential for the observatory to show the product of its activity.

It should be that what we call here Policy observatories corresponds to the French category of Operational observatories (See the 2001 *Rapport sur les observatoires pour l'environnement*,, by Balland et al.). They are in charge of "helping public action and public policies, […], indicating the state of the environment […], and evaluate the performances of the different aspects of the national policy of prevention of pollution and the environmental management" (p.10).

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[7] The Frascati Manual, for example, relies on a vision of the research system as input-output system, with a rather linear view of the connection between research and application
[8] Irwin Feller, well known economist, studying the relationship between performance measurement and science and technology policies, was recently calling for great care in the use of indicators, in particular by keeping in mind the historical process of institutionalisation (Feller and Gamota 2007).

Research observatories.

The vast majority of the observatories are related to research and have had a strong component of measurement of variables used in the building of indicators, but also in feeding models and scientific hypothesis and theories? The driving force of these observatories is research itself.

In this report we do not wish to detail all aspects related to the topics that were discussed concerning these research observatories. They can be of very diverse nature, such as for example the small Air Quality observatory in Lebanon which was a collaborative venture of two research units in two different universities (AUB and Saint-Joseph), or the large Antalya astronomical observatory which is serving more than 300 astronomers and various foreign researchers. In between, the array of possible organisations is quite wide

Because of the high costs engaged in the creation and maintenance of research observatories, in some cases one observatory can have national reach. This is the case of astronomical observatories that serve all scientists in the country. The Antalya national observatory is quite illustrative of this case. It is a national observatory which serves to all scientists, not only in universities but also in research institutes in Turkey, and with foreign scientists.

In Tunisia we had the opportunity to see an observatory that is a collaboration of French and Tunisian researchers, called OMERE, that is working on the effects of pesticides on agricultural production. The observatory takes its name because of the very long chronologically series of data that are gathered, on a great variety of variables but on a very restricted site (limitation due mainly because of cost). Also a comparison between parcels in France and in Tunisia is underway. The observational project in this case is rather the product of joining two research teams in 1994, working in Tunisia for many years. Around this initiative, a series of projects are developed. The instruments used wer funded by French and Tunisian funds. The observatory, located in Kamech (Port Bon), is now integrated into the larger network of research observatories in France. Moreover, as the majority of research observatories in France on the environment, this small observatory will be integrated into a large European network of observational sites, called eLTER (an H2020 project, under Environment Agency Austria coordination) —again on the model of the US LTER. Part of the management difficulties this small observatory encounters relate to difficulties in the partnerships between European and North African teams, not relate to the status of a Research Observatory.

As was reminded by an official in charge of French infrastructures, research observatories have usually complicated governance schemes, since they rely on a variety of different research institutions. A large network of observatories would necessarily include numerous institutions from different countries. The governance issue is not a simple one, and relates also to the capacity of attracting funding. Research observatories are no better than any usual research team in writing projects, submitting them and obtaining external funds.

Participatory observatory

In our fieldwork in Tunisia, we encountered what can be called a fourth type of Observatory, namely **Participatory observatory**. This is the case of the Participatory observatory on water in Tunis, which is mainly an internet-based platform that permits citizens to monitor the state of water installations and provide support to those who need to identify possible accidents in

the water distribution. Since the Revolution in 2011, civil society is very active in the South Mediterranean countries and citizens ask for a more intense participation in decisions at the local level concerning drinking water management, waste management, waste-water installations, usually at a municipal level. As an interviewee in Tunisia mentions:

> La politique publique n'a pas anticipé cette vivacité. Les gens au pouvoir ont laissé s'accumuler les problèmes. Comparé à la France qui met en place des mécanismes de la représentativité (exemple : mise en place du tri sélectif), on n'a rien de comparable ici. Mais en Tunisie, il y a un grand nombre d'associations qui relaient la parole citoyenne.

A large number of NGOs have been created and they tend to be active in these issues that affect directly the lives of urban and rural populations. MEDSPRING has already shown the need of active participation of the civil society through the AGORA. Similar mechanisms should be encouraged in MPCs. Of course, the possibility of citizens to express their engagement not simple and in itself constitutes a political act (Ben Néfissa, 2002). Urban and local affairs can be managed at this local level, and empowering citizens in managing the water resources is a necessity. As researchers from CERTE, in Borj el Cedria Technopole mentioned to us, there is a need to relate with the experience in European countries and in setting standards in Water management issues.

