

# Biosphere Reserves: Learning spaces for sustainability

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**ABSTRACT:** Since 1976, the research on sustainable development practices at the Biosphere Reserves (BRs) of the UNESCO Man and Biosphere (MAB) Programme have yielded valuable experiences and built an important knowledge base. The practical knowledge acquired in that collection is presently dispersed and risks disappearing due to its diffuse nature, complexity, social changes, and lack of suitable learning structures. However, the collaboration between BRs' managers as knowledge carriers and scientists from different disciplines, allows transformation of diffuse practical knowledge into scientific knowledge for Sustainability Science, which may be applied elsewhere, such as in the formation of rural development and sustainability professionals. With that purpose in mind, the Spanish Biosphere Reserve Network (comprising of 48 BRs) is now developing a "Knowledge Network", DialogosRB.net project. In it, BRs' managers and scientists, and together with experts in communication and information technologies, have agreed to work as a collective intelligence unit. This article presents the underlying reflections of this project. The results from the Knowledge Network will be available at [www.dialogosrb.net](http://www.dialogosrb.net) on 2018 (initially in Spanish).

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**Keywords:** Biosphere Reserves, UNESCO MAB, Sustainable development, Sustainable land management, Rural areas, Knowledge network, Learning from practice.

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## The MAB Programme

By the 1970s, the alarm bells had already been raised on biodiversity losses in many parts of the world. Protected areas were established in order to save animal and plant species from the unrelenting advance of destructive practices in the use and exploitation of natural resources. A part of society saw it as a blockage to economic development while for others it was an indispensable safety line.

The relationship framework between humankind and nature had changed for everybody and everywhere. It included the direct users of natural resources, like peasants and local communities, as well as the indirect ones, such as consumers and food markets.

The Man and Biosphere Programme, or MAB (UNESCO a, 2016), was created within UNESCO as a front line proposal for natural resources conservation. It was then clear that the long-term conservancy of such resources would be impossible unless it was associated with development models compatible with ecosystem preservation. MAB's purpose was to generate alliances between humans and the biosphere, not confrontations. Without them, both nature conservancy and human development is at risk.

The MAB challenge was put into practice by means of creating the Biosphere Reserve (BR) concept (Ishwaran et al, 2008), born within the MAB Programme in 1976. The new conceptual purpose was integrating conservation and development wherein tests and studies on different ecosystems and cultural environments were conducted all over the world.

A BR is much more than a protected area; it is a social group commitment to the natural values of their territory and a proposal for exploration of development models compatible with such values.

## The Biosphere Reserves (BRs) facing sustainability challenges

Introducing production and management models for the natural resources of a territory according to the guidelines of the MAB Programme required strong commitments. It also required incorporating innovations in many fields, large doses of creativity, leadership, and a great amount of social interaction in order to reach consensus about interventions, which frequently produced conflicts of interest.

Many traditional practices, which for centuries had supported the coexistence of human development and

natural processes, succumbed or were seriously threatened by global changes. Notably, the protected areas were considered spaces excluded from human activities, favouring confrontation.

In the case of traditional models, proven knowledge was transmitted from fathers to sons, generation after generation. When necessary, the introduction of innovations allowed the coexistence of old and new habits, and assimilation was progressive. However, new-world models profoundly disrupted those transmission patterns (FAO, 2000).

The introduction of sustainable practices during the last decades, at odds with the general trend, required the accelerated incorporation of innovations and learning processes. With the MAB Programme began a trial and error path for how to put into practice a promising idea.

Implementing the BR concept in very different geographic and cultural landscapes resulted in very different interventions depending on local priorities, social actors, and territorial characteristics. However, all of them shared common principles and aims.

Each one of these trials, and the concept as a whole, has been operating as a catalyst agent oriented towards generating an inspiring resource-use model for the future of humankind. After 40 years of experience, the BRs now provide a very important body of knowledge, the main object of the present article.

### **The BR as a learning space**

A sustainable development experience requires introducing innovations, which necessarily imply a learning process. In the case of the Spanish Network of Biosphere Reserve (SNBR) (48 BRs in 2016) (RERB, 2016), there are some thematic axes which have structured successful sustainable development initiatives:

(1) Improving the economic development opportunities for rural women, as an efficient way of keeping the population of mountainous areas and avoiding territory abandonment, as well as losses in biodiversity and potential of some ecosystem services.

