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Strategies and Tools for Stakeholders and Endusers: A Learning Curve in Progress

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Abstract

The paper examines how to shift the emphasis in research projects, from 'academic' on the shelf results, to useful 'hands on' results that could be immediately taken up by stakeholders and endusers alike. A detailed outline is presented on how the SAGE (1992) methodology, which is focused on water resources, can be extended to cater for the planning and management of all environmental resources. Crucial to the topic of this paper, the approach shows how to effectively take into consideration the role and attitude among different stakeholders, their respective interests, actions and also their perceptions towards the environment. The paper describes how the initial experience gained in a previously completed INCO research project, RESMANMED is used to guide direct contacts – through individual meetings and joint workshops - with stakeholders and endusers from the very start of two further INCO research projects, COLASU and OPTIMA.

Introduction

The issue of making the results of research projects effective and useful is at the present time rightly reaching critical awareness especially with the great emphasis put on stakeholder and enduser involvement in EU sponsored research projects. IRMCo has for several years been attempting to develop **methodologies and tools** that would shift the emphasis from 'academic' on the shelf results, to useful 'hands on' results that could be taken up immediately by stakeholders and endusers alike.

This paper describes IRMCo's ongoing learning curve, a process which started from its first INCO project in 1997, and is continuing with two other INCO projects, one which started in 2002, and the most recent starting in 2004. What the three projects have in common is that they are developed (or projected to be developed) in a GIS environment and they each address the stakeholder issue, be it at varying and increasing degrees of their involvement. Moreover, a thorough understanding of existing policies and environmental laws in the countries of study is also a common denominator. The latter with the objective to better allow the drawing up of effective guidelines and recommendations.

In the first INCO project, RESMANMED([1]), IRMCo explored and adapted the SAGE methodology.

The SAGE Methodology

The 'Schéma d'Aménagement et de Gestion des Eaux' (SAGE) developed in France in 1992, offered a new planning and management approach to water resources and their use, based on the concept of decentralisation. Its innovative character, when first published, lay with the emphasis on a process of extensive dialogue among legislators, planners and endusers.

This methodology was first applied by IRMCo in RESMANMED (1997-200), and focused on the special fragility associated with coastal karst environments. In this project, a logical step-by-step application of the SAGE philosophy was introduced towards the end of the project in relation to the special vulnerability of the karst island of Gozo.

In this project, the initial diagnosis of the state and use of the Island's resources was coupled with the outcome of a **role and attitude survey** among the different actors, aiming to analyse their respective interests, actions and also their perceptions towards the environment.

Since the RESMANMED project is completed, it is here more thoroughly described.

Objectives of the RESMANMED research: Gozo Case Study

Gozo, the second largest island in the Maltese archipelago with a surface area of just over 65 square kilometers, was selected as one of three study areas for the EU sponsored INCO-DC research project on 'Resource Management in Karstic Areas of the Coastal Regions of the Mediterranean'.

The main objectives of the research were:

- to produce an inventory of environmental resources for selected coastal karst regions in Malta, Turkey and Lebanon;
- to identify the institutional structures in these countries and to evaluate existing policies for resources management;
- to devise and validate integrative methodologies using information management tools such as GIS and remote sensing; and finally
- **to formulate sustainable resource management strategies that can be used to respond effectively to identified development needs.**

Each of these objectives must be seen in relation to the specific conditions and requirements posed by a karst environment, whereby the term karst refers to the landscape associated with Mediterranean karst terrains, the guarigue and maquis habitats, the unique solution subsidence features such as caves, sinkholes and dolines as well as to the ability of karst aquifers to store vast quantities of freshwater. It is generally accepted that karst environments are very fragile and therefore merit special attention in relation to any form of human activities.

Application of the SAGE philosophy

It is worthwhile to start with a review of the various requirements necessary for a correct implementation of the SAGE philosophy to meet the targets that were set for

the Gozo Case Study. The philosophy was developed in relation to a single resource only: water and its use. Clearly, this needed to be extended in the RESMANMED project to cater for the whole range of environmental resources, i.e. water, soils, forestry, biodiversity, karst heritage and their respective uses.

Secondly, as can be expected, SAGE defines the hydrological basin as the basic territorial reference unit. The precise perimeter of the so-called Local Water Commissions is then further refined through the identification for example of smaller catchment areas with specific, common characteristics, difficulties and needs. Although an in-depth discussion on the selection criteria for the "optimum" size and boundaries of these local commissions is beyond the scope of the present paper, it follows that a similar, "suitable" territorial reference unit was needed for the Gozo Case Study. Here, the term "suitable" translates into the requirement for these territorial reference units to be truly representative of a coastal karst environment.