Indicators

As part of WP8, we examined the possibility to have a list of common indicators, considered as the minimum that should be examined if a consortium of observatories was to be created.

Topics	Indicators
Water resources	1. Water availability
	2. Mobilisation (dams, karst, ...) and collection techniques
	3. Use of available water
Water quality	4. Physico-chemical analysis of water
	5. Biological Water Analyses
	6. Hydromorphological (cashing)
	7. Quality of wetlands
Water uses	8. Access to drinking water
	9. Sampling (extractions) (total and by sector: domestic, agriculture, industry)
	10. Unconventional waters and desalinated water
Water monitoring and management	11. Monitoring Capabilities (Observatories of the Budget, number of water stations, ...)
	12. Order or self-referral
	13. Investment in Water Infrastructure

Table 1 - List of common indicators selected by EuroMed Observatories

It was planned to obtain a fact-sheet of each observatory in order to see missing data. These fact sheets amount to a listing of available data. After some exchanges, experts from the field mentioned that this listing of available data has no meaning outside a context of its use by other entities. It was thus recommended to rather define the adequate indicators that would fit a networking project. Such a project would include among its tasks the cataloguing of the available data and appropriate indicators. In effect, the knowledge needed for such an exercise is rather specialised, and thus should be left to experts in the field.

Small observatories might benefit from an integrated framework, rather more needed than specific lists of indicators:

> …des indicateurs sur un petit bassin versant, ce ne serait utile à personne. Si on était un réseau, peut-être que ça pourrait avoir un sens parce qu'on aurait plusieurs points sur tout le pourtour méditerranéen et on pourrait imaginer avoir un certain nombre de données de base même si c'est des petits points à droite à gauche, ça peut peut-être donner des informations intéressantes.

We should mention that O-LIFE has already begun this definitional work, not only on water resources. There was a rather encouraging collaboration, mainly among French and Lebanese partners in this project. OLIFE is very much an experiment, as well as strategic platform. In a similar vein, the already mentioned eLTER project (Integrated European Long-Term Ecosystem & Socio-Ecological Research Infrastructure) is following similar methodology. Observatories, in such a framework can seek an appropriate framework for more intense relations with partners in research.

Trends

'Trends and scenarios' refers to a projection in the future. Trends need to be drawn out of the empirical basis. Concerning the water sector, the environment, the nexus between food-energy and water, and more generally the challenges, (threats and opportunities) concerning the relations between the EU and its neighbours, there is plenty material. Medspring, itself, has produced valuable arguments through its AGORA and through the experts meetings (EMEG). What we would like to tackle here is a bit different: what are the trends concerning the observatories of the environment (mainly Water). We will base these trends on the exchanges we have had in the meetings and interviews.

Multiplication of observatories

If one refers to the publications, we can see a first trend: the growth of observatories in the literature. A simple interrogation of the Web of Science, on the period 1990-2016, with the Words "Observatory" and "Mediterranean" yields 254 records[9]

[9] The interrogation was limited to SCI-Expanded on Topic ad Title search : (Mediterran* AND observato*) OR TITLE: (Mediterran* AND observato*), years 1990-2017. Naming the countries yields few more publications (in total N=268), except for Israel and Turkey (N=162)

