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Elaboration and test of indicators for monitoring the local Mediterranean coast initiatives concerning integrated management

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Abstract: The evaluation of public policies applied to shoreline management is a relatively new approach. The European Directive of Strategic Environmental Assessment (SEA) was transposed into French law in 2001, during which the legislator has stressed the need to put the tools into place to evaluate management approaches. The article addresses this topic by presenting the development of a method for evaluating the dynamic management of the coast. This method, taking support on different dimensions of integration, is used by the integrated management of the coastal zones. Thus, the six indicators that characterize it provide information on (i) the multi-purpose approach, (ii) the inter-institutional coordination, (iii) the proper use of knowledge, (iv) the multi-scale approach, (v) the stakeholder participation, and (vi) the taking into account of sustainability. Hence, the methodology approach was adopted and tested in five sites of the Mediterranean French coast, with five groups of stakeholders representing (i) the services of the State, (ii) the local administrations, (iii) the professionals from the private sector, (iv) the civil society and (v) the scientific experts. Besides the results, this article focuses on the methods to develop and implement such approach and discusses its advantages and limits of application regarding a possible generalization to other cases on the coast.

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1. Introduction

The measures for the Integrated Coastal Zone Management (ICZM) developed by international organizations such as the UNEP Regional Seas Programme and also those represented by FAO regarding the ecosystem approach to fisheries or even those of the ICZM Recommendation of the European Union, to mention only those, have stressed the importance of having indicators to assess the impact of human activities on the coast and to track changes of the state of the marine and coastal environment. The system, in turn, measures the efficiency of ICZM approaches in terms of improvement of the management in these areas. The European guide DEDUCE (DEDUCE consortium, 2006) insists that "*literature and practical experience have shown the need to develop indicators to assess the performance (execution) of ICZM approaches*". According to the guide," *it is increasingly necessary to evaluate the efficiency and the influence of European, national and local coastal policies, particularly regarding sustainable development*". The evaluation of management practices on the shoreline or public policy in general is an essential element, recognized by most utility managers and decision-makers. However, it is a relatively complex approach that needs to adapt to the new context of ICZM and sustainable development in particular. Indeed, *"the inclusion of the sustainable development requires an adaptation of the methodologies of assessment of the public policies so as to be able to, in particular, "prove" their integrated and joint character"* (REY-VALETTE & ROUSSEL, 2006).

At the national level, the costal integrated management approach is involved in the land management policies in support of the implementation of management tools (LAFITTE, 2008), to be more specific: SCOT, SAGE, NATURA 2000, regional natural parks, the Conservatoire du Littoral sites, environment contracts etc.. Such approaches call upon different dimensions of integration which are precisely the subjects of the proposed evaluation method. Thus, the purpose of this method is to evaluate the way in which costal management tools, regarding the principles and the steps of an ICZM process, are implemented using a system of indicators that declines six integrating dimensions . This form of the evaluation of public policies has been conducted with various stakeholders involved in the management process through surveys and interviews.

This is the result of a study conducted as part of the Framework Convention established between the Rhone-Mediterranean and Corsica Water Agency and Ifremer (Mediterranean Centre) on "*Indicators for monitoring the operations of integrated coastal management*" (LAFITTE, 2010).This study is pertinent because "*to assess the steps already taken for Integrated Coastal Zone Management*" ranks high in the Blue Book of the Grenelle de la Mer. Regarding the spatial planning, "*to give a truly integrated territorial planning tool*" is also one of the commitments of COMOP n°6 (GRENELLE DE LA MER, 2010). The two main axes that structure this article are (i) the presentation of modalities of elaboration and implementation of such a method and (ii) the discussion of its advantages and application limitations .

2. The method of monitoring and evaluation: step by step

The purpose of the study is to evaluate the manner in which the coastal management tools are implemented according to the principles and steps falling within a process of ICZM and to translate them more specifically in terms of index or ICZM degree , applied to any given management tool.

The measure of this ICZM degree resorts to a system of indicators declining six dimensions of integration.

The methodological approach involves three main phases which address successively (i) the qualitative approach expressed in terms of prerequisites, (ii) the quantitative approach which brings into play the mechanisms of the information construction and (iii) the approach to the diagram block of the results.

2.1 The prerequisites for the qualitative approach phase

They provide the necessary materials for the methodological development of indicators, prior to their actual development.