The innovative character of SAGE lies with the incorporation of a process of **extensive dialogue among decision-makers, planners and end-user groups.** Each of these so-called "actors" is represented in the local commissions, which are then responsible for the elaboration and implementation of a local water planning and management scheme. Until these commissions are actually formed and operational, SAGE recommends the preparation of a preliminary planning and management scheme by an **informal steering group,** whose additional task is to create favourable conditions for the eventual introduction of the methodology. The latter observation provided a most interesting starting point for the adaptation and extension of the step-by-step approach described below.

A step-by-step approach

The logical sequence provided by SAGE, shown in Table 1, has been maintained with a single adaptation: **water is replaced by all environmental resources**.

Table 1 Logical sequence provided by SAGE (1992)

Step 1	State and use of environmental resources
Step 2	Global diagnostic
Step 3	Trends and scenarios
Step 4	Selection of strategy
Step 5	Outputs
Step 6	Final validation

Step 1 State and use of environmental resources

The first step essentially translates into a data collection exercise and was started with the drawing up of a comprehensive list of parameters that can be used to describe both the state and use of the environmental resources. As an example, information on the geology includes an appraisal of the quality of the different limestone formations as a

construction material such as gravel or building stone. Existing limestone quarries are identified, together with their depth of excavation / elevation above the groundwater table. Socio-economic data such as the volume and rate of production and the number of employees are also needed. It proved most useful to also keep track of the source of the data collected (e.g. map, field survey, aerial photograph); the scale; as well as to store an indicator for the quality of the data (based on age, completeness and reliability). This first step permitted the production of an atlas of environmental resource state and use maps.

Step 2 Global diagnostic

This step involves a two-fold diagnosis. The maps originating from the previous step facilitated a detailed compatibility analysis, i.e. a comparison of the adequacy of the present use of the various resources with their capacity to sustain such use. In many cases, it was possible to establish a direct link between past human activities and the 'condition' of the resources today. Centuries' old rubble walls, delineating field boundaries but more importantly providing adequate terracing, have been ill-maintained in the recent past, which could be easily demonstrated by superimposing the present day soil erosion map.

In parallel to the above diagnosis, another type of diagnosis is carried out, the so-called diagnosis of the axis "actors**". The objective is to identify the role and attitude of the different stakeholders**, facilitated through the use of two different matrices or spreadsheets. In the first matrix, shown in Table 2, eleven actors (public entities, local residents, farmers, developers, environmental researchers etc.) which are relevant to the Gozo Case Study have been listed in the same order in both horizontal and vertical direction. For each combination of two actors, i.e. for each cell in the matrix except the diagonal, it is marked whether their respective actions present either synergy, marked "+" or conflict "-" of interest. A neutral position is marked "0". Not surprisingly, it proved extremely difficult to assign such marks without referring to a particular type of development and its associated impacts. For this reason, as described further below, the actual use of this first matrix was found to be more relevant at a later stage.

In a second matrix, shown in Table 3, the actors are again listed in the same order in the vertical direction. The horizontal direction however, is now reserved to indicate whether their **respective actions or interests represent an attitude of conservation or one of aggression** towards the environmental resources. This was achieved by repeating this question in relation to actions that concern the protection of the resource through protective measures, the use of the resource for recreation, overexploitation of the resource, the generation of pollution and (as the most aggressive type of action) the alteration of the environmental resources.

Several classes were introduced for the filling of this matrix, ranging from very weak to very strong. For this second type of matrix, it can be easily understood that it proved necessary to build a matrix for each of type of resource as well as in relation to a particular development.

Past/Present Situation of Environmental Resources

Table 2 The matrix actors - actors

Actors / Actors	Planning Authority	Other Public Entities	Local councils	MTA[1]	HCEB[2]	Local residents	Tourists	Farmers	Devel-opers	Leisure Industry	Environm Research	NGOs
Planning Authority												
Other Public Entities												
Local Councils												
MTA[1]												
HCEB[2]												
Local residents												
Tourists												
Farmers												
Developers												
Leisure Industry												
Environmental Researchers												
NGOs												

Strongly Convergent = + +
Convergent = +
Neutral = 0
Strongly Conflicting = - -
Conflicting = -
Not Consulted = ?

MTA[1] = Malta Tourism Authority
HCEB[2] = Hotels and Catering Establishment Board

Resource :_____

PROTECTIVE **AGGRESSIVE**

Actions / Actors	Resource protection measures	Use of resource for recreation	Over exploitation of resource	Pollution generation	Alteration of environmental resource
Planning Authority					
Other Public Entities					
Local councils					
MTA[1]					
HCEB[2]					
Local residents					
Tourists					
Farmers					
Developers					
Leisure Industry					
Environmental Researchers					
NGO's					

MTA[1] = Malta Tourism Authority
HCEB[2] = Hotels and Catering Establishment Board

Table 3 The matrix actors - actions

Step 3 Trends and scenarios

The analysis of trends and the drawing up of, intentionally chosen, very contrasting scenarios provides the next logical step. In the SAGE philosophy, this particular step is designed to provide essential information for the next two steps, i.e. the selection of strategy and the formulation of guidelines. In the strict sense, the application of this step depends on the availability of historical records, i.e. it requires the availability of time series of the data collected during the first step. Obvious scenarios would then make use of an extrapolation of any trends that are noticed. The collection of all data related to the present already amounted to a mammoth task, since very few of the data information requirements proved readily available. Hence, both time and financial constraints did not permit to cater for an analysis of trends. To overcome this difficulty, it was decided to adopt the following alternative approach.