(2) Transforming traditional olive groves into organic ones, looking for new market opportunities as well as diminishing pollution from chemical additives, especially in a territory with unique natural values.

(3) Modifying an island energy model in order to diminish the use of fossil fuels and the pollution they produce, with the aim of reaching a 100 percent renewable energy situation.

(4) Implementing its own BR trademark in products and services, as a guarantee for companies complying with environmental requirements and committed to transparency towards its consumers and workers.

(5) Transforming a natural park into a fully functional BR, by means of territorial consensus about its surface enlargement and about the governance model to be adopted.

Similar to many other BRs in different parts of the world, all managers involved with these initiatives underwent an innovation process in their own BRs when trying to make situation "A" evolve towards target "B". Usually, the manager of the BR is its director/coordinator, but here I will use the word manager to include also his or her team.

At a closer look, any of the former examples imply a meticulous and laborious programming throughout a number of years. All of them require the collaboration from different social sectors, such as local politicians, representatives of departmental policies, BR governing institutions, economic agents for different sectors, social volunteers, social groups, and the local population.

In order to steer the process towards the chosen target, managers need to mobilize the interest of the different involved sectors. Additionally, they need to contribute in identifying and visualizing clear objectives and benefits for the involved agents (including individual, communal, or sectorial), as well as in designing the path to be followed and the possible role each agent will play in it.

Exploring a new path, even if the managers have a solid technical and academic background, will mean for them a new and accelerated learning process, as they confront many situations, circumstances, and details with which they were not familiar before. That learning process becomes incorporated in those individuals in the form of new knowledge and skills. That has happened in each one of the five above cited initiatives.

From such a viewpoint, the BRs' sustainability research always constitutes learning spaces for the managers, thereby improving their capability to tackle new research armed with better tools. This is one of the products derived from the nature of the BRs, independent of other tangible results derived from the

thematic content of the intervention, or the new skills acquired by the involved social agents.

### **The value of the interchanges among BR managers**

Since its beginnings, the MAB Programme has recommended interchanging experiences among its BRs managers, in order to accelerate the training needed to drive and expand sustainable development actions. Its networks have the objective of promoting, at different scales, the interchange of best practices by means of direct communication, transmission, or stimulation (UNESCO b, 2016), Action B5.1. of the Lima Action Plan).

Since 1992, the SNBR organizes one or two meetings per year with the BR managers. The personal interchanges and collaborations, which arise from such meetings, have repeatedly been praised by the managers as one of the main benefits of being part of the network.

Each of the previous five initiatives already quoted reflect a series of actions addressed towards their projects and themes, but all of them respond to the common objective of the MAB Programme and a number of actions will be similar. For example, preparing relevant reports and news items to publicize a project, participation processes with essential sector agents, formulas to deactivate conflicting situations, strategies and training patterns for involved agents, managerial mechanisms applied for establishing consensus, and putting agreements into practice.

When the managers of the SNBR share their experiences, the analysis is centered on the relevant and meaningful aspects which produced the positive results, as well as on those aspects that can help to improve the overall efficiency of the actions. Many of these aspects are of a subtle nature. Sometimes they look like small, unimportant details, but may be the triggers of important processes. Frequently they refer to social interactions which, once identified, may be of great help in future actions. However, to an external observer studying a large number of BRs, most of these subtleties are almost undetectable and, therefore, may miss essential features.

The skills the managers acquired during the practice at their respective BRs are shared in the interchange of experiences. Sharing common concerns and similar professional languages allows the quick understanding of other participants' contributions.

Synergies among them yield new ideas for the network as a whole and strengthen the implementation of existing practices.

The knowledge acquired in the aforementioned learning scenarios is characterized by hands-on experience, nourished by interchanges among equals, and directly applicable in improving actions.

Schultz, L. and Lundholm, C. (2010), in a study comprising 148 BRs, offer an interesting analysis of the learning processes inside a BR as well as in the interaction among BRs:

Most of the learning opportunities identified in this study are provided locally and even though the lessons learned are possibly spread elsewhere through the networks of participants we have found little evidence of cross-scale learning taking place in the World Network of Biosphere Reserves (p. 659)

### **The MAB Programme trajectory in the face of the changing challenges of society**

During the first decade of the BRs, the focus was on introducing the idea of redirecting the association between humankind and nature, as stated at the Minsk Action Plan at the First International Biosphere Reserve Congress (Belarus) encounter in 1983 (UNESCO, 1984). Then, at the UN Conference on Environment and Development 1992-Earth Summit (United Nations, 2000), in Rio de Janeiro 1992, Earth Summit Agenda 21, 1992 (United Nations, 1992) established the sustainable development notion on a global scale.