2.1.1 Study sites

The study sites are five in numbers and they belong to the three administrative regions of Languedoc-Roussillon (one study site), Provence-Alpes-Côte d'Azur (three study sites) and Corsica (one study site). They correspond to the same number of management tools to analyze.

The "Bay Contract" tool is singular in the sense that it is based on a voluntary approach and partnership. This is an interesting tool because it is a management tool which, in these circumstances, is well adapted to coastal management.

The case of the "Nature Reserve" is interesting because it gives priority to environmental protection. With the evolution of the pressures on coastal areas, this tool seems to be able to adapt and to reconcile the issues of protection with a moderate development of water activities.

The case of the "Natura 2000" sites is also interesting to study because these perimeters are the source of the term "management plan" which is set up on the Mediterranean facade. This is the case for the three sites studied in the PACA region: the Cap d'Agde, the bay of Marseilles and the Littoral des Maures. The implementation of these management approaches is the result of the detailed consultation and the stakeholder involvement. Thus, the Objectives Document (OD) diagnostic tool and guidance for the management of Natura 2000 sites attempt to reconcile the best possible protection and development requirements of areas under its definition.

It is noteworthy that the history of the site is an important aspect because the analysis of the current approaches has been developed in recent years and so will be more complete. Therefore, this will benefit from a certain background. In terms of service, the

analyzed public policies have an average of five-year existence (except for the Scandola Nature Reserve which has been in existence for thirty-five years).

2.1.2 The management stakeholders approach

They are grouped into five categories corresponding to different representative colleges of the chosen land management stakeholders. The choice was made to adapt these categories to those associated with reflection choices from the Grenelle de la Mer. It must be pointed out that the representatives of the stakeholders in the ICZM process should be qualified according to the specificities of the area and its issues.

The category of "managers/decision makers" includes elected officials from local communities. They often appear as central stakeholders. Their role, except the decision-making, also depends on their ability to unite, promote and undertake a project at a territorial scale (regions, departments, municipalities ...).

The "State representatives" (prefects, decentralized government services...) and the related administrations of coastal management play a major role in defending the public interest and in ensuring the compliance of international commitments and communities of France. With the will of decentralization, the role of the state should be more and more focused on arbitration, technical support and regulation.

The "socio-economic representatives" involved show the multiplicity of guidelines and activities in coastal areas. They are a group of important stakeholders regarding the analyzis of public policies and we must see how these local stakeholders are involved in the management process and how they perceive the managers' decisions.

The "technical and scientific experts"(academics, specialized engineers, researchers...) must produce knowledge and specific data that feed the ICZM process. These experts contribute, with their opinions, to enlighten the public powers and they also help in decision-making.

The "civil society" category includes citizens. They can be represented through different associations of users or of environmental protection, for example. This group of players is essential to any process of integrated coastal management.

For each analyzed public policy , five identified colleges were interviewed. Actually, it is essential to have a representativeness as homogeneous as possible to obtain the most objective view possible. In total, 40 people were interviewed, that is, 8 per site on average, with a majority in the categories of managers and professionals.

2.1.3 The indicators and the evaluation criteria

Six in number, these indicators are intended to measure the actual effects of the implementation of a public policy under the ICZM principles. These principles are expressed in six variations of the integration which is the "red line" of this analyzis. These are (i) *horizontal integration* that informs on the related level of management system considered, (ii) *vertical integration* that focuses on the level of the coordination

between institutions concerned by the use of this system, (iii) *the integration of knowledge* that exposes the intervention level of knowledge in decision-making processes, (iv) *the spatial integration* that evaluates the relevance of management schemes, (v) *the participatory integration* that determines the level of participation of the stakeholders involved in the management, and (vi) *the temporal integration* that shows the projection of management actions over time. Even if an approach (GOUDEDRANCHE & GAIGNON, 2006) has been proposed for the evaluation of ICZM projects DIACT / SG Mer 2005 *"For a balanced development of coastal areas by ICZM"*, there is currently no consensus or standardized method for the construction of a system of indicators for ICZM.

The evaluation criteria for each of the indicators are in the form of *questions* asked in interviews to the representative of each of the five colleges that are related to the integration dimension concerned. These criteria are organized in a table respecting an order that insures the optimal course of questions during the interview. They are the result of our personal reflections and of a study conducted by the Commission Environnement Littoral (CEL, 2002).

2.2 The construction of the information in the quantitative phase

2.2.1 Detailed scoring system

The second phase deals with the construction of information on each indicator.