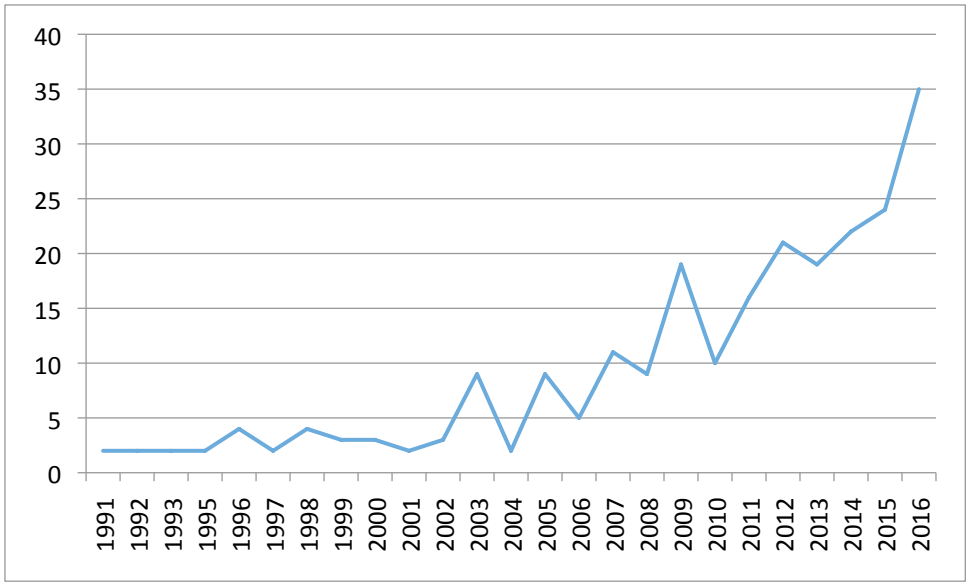

Figure 1. Number of publications explicitly mentioning an observatory in the Mediterranean Region (Source: Web of Science, 1990-2016)

These figures permit also to see the increase of activity of observatories in the environmental sciences. Before the beginning of this century, observatories were involving mainly astronomy and geosciences. Since the year 2007, we see a large number of environmental interests and social issues. In other words, the mere number of issues relating to the environment that rely on measurement and data analysis are clearly increasing. The survey that was done by WP8 of MEDSPRING has clearly identified this tendency, including the appearance of social sciences observatories (not only in demographics). It should also be noted that the traditional agricultural sciences have been included in work relating to the environment, the climate, energy and food production.

A clear change appears after years 2003-2007, and since 2011 a growth of the number of articles. Focusing on South and East Mediterranean countries, the term 'Observatory' has become more common and relates to a large variety of scientific fields (See figure N°2).[10]

The environment as main topic of collaboration

Obviously this database and the kind of question that specifies countries and regions is favouring natural sciences based on locational aspects. Agriculture, water, and environmental issues probabaly are over-represented. Health sciences and social sciences are less well taken into account in this figure n°2. Nonetheless, it very much looks at the same domains as those that project ERANET MED had identified after analyzing the cooperation programmes taking

[10] Including Turkey and Israel would increase Astronomy (N=77). The proportions would be the same in Geosciences, Geophysics + Geochemistry (61), Meteorology (15), and all other domains would have the same distribution as above.

place in the MPC and European countries (D2.2- *White paper on strategic areas on cooperation for joint activities,* project ERANET MED, October 2013).It is also consistent with an in-depth bibliometric analysis of international research collaborations between European countries and MPC. Hanafi and Arvanitis (2016, chapter 2) showed that the EU has profoundly influenced the international collaborations of MENA countries, raising environmental concerns at the forefront.

Interrogating the same database (Web of Science) on the expression "Euro-mediterranean" yields 404 articles, mainly in the political sciences (and/or international relations), meteorology and atmospheric sciences and a series of environmental sciences. The documents in political sciences, economics, sociology are clearly linked to analyzing policy issues and societal challenges. This is a remarkable result, given the fact that WoS is not covering satisfactorily the social sciences. Interestingly, the growth of the publications dealing with "Euro-Mediterranean" questions coincides exactly with the growth of the word "Observatories" with a clear increase after 2007. Today approximately 50 articles are registered in this database every year on the 'Euro-Mediterranean', mainly from political sciences. But we observe a disconnection between the two bodies of work, those based on 'Obseravtories' and those mentioning the Euro-Med. In effect, only two documents among the 304 on observatories mention the word "Euro-Mediterranean" and among the 404 documents mentioning Euro-Med.

Thus, we can say that the discussions in the MEDSPRING project were very exceptional in terms of contents, since they tried to bridge these two interests, and seeking to define a framework for the environmental issues related to water, energy and food and policy matters.