The MAB Programme embraced the Rio '92 challenge in its Seville Strategy and the Statutory Framework of the World Network of Biosphere Reserves (WNBR) (UNESCO, 1996), at the Second World Meeting of the WNBR. In them were established objectives and requirements that the BRs need to meet in order to carry out their sustainable development mission.

The Strategy made recommendations on how it should to be applied at international, national, and individual BR levels. At the individual level, it highlights the task of supplying examples of managerial best practices apt to be extended to the regional scale, farther away from their limits. The Strategy also encompassed many other actors who contribute to the MAB Programme objectives and the BRs' functions: National MAB Committees, states, local

governments, international entities, academic and research sectors, social and economic sectors, etc.

The Seville Strategy and the Statutory Framework are still the general reference framework for the WNRB, complemented by the Madrid Action Plan (UNESCO, 2009) and the Lima Action Plan.

The Madrid Action Plan was one of the results of the Third World Meeting of BRs in 2008. It stressed the need to fully apply the Seville Strategy content to BRs all over the world, focusing their attention on applying the Millennium Development Goals.

Among the items highlighted by the Madrid Action Plan are sustainable development learning, research, and training. The Plan devotes one of its four main action lines to that purpose, specifying actions addressed to the BRs' interchange of experiences, to the development of research based upon BRs' management, to the training of managers and other actors, and to the communication of the lessons learned.

Lately a new MAB Strategy has been developed for 2015-2025 (UNESCO, 2015), as well as the Lima Action Plan for 2016-2025, focusing the attention on the challenges to be met until 2025. For the latter, the reference framework is the UN 2030 Agenda for Sustainable Development (United Nations a, 2015) and its 17 Sustainable Development Goals (United Nations b, 2015), approved in December 2015. These goals do not imply changing the MAB's present direction, but placing the attention on a development vision in accordance with humankind's most important challenges today.

Two of the Agenda 2030 goals deal with natural elements, three with interventions oriented towards improving natural resources (water, climate, and energy), eleven with improvements in living conditions and human group integration, and one with generating alliances for reaching these goals. The whole picture shows the urgency in working on the human group integration and in not allowing exclusion (be it economic, political, educative, etc.).

The Lima Action Plan was generated in 2015-2016 by the MAB community and adopted at the 4th World Congress of Biosphere Reserves, Lima, March 2016. From then on, sustainability and its many different components were established as the goal shared by all the BRs until 2025, a goal which encompasses a broader field than the strictly environmental.

Even more than any of the former WNRB meetings, Lima was an extraordinary scenario for interchanging

experiences among over a thousand participants from 120 countries, representing the existing 669 BRs in 2016. The maturity of the BRs and of the different MAB networks, as well as of members from MAB Programme communities supporting the functioning of the BRs, was clearly seen in the more than 100 presentations about successful experiences.

Those experiences showed not only the internal components within a BR but also the external ones that contribute to a good BR functioning. Among them, trans-border agreements, governance models and different kinds of networks such as thematic, geographical, scientific, and infrastructure for information management and dissemination. The content of 21 workshops and 13 side events at the 4th World Congress of Biosphere Reserves, Lima, March 2016 (UNESCO c, 2016) clearly highlights that BRs may greatly contribute to the last of the Agenda 2030 goals, generating alliances, by making available the lessons learnt during the last 40 years.

### **The experience gained at each BR, where does it go?**

Firstly, the experience returns to the BR itself in the form of managerial improvements and more implication from its local agents and greater training of its managers when starting new initiatives. Outside the BR, the most common form of extension is person-to-person communication with other BRs, establishing direct contacts or new collaboration initiatives. A broader influence area includes the different MAB networks (thematic, regional, national, or the WNRB) and the diffusion of published documents, and the internet, for example. Another area of incidence is affecting other structures, external to the BR, which may contribute to the functioning of the BRs, such as departmental governments, state governing bodies, MAB National Committees, academic and scientific sectors, legislative and land-use planning areas, and business corporations.