This forward-looking work aims at collecting information which is not of statistical nature, but rather of qualitative nature relating to a given situation. However, it is mathematically possible to treat this type of indicators. According to a methodological guide (COUNCIL OF EUROPE, 2005) "*an indicator can always be expressed by a number, whether qualitative or quantitative*."

It must be noted that at first and for more simplicity, the choice was made to assign the same weight to all indicators and all colleges.

Reliability was enhanced by asking the objective questions that allow the person to gradually identify the problem as well as interrogating a sufficiently representative sample of the population.

The information gathered as a result of hearings conducted for the five colleges allowed to assign a rating to each criterion which leads to an overall score for each dimension of integration (see Figure 1). If the response approaches the "optimal ICZM" initial set (an ideal of coastal management to strive for), the maximum score is assigned to it. The more the answer is distant from the initial optimum, the lower the score. The scale is the following: 0 (no integration), 0.5 to 1 (low to medium integration), 2 to 3 (satisfactory to good integration). Each criterion is marked and the average ("Total" in Figure 1) is then marked out of 5. This is an arbitrary value which is a scale of indicators' assessment.

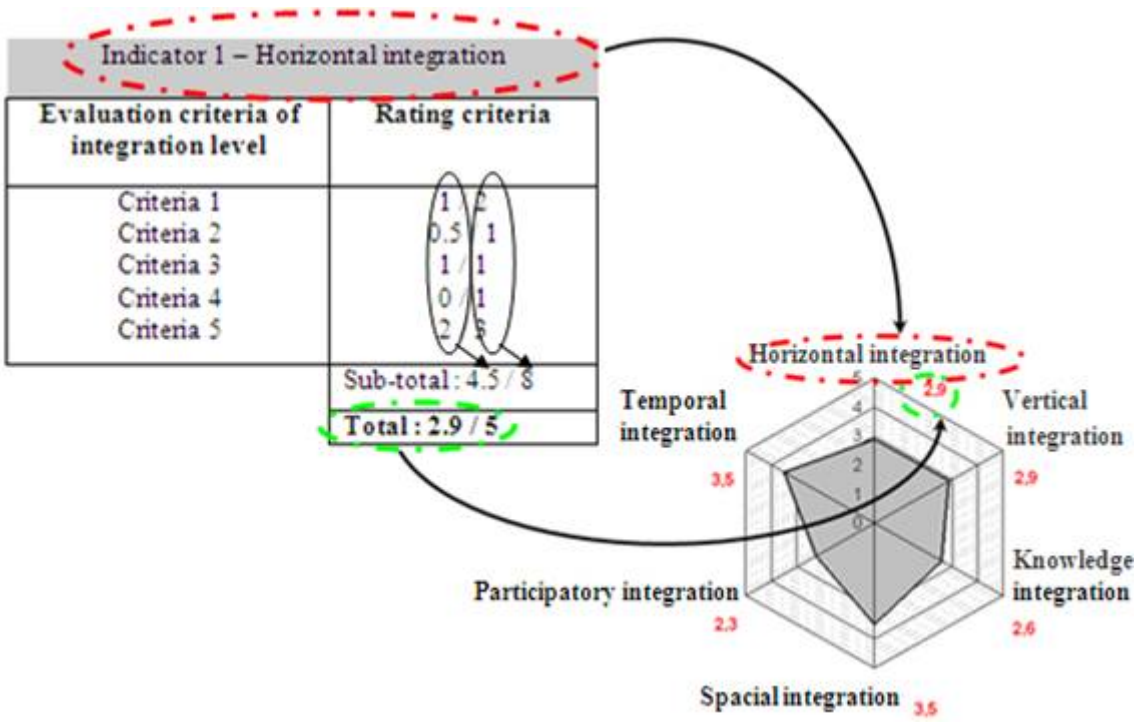

Figure 1. Illustration of the rating system.

The rating of an indicator always results from the statistical treatment of a certain related number of criteria. The number most commonly used is the average. In this case, the choice fell on the use of simple averages of the ratings. The calculations of probability show that in any relatively homogeneous set, the greater the number of the variables, the more reliable the average is. Increasing the number of criteria is one way to increase the reliability of the indicator. Therefore, the evaluation criteria used for each indicator ranged from 8 to 19. Such a difference reflects the fact that there was not enough material to list new criteria and to balance out the indicators. This is particularly important for the qualitative indicators that have been developed.