Water: an hyper-saturated policy space

Water –or lack of— has been clearly the most frequently and debated topic in all work published in the last ten years.[11] Nonetheless, we have to mention also a change of nature in the discussions about water. Indicators of quality of water, and not only the monitoring of water resources in quantitative terms, are sought. In Tunisia, this question has been raised by the Agency on the Environment, and it has been shown to be a difficult task to set-up an observatory on the quality of water. Moreover, the usual hydrological authorities, like the Ministry of Agriculture in Tunisia, are ill equipped to tackle this question of quality. They lack both the equipment and the necessary science, since the issues concerning pollution and quality do not relate directly to the quantitative availability of water. Monitoring a new variable is thus particularly costly at the beginning, since equipment, training and political willingness need to be mobilized. Moreover, water management and policies concerning water are a fertile ground for examples of mismanagement by the pubic sector. As we already mentionned, water has been an area of citizens mobilisation in Tunisia with the creation of the Participatory Observatory of Water. Similar and numerous experiences have taken place around the Mediterranean (Dugot 2006) ; the necessity to raise awareness and a "water culture" has been already stressed, for example by the MELIA project (Laureano et al. 2008).

In terms of policy on the water sector, one can identify two different types of initiatives: on the one hand, UNEP, and the Action plan of the Mediterranean, which Plan Bleu is part of; on

[11] An analysis of Moroccan science production in the Agricultural sciences clearly confirms the importance of water and agriculture. See Zebakh S., Arvanitis R., Boutracheh and Saddiki (2017).

the hand, the Euro-Mediterranean policies, related to the Neighbourhood policy and UfM. The pollution plan on water pollution called H2020 (not to be mistaken with the Framework plan) was one such instrument. Although the main focus is the sea, when looking at pollution sources, solid waste, residual urban water and industrial pollutions are concerned. In a policy that is based on hydrological basins, these issues need to be taken into account. Additionally GIZ has also a policy that promoting bilateral cooperations between Germany and Mediterranean countries. Local regional agencies in charge of water in some countries have direct linkages with European Water Basin Agencies (France, Belgium…).

Some time ago, an analysis of the framework of research cooperation agreements showed the Euro-Med is a saturated political space (Arvanitis, Rodriguez et Zoheiry, 2013). Based on the above observations, we can add, that concerning Water policies, the space is even more saturated. There is a clear need for coordination, and any initiative that could permit to establish some hierarchical choice would be of great benefit.

Lack of statistics and indicators

Statistics on Water at the Euro-Med level are notoriously insufficient. The statistics programme called MEDSTAT, backed up by Eurostat, has had some influence on international statistics inside the framework of ENP policy, although data produced are too few and, in some cases largely insufficient (for example on droughts, annual data are not necessarily the best way to monitor needs in water). The general tendency has also been to leave the purely quantitative approach in order to go towards a more qualitative approach. It should be noted that on Water, like in Science and Technology; MENA countries have a tendency to express lack of confidence on statistical data, for various reasons (see Arvanitis, et al. 2013): in the very end we are lacking data on the research systems although all Mediterranean Partner countries have been claiming the need for such data (see Hanafi and Arvanitis, 2016, chapter 1). Data on the Environment are still very diverse and lack a common framework. It might be that the eLTER project could join needs and concrete stations.

In any case, it seems that observatories wish to overcome the possible dispersion, but not necessarily on an exclusive domain, but rather on a more open research problematic that includes various aspects of the environment.