Currently, in-person communication has a central role in disseminating successful experiences that are complemented with written documents. It is stimulating and effective for the participants, especially in frequent and repeated interchange scenarios which may provide the opportunity for delving into the underlying intangible aspects. Certain aspects which participants were unaware of, frequently surface spontaneously in the communication process.

The influence of in-person communication usually remains at the local scale. Conversely, in relation to its potential impact, it is subjected to a number of limitations: (i) limited presentation time and selected contents; (ii) small audience for oral presentations; (iii) changes in local social circumstances frequently affect the managers who may be substituted, moved, or reassigned to other tasks with higher priorities. Therefore, the knowledge they acquire risks becoming fragmented, scattered, non-operational, and even may disappear from the territory. Such loss has a direct effect locally, but also affects the interchange flows within the MAB Programme.

The evidence observed through direct personal contact with BRs, shows that conservation and dissemination of managers' accumulated knowledge is fragile and highly dependent on circumstances, people, locations, and the time at which the research took place.

Due to such limitations, many of the excellent experiences in BRs and in the WNBR, do not reach the rest of BRs, and may not even be available in the future to the BR from where they came. Therefore, BRs are presently making a very limited contribution to the advancement of the general sustainability processes. Unconsciously, we are little by little losing the highly valuable knowledge generated throughout decades of great economic effort, dedication, and determination of so many people. Shultz and Lundholm (2010) point out the weakness of the BRs in generating general-purpose knowledge and in communicating the lessons learned: "There is also a tension between action and reflection; or time spent providing learning opportunities versus time spent reflecting upon and evaluating actions taken to improve strategies" (p. 659).

No doubt, many places and communities all over the world could benefit from knowledge generated in the BRs. For instance, in rectifying land-use management and development towards more sustainable patterns. The BRs' 40 years of experience have generated an extraordinary stock of useful knowledge, which should be preserved to be able to extract from it when needed.

### **New knowledge for a new Sustainability Science**

As evidenced at the 4th World Congress of Biosphere Reserves, a large number of scientists are interested in the developmental processes of MAB Programme and the BRs. A workshop on networking between

scientists and knowledge-carriers attracted more than 200 participants.

Broadly speaking, in that workshop there were two different approaches to scientific aspects and/or knowledge management:

(1) An academically-oriented approach. Including, an emphasis on the scientific sector is placed for reinforcing the scientific structures dealing with sustainable development (e.g. chairs, masters, research lines), as well as making their knowledge ready for other social sectors such as decision makers or the BRs' communities. Sometimes, however, they consider their own function as a source of one-way knowledge addressed towards other social sectors. It must be pointed out that typical scientific studies contribute general and rigorous views about certain functioning aspects of the BRs, which are not necessarily suitable for applying to the BRs' actions. However, they are very valuable for establishing policies and mobilizing resources, especially at global, regional, or national levels, and for increasing the receptivity of decision makers to the need for introducing sustainability criteria in broad programs and policies.

(2) Another approach is oriented towards knowledge generated within BRs' sustainable development initiatives, nourishing with it a Sustainability Science, presently under construction. At the workshop, the chair of the International Advisory Council, Sergio Guevara (Guevara, 2016), contributed this approach with a traditional expression that may well encapsulate it: "A knowledge dialog", a vision which attracted certain scientific sectors and which the present article shares.

Schultz, L., in an oral presentation (2016), expressed that necessity as: a) There is a wealth of experience in BRs that can inform Sustainability Science; b) There is a need to synthesize these to improve policy and practice-important role for scientists, and; c) There is no central repository of BR data that researches and other knowledge holders can use.

That way of thinking about knowledge and the MAB Programme was included in the Lima Action Plan as objective B7: "An active interdisciplinary network open to scientists and knowledge-carriers, sharing a mission and a common MAB vision". The introduction of "knowledge-carriers" is a meaningful modification introduced in the final Action Plan document. Putting scientists and other knowledge-carriers on a same level opens a collaborating path for gathering and

processing useful knowledge, irrespective of where it comes from.