2.2.2 Elaboration of surveys to provide information for the indicators

The choice to proceed with survey among different groups of actors appeared as the best suited solution to our approach regarding the types of data we desired. The questionnaire and survey are two essential elements of the approach. The questionnaire is of "oral" type and the survey is of "face to face" type or "personal interview survey" (document UNEP/MAP /SMAP III PROJECT, 2006)".

The survey remains the method of preference to collect data because it is more effective to improve the quality of the collected information.

This makes the exchange very interactive and obliges the interviewee to stick to the subject. Response rates are usually much higher than those obtained from other types of

surveys (by telephone, email or mail). Our way of proceeding contains two stages. The first one consists in targeting the most representative persons for our approach and arranging a meeting. The second step is the interview through the questionnaire. The fact of meeting with representatives of various colleges in interviews allowed us to obtain almost complete qualified criteria for indicators. Thus, in addition to each site analysed, a collection of the comments of the interviewee has been formed to fully justify the awarded scores. Note that the surveys, indicators and criteria have not been reviewed after each interview; the idea being to have the same basic questionnaire for analysis. The survey lasted an average of 1h30 (45 minutes for the fastest and 3 hours for the longest). The average response rate at the end of the 40 interviews was 90%.

2.2.3 Processing of the surveys

The first level concerns the observations of the respondent. During each interview, all remarks or comments made by the interviewee were recorded. The comments made on the use of the study, the methodology and the indicators were stated. It was therefore possible to write a perspective on how respondents perceived the survey regarding its form and substance. This is a valuable feedback. The second level describes the perception of the interviewer. After each interview, the interviewers expressed their own perception on the survey, function (role and place) of the respondent in the interview and its behaviour (in relation to his personality).

2.3 The visualization of the information through the block diagram

2.3.1 A 6-axis radar (one by indicator) schematically materializes all the values obtained by a college for a given site.

Each value is attached to its range of variations with the minimum and maximum values. The report card summarizes the results (see Figure 2 and Table 1) for the six indicators for each public policy analysed.

2.3.2 A location map of study sites: a reference state in 2010

The final product of restitution is a panoramic map across the Mediterranean coast (see Figure 3). It allows viewing the spatial positioning of analyzed management policies and their characteristics thanks to a pivot table "indicators / group of actors." The results are represented using a colour code assigned to each indicator on the scale from 0 to 5 of "radar", to distinguish low (values from 0 to 3), moderate (3.1 to 4), satisfactory (from 4.1 to 4.5) and excellent levels (4.6 to 5).

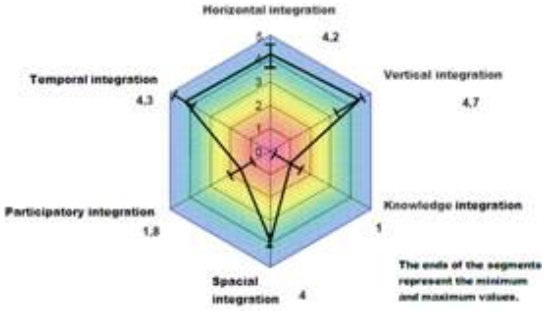

Figure 2. Hypothetical example of the representation of information in "radar" according to the five colleges and six indicators.

Name of the public policy analysed	State representatives	Local managers (managers + local authority)	Socio-economic representatives	Civil society	Scientist experts
Horizontal integration	4	4.8	4.2	4.2	4
Vertical integration	4.3	4.8	4.1	4.8	4.1
Knowledge integration	1.2	2.1	2	1.4	1
Spacial integration	4	4.1	4.8	4.1	4.8
Participatory integration	2.1	2.5	1.3	1.1	1.2
Temporal integration	4	4.1	4.2	4.8	4.6

Value of share classes

4.6 to 5 : Excellent
4.1 to 4.5 : Satisfactory
3.1 to 4 : Moderate
1 to 3 : Low

Table 1. The different hypothetical perceptions of representatives of the five colleges on each of the six indicators.