By selecting a few, major developments carried out in the recent past, it was possible to assess the impact of these specific developments on the different resources. Even more importantly, it became possible to fill in the matrices described above.

The very rapid urbanization witnessed during the past 15 years of Xlendi village has been driven by a demand for tourist accommodation during the summer period. The village is equally popular with Maltese holidaymakers and hence the village has been growing at an exponential rate. There are virtually no local residents, giving the out-of-season visitor the impression of entering a ghost town. The urban extension has occurred to a large extent along the roads leading into the village, providing a linear development pattern. Due to the local topography, first roads and today also houses have been built along one of the island's most scenic valleys. Another development, Fort Chambray, one the island's unique historical monuments, is the object of a controversial conversion into a major hotel resort.

In both instances, the impact on the environmental resources can be visually assessed, and these developments therefore present a strong case for current development application procedures to be reviewed. Naturally, this is easier said than done, but this is precisely where the SAGE philosophy offers an innovative approach, which can be tested in the following manner. **A different type of scenario is created, in which one group of actors, and their interests, is given priority over other group of actors**. In this type of scenario, it is evident how existing trends could even be reversed, at least hypothetically. However, the approach does offer an immediate insight in novel ways how to reach an acceptable equilibrium between the need for development and the need for conservation. To demonstrate this, two future development scenarios were analysed from the diagnosis of the 'actors' point of view. The first concerned the continued expansion of Xlendi village for the next 10 years, while a second scenario dealt with the much debated idea to construct an airport on the island of Gozo.

Step 4 Selection of strategy

The selection of an appropriate strategy concerns foremost the reaching of a consensus among the representatives of the various stakeholders on so-called "collective objectives". These are formulated and illustrated through the use of several "indicators", which can be quantitative or qualitative. Generally, these

indicators are defined around three inter-related themes**: 1) resource conservation, 2) resource use optimization and 3) land use planning. Further research on the Gozo Case Study has been focused on the identification of such indicators**. Using the present situation as a reference basis, the potential future development scenarios could be assessed both quantitatively and qualitatively. A set of resource impact maps that would result from these future development scenarios provide a visual aid, a most useful means to explain the overall methodology and hence a significant contribution towards gaining the acceptance and eventual implementation of the new approach.

Step 5 Outputs

The most important output is to arrive at the **formulation of guidelines** concerning land use planning, agricultural practices, heritage conservation, etc. that are compatible with the collective objectives defined in the previous step. The application of the SAGE philosophy in this respect led to the formulation of "optimum response strategies", based on the lessons learned from previous 'mistakes' and also on the basis of what can be envisaged to result from the scenarios that were selected earlier.

Step 6 Final validation

As for any good project management, outputs need to be thoroughly tested, hence the essential inclusion of a **"final validation"** step. In the context of the present research, the study has led to the production of **an operational, GIS based tool for the planning and management of the environmental resources for the Island of Gozo.** Its use is designed to cater for these needs at a regional scale, it is not intended to replace the requirements of a site-specific Environmental Impact Assessment. Most importantly, the production of an atlas of maps depicting the state and use of the various resources as well as the production of resource impact maps associated with carefully selected development scenarios, provide an essential visual aid to assist in the creation of a favourable "atmosphere" that is needed to gain the understanding and acceptance of the methodology by all stakeholders.

Conclusions for the RESMANMED project

The adaptation and application of the SAGE philosophy as a novel approach for a better planning and management of the environmental resources for the Island of Gozo, has already resulted in tangible progress. The compilation of data on the state and use of all environmental resources, including socio-economic data, into one single coherent GIS has led to new insights about environmental resource relationships and resource interdependencies. Moreover, the additional consideration of the perception of the local actors towards their environment, their soils, their valleys and their heritage, has offered a novel form to assess whether our actions today are compatible with the needs of tomorrow's generations.

The ongoing COLASU research project

The second INCO research project, COLASU(^{2}), is focused on studying the pollution and sustainable development of two lagoons, El Meleh in Tunisia and Nador in Morocco.