Rescuing the treasures of knowledge hidden among the BRs' diverse agents, and expressing it in appropriate ways, could be a major contribution of the MAB Programme, for the 2016-2025 period, to the sustainable development goals of the UN Agenda 2030. The collaboration among different knowledge-carriers is very much in line with the main axis of the Agenda's goals, which is integrating all segments of human population.

A first step in that direction could be integrating the knowledge managers accumulated while implementing best practices in their BRs. In order to reach that objective, several types of necessary agents and tasks should come together, working in a coordinated way in a form of collective intelligence. For instance, pooling different experiences, geographically apart, and carried out by unknown agents, in order to extract its common points and features from the lessons learned. The starting point is the managers of institutional BRs, but a coordinated and collaborative action is needed because the task exceeds the functions and competencies of each of them.

Making a scattered collective of contributors that function as a team, by means of a dynamic process to increase their participation, bringing out the most significant experiences from each of them, and producing a meaningful information flow.

Structuring the information store thus generated, complementing it with other kinds of knowledge and carrying out its content analysis. Dealing with such a heterogeneous data set needs an assemblage of rigorous scientific procedures and innovative methodologies, as well as scientists and experts ready to share their knowledge and technical skills.

The resulting products must comply with formats suitable for each segment of their interested public and be then broadcast by means of the most efficient and accessible communication channels. The communication campaign must also ensure that those products remain accessible for a long period of time.

Such a package would link the individual experience from promoters of BR's best practices to a large interested public, who could profit from the experience in many other places and at any time. It will be useful in the training of BRs' managers and technicians, as they are a key element in the BRs'

development and a bridge translating the acquired knowledge into action programs.

There would also be a large number of other potential recipients, such as professionals, experts under training, decision makers, and other sectors of society with an interest in land-use, development, and conservation. Furthermore, it would be useful for managers of public or private entities ready to collaborate in sustainability issues, local development leaders and, of course, the BRs' population at large.

From another viewpoint, rescuing high value knowledge coming from the BRs' practices opens a gate to a source worthy of being added to the new Sustainability Science. This approach may become an important challenge for scientists, as it somewhat diverges from the usual scientific study procedures and analysis, but may also offer new opportunities for them. Fortunately, present information and communication technologies offer resources and methodologies that facilitate the task of gathering, synthesizing, processing, and spreading the knowledge generated in a large number of successful sustainable development experiences around the world.

### **DialogosRB.net, a Spanish Network of Biosphere Reserve initiative**

In order to generate a solution to the present loss of practical knowledge, specifically its rescue and dissemination, we need a collective effort that exceeds the usual BRs' capacities and its limited geographic extension. Therefore, we need to design a new collaborative space, where the different necessary agents may come together with a common objective in mind: sustainability for the 21st century.

Applying this approach, the project DialogosRb.net has started, at the beginning of 2017, a Knowledge Network for the SNBR, which will carry on its activities through this year ([www.dalogosrb.net/blog](http://www.dalogosrb.net/blog)).

A team of BR managers, scientists, and experts on communication and information technologies have accepted the challenge of jointly developing such a knowledge network. In its pilot phase, the team will work on five good-practice initiatives that have been carried out in five Spanish BRs during the last few years. The initiatives are scattered around the country and are representative of many other initiatives that have already been carried out within the Spanish BRs.

After a first in-person meeting, the team is now continuing its work online and its discussions are open to all the Spanish BRs, the Scientific Council of the Spanish MAB Programme and other experts.

The economic resources for the project come from a collaboration among the five BRs, an NGO that collaborates with one of them, and the Fundación Biodiversidad of the Spanish Ministry for Agriculture and Fisheries, Food, and Environment.

The project results will be available on [www.dialogosrb.net](http://www.dialogosrb.net) (initially in Spanish) in 2018.

## ACKNOWLEDGEMENTS

The DialogosRB.net project is supported, technically and financially, by its partners, these being five of the Spanish Biosphere Reserves (Área de Allariz, Alto Bernesga, Sierra de las Nieves, Lanzarote and Montseny). It has the support of a group of scientists from the universities Autónoma de Madrid, Alcalá de Henares, and the Basque country university, and is also supported by the UNESCO Sustainable Development and Environmental Education Chair, from the same university. The project has a general coordinator, the author of the present article, and is being developed with the financial support of the Fundación Biodiversidad of the Spanish Ministry for Agriculture and Fisheries, Food and Environment.

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