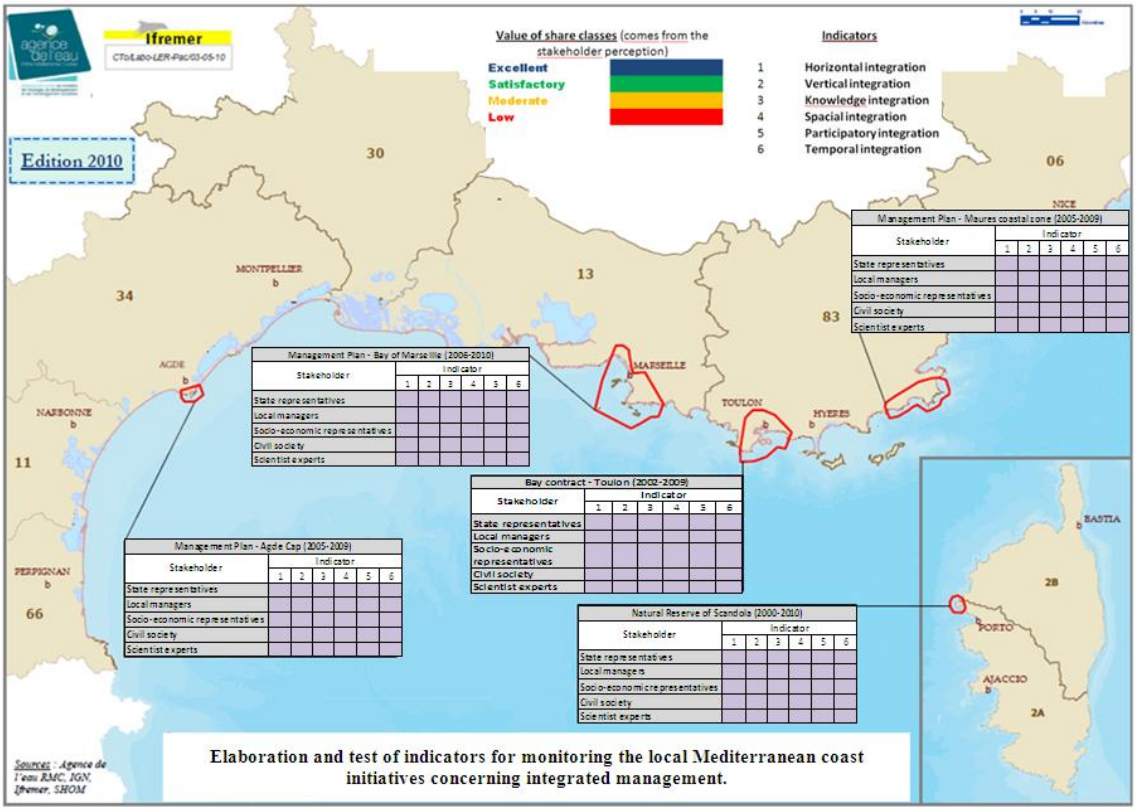

Figure 3. Dashboard of results for each analyzed public policy.

3. Discussion

3.1 The advantages of such an approach

This assessment highlights the strengths of these approaches but also the factors that limit the integrated approach in the public policies. The interest of this study is to provide a feed-back to the managers, based on the perception of a number of local actors to know how their management approach in an area is perceived by the latter. The idea is to eventually give insight to the managers of the weak points in order to improve them and also of the strong points in order to maintain or strengthen them and therefore, to reach a truly integrated management of the areas concerned.
Thanks to the six indicators defined and the various criteria for evaluating the level of ICZM, an initial assessment of management tools was possible. This approach appeared to the majority of those interviewed to be an interesting one and also necessary. According to their statements, to assess the relevance of the management method is useful because it is important for the administrators to ask themselves the following question: *"what has been done and what remains to be done?"*
Through this study, it was a matter of studying the local application of a management tool. Thanks to this method, an initial working basis emerges to analyze the implementation and how a management tool is set up in a territory. Most of the interviewed persons had mentioned also the following: *"The interview allows the respondent to plunge into the public policy to which he is confronted daily. Your study also enables all interviewed persons to submit an opinion."*
One must point out that this approach is applicable and reproducible on different sites.