El Meleh lagoon is located on the Tunis gulf at about 4 km to the north of Soliman town. It is 3 km long and 1 km wide with a surface area of 200 ha. The natural hydraulic feed of the lagoon is derived from precipitation (457 mm/year), streams (oued El Bey), seawater and groundwater (Oued El Bey and Said phreatic waters). There is also an artificial input by direct discharge of treated waters of the Soliman wastewater treatment station (the discharge reaches 3000 m3/day). The lagoon system presents three geomorphological landscapes, a bar of coastal dunes, a coastal plain and a consolidated bar near Soliman.

Nador lagoon is located on the Moroccan eastern coast. It is a restricted lagoon of 115 km2 (25 by 7.5 km) and with a depth not exceeding 8m.The island barrier is 25 km large with an average width of 300-400m (it can come up to 2 km in some parts) and is cut by an artificial inlet. The lagoon is nourished by several tributaries which are used today for the sewer discharge of the upstream built-up areas. There are 3 urban clusters in the surroundings and 2 saline workings on the banks of the lagoon. There is also an important fish farm.

In this project, IRMCo, who are the scientific coordinators, have from the very start, in July 2002, made it an area of priority and concern to have direct contact with the relevant stakeholders and potential end-users. Indeed the aspect of stakeholder involvement is always put foremost on the agenda of every coordination meeting. This is done with a longer-term view to define the issues relevant to the sustainable management of the lagoons in active, direct consultation with them.

One of the first tasks of the relevant partners was to draw up an inventory of the institutions and organizations that have a direct or indirect involvement in the management of the respective lagoons. The partners also obtained letters of interest which augured well for the project from the very beginning. A year into the project, IRMCo succeeded to have individual meetings with 10 of the stakeholders in Tunisia through the active assistance of the Tunisian partner. These meetings served to discuss the progress of the project and to invite the stakeholders to a joint, interactive workshop in December 2004. These visits were followed up with an invitation letter a month later.

The aim of the workshop is to give an opportunity to all the relevant stakeholders to come together to review the progress of the project, to give their feedback and to enable IRMCo to tackle the task of formulating 'optimum response guidelines' for the sustainable management of the lagoons, which in themselves are a Deliverable in the COLASU project.

IRMCo are presently working on developing a specific design of the workshop layout that will channel feedback from the stakeholders that can be directly translated into the guidelines.

Guiding a Workshop for Stakeholders and Endusers

At this preliminary phase of the workshop preparation some fundamental questions are being explored.

How to draw up the workshop format? Are presentations alternating with round table discussions the right approach? How to establish what resources are available to the stakeholders to solve the problem? Do the stakeholders consider existing policies and legislation to be adequate?

Do we use the type of matrices that we used in RESMANMED to ascertain the conflicts of interests that relate to the growing tourist village of Soliman Plage and its seasonal wastewater overload. (By the time of the Workshop the final report of the Life Cycle Assessment (LCA) of the wastewater treatement station near El Meleh should be completed).

What must be done to ensure that after the workshop the stakeholders will use the results of the study? What must be done to encourage stakeholders to consult the tools (LCA) available with the Tunisian partner of the project after the project?

OPTIMA

The lessons learned so far from RESMANMED and from Colasu will be further explored in our third INCO project, titled OPTIMA([3]), which deals with the optimization of sustainable water resources. In this project IRMCo contributes for the first time with a **specific workpackage on stakeholder involvement**, placing emphasis on a **Participatory Strategic Approach, that targets the creation of tools which the stakeholders can relate to and are therefore willing to adopt through demonstration of the various geomantic technologies.**

To this effect, IRMCo has been assigned with a lead-role towards the development of a Guidebook for local stakeholder participation and dissemination, as well as the organization of a regional end-user conference towards the end of the projects, to be held in Malta.

The first task of IRMCo is to make a detailed study of the many physical, social, political, and economical conditions that can limit or hinder the success of the project.

In OPTIMA, the intention is to go a few steps further than in the previous two projects and explore the meaning of developing a Strategic Participatory Approach. It is understood from literature that Participatory Approaches or so-called Learner-Centered Approaches in adult training developed in parallel to the evolution towards a knowledge system perspective. '"While traditional teaching methods, e.g. didactic teaching, emphasized the transfer of knowledge, messages or content-pre-selected by outside specialists, participatory training focuses more on the development of the human capacities, the stakeholders or endusers themselves to assess, choose, plan, create, organize and take initiative (SRINIVASAN, 1993).

A new related task in OPTIMA is the implementation of a **Marketing Plan** of how to reach the stakeholders and endusers effectively. A new area of research will have to

be explored and adapted and a new discipline, that of cognitive science would have to be brought in the project. Thus the language and the colours used for example for specific products, like maps, would also be given due importance.

Conclusion

IRMCo envisages that by documenting this learning curve in progress, the step-by-step guidelines that may emerge would be of valuable use also to other research projects in the Mediterranean.

Acknowledgements

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