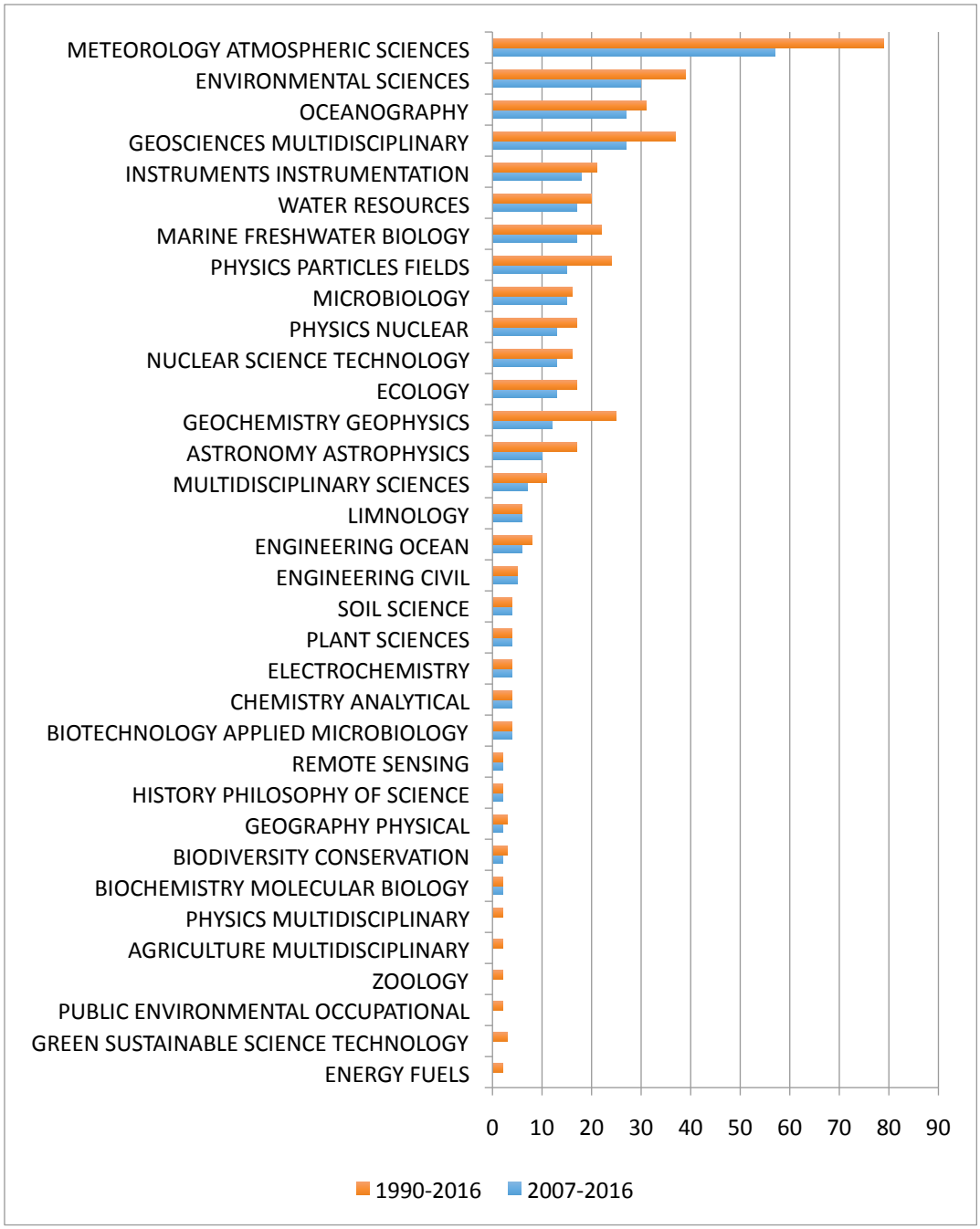

Figure 2. Domains Involved by the Euro-mediterranean Observatories

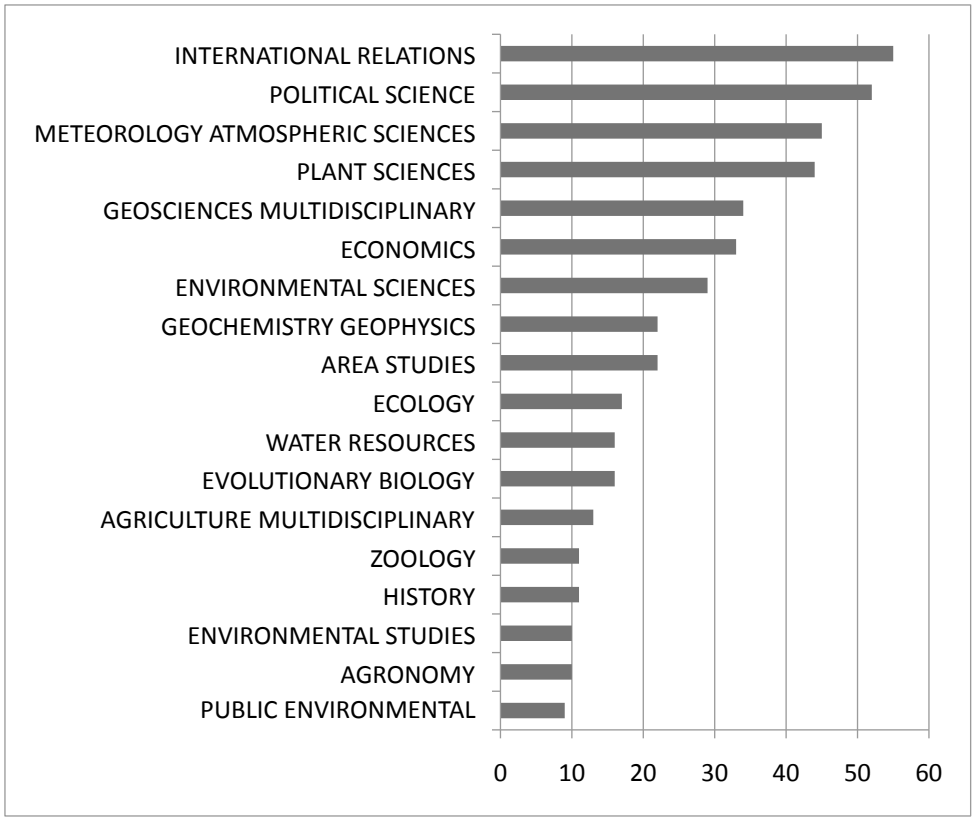

Figure 3. Domains involved by articles mentioning the Euro-Mediterranean relations.

Conclusion : Main challenges faced by the environmental observatories

The initial question this report wants to answer is the *possibility* to knit closer relations between observatories. As could be expected, there is no simple answer to this question. The reflections collected in the WP8 of MEDSPRING reflected a certain ambivalence concerning the possibility to inter-connect Observatories on the geographic basis of being "Euro-Mediterranean". The minutes of the last workshop organized in this Work package mention:

> Participants agreed on the fact that observatories have to be considered as research infrastructures and do not have to hesitate to submit proposals under national, European or international calls dedicated to research infrastructures. Through the White Paper EuroMed Observatories must convince EU institutions through the ESFRI, the European Strategy Forum on Research Infrastructures, that a network of observatories could be part of the Research infrastructure. (D8.7 Meeting Minutes)

Relations between observatories should also serve some practical purpose and not be the simple result of an institutional arrangement or a temporary incentive. A project like MEDSPRING offers an opportunity for this to happen, although, in the two meetings, no representative of an observatory offered a specific and concrete need that could be defined as the main motive for closer common collaborations. In the following lines we offer some material on this riddle: why does it seem so difficult to define the objectives and activities

involved in a closer collaboration between observatories, when, at the same time there appears to be fertile ground for this?

Observatories are supposed to be light organisations. Whatever their orientation, they always have been designed in relation to some very specific purpose: produce a report, monitor a variable, feed a scientific experiment. Interconnections with observatories should be thought of not because of a technocratic need for efficiency, which would inevitably oblige these structures to grow and consolidate, but because of a scientific necessity. The option then is not vertical growth but rather larger integrated ('horizontal') networking.