3.2 The limits of the approach

3.2.1 On a formal content (the answers collected and the interviewed colleges)

The choice of schematic representation and final synthetic form of six angles "radar" presents the risk that readers will only retain the illustrated conclusion.
This representation is nevertheless useful to illustrate and propose a synopsis of "the ICZM level" results tool. Some managers have stated: *"the radar vision which will be released in the end is interesting because we can get an image of how our actions are perceived."* However, this representation is not the most relevant. In fact, although the extremes are represented graphically by segments, it also shows the average on the aggregation of the result. Thus, we should not simply be limited to this sole presentation. This is why the perceptions and comments of different groups of stakeholders interviewed are essential for more discernment and understanding of material for these "radars".
Regarding stakeholder groups on all five study sites, perceptions varied among colleges. Thus, the "State" college is the most satisfied by the set up management, followed by the "managers" and "scientists". "Professional" colleges and "Civil Society" are the more reserved on the integrated nature of the considered management tools. To conduct a relatively complete and balanced analysis, it is not possible to set aside a college with

the risk of skewing the results significantly since each group of stakeholders has its own vision.
It is essential to consider what position the interviewee occupies. Take an example of the "Civil Society" college; the vision will differ from interviewee: a nature protection association, recreational boaters or hikers.. The same conclusion can be drawn about the professionals. In fact, depending on what they do, fisherman, diver, operator of passenger boats or director of a shipyard, the expectations and their points of view will be different. This is not directly taken into account in the proposed approach.
The attitude of the representatives is also an important aspect to consider. Whether the interviewee is favourable or not to the applied management policy will inevitably lead to differences in responses that will affect the rating. Thus, for the same question, on the same object, we will have two separate answers. The evaluation of the implementation of a management tool is strongly related to the perception of each individual.

3.2.2 On the substance issue (the indicators and the criteria)
Although having tried to vary the sources by interviewing one candidate from each of the five colleges, focusing on only one person is probably not enough to obtain exploitable statistics. One person per college is sufficient in the sense that this person chosen is the most representative of his college for the site being analyzed. For example, for the college of "scientific experts", the president of the scientific committee, coordinator of a multidisciplinary team, was interviewed. However, this is compensated by interviewing more than one person per college (numbers are planned initially). Also, note that the purpose of this study was essentially methodological.
Two elements have also emerged regarding the perception of managers on the proposed method. First, it concerns a difficult task that requires a synthesis of a certain number of years of experience in a relatively short period of time (during the interview). The second issue is that this approach seems rather academic. *"We must fit inside boxes while the answers we give must always be nuanced."*
Concerning the criteria, they are not identical in number among the six indicators. This results in a lack of reliability and equality between them in terms of scoring. In fact, a distinguishing criterion will have a greater impact on the sum of all criteria when these are few in one indicator. In other words, the score of "0" will have greater impact on the indicator 1 *(horizontal integration)*, which consists of 8 criteria, than on the indicator 3 *(knowledge integration)*, which is composed of 19 criteria. Another point concerns the ambiguity of certain criteria. The nuance between two questions is not always obvious. It is also why that face-to-face interview is partly necessary. This also helps to explain what we are trying to focus on in the questions.

Moreover, it was found during the interviews that some criteria are more oriented towards managers. Thus, for a lack of related knowledge, other colleges are not able to answer the question.

Finally, despite the bibliographic work and construction of indicators, it is possible that some important elements for the analysis of ICZM have been omitted. This is why the following question is posed to all the interviewees, *"Do you think one or more important aspects of this evaluation have been omitted?"* and only 5 out of 40 interviewees answered "yes" and then gave their opinions.

However, despite these remarks, the attempt to make the questions as exhaustive as possible while covering most of the fields with 84 criteria, allowed us to conduct a first evaluation process of public policies on ICZM. To illustrate this, some interviewees made the following comments: *"The indicators have covered the management issues well and the questions (criteria) that you asked are also relevant."*

4. Conclusion and recommendations

It seems difficult to propose an identical analysis frequency for all the sites to the extent that each one of them has its own unfolding. What is valid for all policies is that the annual analysis seems somewhat irrelevant. In fact, the evolution analysis of practices and ways in which managers manage the space are difficult to measure in short term. However, conducting an analysis to compare two situations on the same site on a scale revision of the management plan appears to be more severe and meaningful in terms of advanced results.

Targeted sampling for surveys is essential because of the perception management approach in place of the interviewees who provide the results. Since the analysis focuses on the local management approach, it seemed more appropriate to insist on the perceptions of managers and professionals. It is then proposed to interview at least one representative from each of the professional fields of coastal areas concerned and one or more managers, the number depending on the structure.

Perceptions of other colleges, including "scientific experts", "civil society" and "state services" are also to be taken into consideration. The number of their representatives may be smaller (one or two).

The representation of the results "in radar form" is an aspect already discussed within the methodology limits, but it is recommended to systematically combine the results of this representation with the table of results and the one with the colour code table displayed on the dashboard.

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