It should be quite clear that our main concern here is about *Research observatories*. A very different approach should be taken for Operational observatories, or *Policy observatories*, that need to be supported mainly in terms of capacity building and enhancing the level of competence of the structures.

Participatory observatories should be promoted through programmes that raise awareness on environmental issues. They should also play a much more important role in the future if they are integrated in crowdsourcing schemes, or community-based research. Europe should be very attentive to this new tendency for participatory research, mainly in Maghreb countries.

Some dangers are also clearly visible. We detect a possible change in the nature of the relations of the observatories in the dissemination to some 'client' of the data produced. The possible commercial use of data is politically difficult issue to tackle. In the Mediterranean region, because of the nature of the observatories, these issues have rarely been raised. Most such observatories are public entities, linked to a public research institute or a Ministry. Some rare instances of private consultancy companies or quasi-public unit will appear. The public paradigm (producing public data, 'open source' and getting support from public institutions) is the main model. What could happen if we enter a different scenario where Observatories become quasi-commercial entities, selling data they collect and manage on the market. Obviously, if data collected has value, there will always be already large companies interested in doing the commercial part of the business. The market for information is already there, and big data is the name of the business. For the time being, the observatories in the Mediterranean have not been sensitive to this threat (or opportunity?).

This issue is closely related to the open source movement. Whenever data becomes comparable, it acquires a value well beyond its initial purpose. Scientists and actors that need this information should try to be partners rather than "clients" of some observatory. The scenarios here will be either the coordination of the very large networking will occur through cooperative agreements and complex, heterogeneous and 'messy' collaborations, or through market mechanisms.

In all cases, whether we enter a market dominated by private actors or through public entities, data will need to be made accessible; meaningful and usable. WP8 raised this issue a bit too early in the project, in the first meeting on indicators, showing the complex work involved in producing the necessary metadata in order to disseminate and use data, even within the scientific domain.

We want to remind MEDSPRING, that the EU is funding a very large data project called RISIS (risis.eu), which aims at producing an infrastructure on data relevant for research and innovation dynamics and policies. The project RISIS is an example of possible responses to

the need of producing sound and meaningful data: it entails the creation of a scientifically sound demand for data ! To do this, one needs to tailor the data to the possible users, answering questions these users might need to raise. By selecting datasets, enriching the data, developing open platforms of data management, creating harmonised references, facilitating interconnections and integrations between heterogeneous datasets.

In the meanwhile, between the public paradigm and the commercial paradigm appear a series of possibilities. NGOs, small companies, private-public partnerships, cooperative companies, academic units backing-up some stat-up or commercial valorisation company are all possible actors. What seem to new is the engagement, advocacy and critical stance of researchers and citizens working with the environmental issues.

The issue of the interconnection should not solely be thought of as a mere need for more financial support. It is necessary to design a collaborative strategy that gives the opportunity to social and economic actors engaged in the data management business and research to define the new uses of environmental data.

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ANNEX 1 – Concept note concerning the Trends and scenarios report

D8.9 — Report on trends and scenarios (M54)

In order to establish possible synergies, we decided to follow a different method to identify common areas of interest. The indicators meeting (Marseille, November 2015) showed that even if could gather all observatories in a same domain, or on a similar societal challenge (e.g. water), the same differences (scope, range, inputs, constituencies, outputs...) will persist. In fact, we need to identify *not only a common domain* but also define *a common focus on objects/variables that are observed*. By focus we mean the reason (the object and reason to measure it) for which a particular indicator is measured. Based on the survey we suggest that there are three "levels" of focussing :

- *Focus on variables* (the percentage share of groundwater in the abstracted water) that are measured on a routine base and can feed both research and policy, but need an equipment, on the ground stations, specialized personnel, etc.
- *Focus on indicators* (water quality) that are meaningful for national policies or that illustrate policy issues at a national level;
- *Focus on standardization* and comparability issues related to the uses and circulation of data and/or *indicators* (international databases, prospective and comparative analysis).

Observatories also differ on the uses of the data and in organizational aspects that are very meaningful (international organizations, national units, research units, data gathering units).

We suggest to exploit the results of the survey and delve more in depth on these differences, and discuss the results with the observatories in two different moments:

- During interviews;
- When discussing the draft of our analysis, that will be the first part of the final deliverable (Trends and scenarios, D8.9).

We suggest to interview observatories that were voluntarily present in the meetings of the project: SEMIDE, Sahara and Sahel Observatory, O-LiFE, Air quality research unit, TUBITAK National Observatory.

Interviews will also allow to interrogate each observatories on collaborations and the need for collaboration, in a more qualitative and in-depth manner, that is only feasible in private face-to-face interviews.

This method would be in the continuity of the previous work. It allows to follow-up and enrich the material and information gathered so far through the two surveys and the meetings.

The final objective will be to describe some scenarios (or recommendations) concerning the possibility to consolidate collaborations among observatories.

ANNEX 2 : PRIORITIES OF THE FRENCH ALLIANCE ON THE ENVIRONMENT

Allenvie, the French alliance of national research and academic institutions, has elaborated a document that identifies priorities for research in the Mediterranean region. We list these priorities as well the last priority *in extenso*, that relates directly to observational activities in the Mediterranean region:

Research priorities

Allenvie identified 3 areas of research, and varios strategic objectives.

DOMAINE DE RECHERCHE 1 : Connaissance et gestion des écosystèmes, des ressources et des risques

- Objectif stratégique 1.1 : Compréhension des processus physiques, biogéochimiques et sédimentaires en méditerranée et évolutions

- Objectif stratégique 1.2 : Connaissance (et préservation) des écosystèmes méditerranéens terrestres et marins

- Objectif stratégique 1.3 : Préservation des ressources Eau et Sols

- Objectif 1.4 : Risques naturels et risques d'origine anthropiques

- Objectif stratégique 1.5 : Soutenir la gestion intégrée de la mer et des littoraux

DOMAINE DE RECHERCHE 2 : Agro-écosystèmes productifs durables et sécurité alimentaire

- Objectif stratégique 2.1 : Assurer la sécurité alimentaire régionale

- Objectif 2.2 : Systèmes de production et de conservation innovants (quantitative et qualitative)

- Objectif stratégique 2.3 : Contrôle du risque biologique

- Objectif stratégique 2.4 : Filières agroalimentaire

DOMAINE DE RECHERCHE 3 : Vers une croissance bleue et durable

- Objectif stratégique 3.1 : Pour une approche éco-systémique de la pêche

- Objectif stratégique 3.2 : Développer une aquaculture durable en Méditerranée

- Objectif stratégique 3.3 : Accroitre la sécurité de l'exploitation des ressources énergétiques

- Objectif 3.4 : Connaitre, mesurer, modéliser pour comprendre, évaluer, gérer

Objectif 3.4 : Connaitre, mesurer, modéliser pour comprendre, évaluer, gérer

Pour le développement de réseaux d'observation et d'alerte, l'intégration des données environnementales pluridisciplinaires et l'accroissement des capacités de recherche en sciences marines et maritimes de la méditerranée.

Contexte : La méditerranée pose des défis scientifiques particuliers dans le domaine de l'observation et de la modélisation par la grande diversité de ses écosystèmes (gradient entre côtes eutrophes et large oligotrophe) sa circulation thermohaline de grande échelle, les impacts croissants de pressions anthropiques multiples et denses même en mer ouverte ainsi que l'intensification attendue des effets du changement climatique. Eurocean, le centre européen pour l'information sur les sciences et technologies marines, entretient une base de données sur les infrastructures de recherche marine, qui couvre notamment les pays européens et Israël. Même si les moyens existants dans ces pays sont conséquents6 ils restent mal répartis ou redondants. Il existe aussi un déséquilibre entre les pays du nord et ceux de l'est et du sud de la méditerranée en matière de partage des données et des connaissances ; les capacités de prédiction à partir de modèles restent trop fragmentées et peu disponibles pour les pays du sud. Plusieurs projets de nouvelles infrastructures de recherche sont en cours dans le cadre de l'ESFRI7 européen (notamment EURO ARGO) visant à combler les lacunes.

Champs de recherche associés :

- Renforcer les réseaux d'observations supra nationaux intégrant les mesures et les réseaux de surveillance à la côte et au large issues de multiples plateformes in-situ et spatiales pour le développement de modèles prévisionnels. Conforter la bancarisation, la rétro modélisation et le partage des données.

- Développer un réseau d'observation et d'alerte sismique temps réel adapté au contexte spécifique méditerranéen.

- Renforcer la capacité des installations expérimentales aquacoles pour contribuer à la diversification des activités, notamment en matière d'espèces élevées.

- Développer des modèles intégrateurs prenant en compte de multiples dimensions (physique, climatique, biogéochimique, biologique, écologique, économiques...) et leurs interactions.

- Renforcer l'utilisation partagée des installations de recherche, y compris la programmation commune des navires, l'interopérabilité des véhicules sous-marins ainsi que le déploiement et la maintenance de systèmes d'observation. Au-delà, favoriser le développement de visions communes pour les futurs investissements stratégiques et le renforcement des capacités en mettant l'accent sur la convergence nord-sud.

ANNEX 3 - List of Interviews and visits for this report

In France (phone or visits)

Éric MINO, SEMIDE
Mohammed BLINDA, Observatoire du Sahara et du Sahel OSS
Marinella Gianelli and Virginia Belsanti, CIHEAM – IAMB
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List of Interviews in the Fieldwork in Tunisia

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Arbia Ben Othman , Observatoire des sciences et des techniques, Ministère de l'Enseignement Supérieur et de la Recherche Scientifique (MESRS)
Christian Leduc, , Institut de Recherche pour le Développement (IRD)
Insaf Mekki, Institut National de Recherches en Génie Rural, Eaux et Forêts (INRGREF)
Alaa Marzougui, Observatoire Tunisien de l'eau
Mohammed Blinda, Observatoire du Sahara et du Sahel (OSS) and 5 young engineers
Marie-José Elloumi, Agence Nationale de la Protection de l'Environnement (ANPE)
Samir Kaabi, Observatoire Tunisien de l'Environnement et du Développement Durable (OTEDD)
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Olivier Grünberger, Jérôme Molenat, Damien Raclot, Guillaume Coulouma et Denis Feurer, IRD
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