



**CAPACITY BUILDING FOR EDUCATION AND APPLIED
RESEARCH IN MEDITERRANEAN UNESCO'S BIOSPHERE RESERVES**

Report from Task 1.3 & 2.10

Frameworks and governance mechanisms in Biosphere Reserve management in Lebanon, Morocco, France and Spain Policy Review and Recommendations



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About Edu-BioMed

The project aims to strengthen, ameliorate and upgrade academic activity at four Moroccan and Lebanese Higher Education Institutions (HEIs) in the context of Mediterranean Biosphere Reserves (BRs), in collaboration and through networking with BRs' stakeholders (citizens, visitors, managers and technicians), public administrations and EU Partners.

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Table of Contents

1. Introduction.....	6
1.1. The Task 1.3 & 2.10 of the Edu-BioMed project	6
1.2. The UNESCO Man and the Biosphere (MAB) programme	7
2. Policy frameworks	9
2.1. MAB Strategies and Action Plans	9
2.1.1. The MAB Strategy within UNESCO's Medium-Term Strategy	9
2.1.2. Vision and Mission of the MAB Programme	10
2.1.3. The MAB Strategy 2015-2025.....	10
2.1.4. The Lima Action Plan 2016-2025	11
2.2. National frameworks.....	11
2.2.1. Introduction.....	11
2.2.2. Lebanese national framework.....	11
2.2.3. Moroccan national framework.....	12
2.2.4. French national framework	13
2.2.5. Spanish national framework.....	13
3. Governance.....	14
3.1. International level	14
3.2. National level.....	15
3.2.1. Lebanon	15
3.2.2. Morocco.....	16
3.2.3. France	17
3.2.4. Spain	18
3.3. Biosphere Reserve level	20
3.3.1. Introduction.....	21
3.3.2. Lebanon	21
3.3.3. Morocco.....	23
3.3.4. France	25
3.3.5. Spain	28
3.4. Mechanisms for the involvement of local communities	33
3.4.1. Lebanon	33

3.4.2. Morocco.....	35
3.4.3. France	36
3.4.4. Spain	37
3.5. Financing instruments	37
3.5.1. Lebanon	37
3.5.2. Morocco.....	38
3.5.3. France	39
3.5.4. Spain	39
3.6. The Scientific Committees	39
3.6.1. Lebanon	39
3.6.2. Morocco.....	40
3.6.3. France	41
3.6.4. Spain	42
4. SWOT analyses	42
4.1. Lebanon	43
4.2. Morocco.....	44
4.3. France	45
4.4. Spain	46
5. Recommendations for policy makers	47
5.1. Lebanon	47
5.2. Morocco.....	47
5.3. France	47
5.4. Spain	48
5.5. Key messages.....	48

1. Introduction

This document is published in the frame of Edu-BioMed, an international cooperation project co-funded by the Erasmus+ Capacity Building in Higher Education programme of the European Union during the period 15 November 2018 - 15 November 2021.

The project aims to strengthen, ameliorate and upgrade academic activity at four Moroccan and Lebanese Higher Education Institutions (HEIs) in the context of Mediterranean Biosphere Reserves (BRs), in collaboration and through networking with BRs' stakeholders (citizens, visitors, managers and technicians), public administrations and EU Partners.

'BR' is a UNESCO designation for territories composing a mosaic of natural protected areas, cultural heritage, human settlements, and land use designations for eco-friendly economic activity. The designation falls under the auspices of UNESCO's "Man and Biosphere" (MaB)¹ program, which aim is to explore solutions for the improvement or relationships between people and their environments on a multidisciplinary scientific basis, and to achieve the SDGs as soon as possible. It grows the necessity in Region 3 to link countries, universities and territories so that they cooperate in tackling common socio-economical-ecological challenges of the new era.

The four beneficiaries of the action are the American University of Beirut (AUB), the Saint Joseph University of Beirut (USJ), the Université Cadi Ayyad of Marrakech (UCA) and the Université Mohammed V of Rabat (UM5). Five other organizations support these HEIs in pursuing such aim: the Universitat Autònoma de Barcelona (UAB), the Aix-Marseille University (AMU), MAB France, UNIMED and the Association for the Protection of Jabal Moussa (APJM).

"Edu-BioMed aim is to strengthen, ameliorate and upgrade academic activity at four Moroccan and Lebanese universities in the context of Mediterranean Biosphere Reserves, in collaboration and through networking with BRs' stakeholders"

Please consult the [Project Website](#) for more information.

1.1. The Task 1.3 & 2.10 of the Edu-BioMed project

The strengthening of the role of targeted HEIs as policy advisor is one among the specific objectives of Edu-BioMed. Partner HEIs wish to strengthen their capacity to provide policymakers with objective critiques to the legal and BR governance status quo on a scientific evidence-base.

The clear understanding of the legal framework and governance mechanisms that influence on the reality of BR is a hard task, given the layers of institutional complexities 'behind' a BR. Given the novelty of the MaB programme, surely at policy there is margin of improvement towards a sustainable territorial management.

Within the initial phase of Edu-BioMed (Work Package 1 – Preparation), Task 1.3 consists in the assessment of gaps, inertias and opportunities at the level of those legal frameworks and governance mechanisms that influence BRs management and reality.

¹ <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/>

In a second phase (Work Package 2 – Development) of project activities, Task 2.10 will consist in the production of recommendations for Moroccan and Lebanese policy reforms, against the analysis conducted in Task 1.3.

“The main objective is to understand the legal framework and governance mechanisms that influence the reality of Mediterranean Biosphere Reserves”

The assessment is performed in the four countries where EduBioMed partner HEIs are based: i.e. Lebanon, Morocco, France and Spain. This allows a comparison between different policy systems, and enables the sharing of learning experiences between different territories.

This document is the output of these tasks, and holistically reports on the just mentioned assessments.

Besides HEIs, other main beneficiaries of the action are Moroccan and Lebanese policymakers. Being provided with evidence/demand-based policy recommendation, public administrators at local, regional, national levels will be facilitated in their work of spotting scenarios for policy upgrading in the long term.

1.2. The UNESCO Man and the Biosphere (MAB) programme



Figure 1. The World Network of Biosphere Reserves (Source: UNESCO)

UNESCO's Man and the Biosphere (MAB)² is an Intergovernmental Scientific Programme that seeks to establish a scientific basis for the long-term improvement of the relationship between people and the environment.

Launched in 1971, MAB proposes an interdisciplinary research and capacity-building agenda focusing on the ecological, social and economic dimensions of biodiversity loss and reduction, in order to safeguard natural

² <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/>

and managed ecosystems, while promoting innovative approaches to economic development that are environmentally sustainable as well as socially and culturally appropriate.

Its activities include research, training, monitoring and education on biodiversity, as well as the implementation of pilot projects on the search for balance between the responsibility to conserve nature and biodiversity, and the human need to use natural resources to improve the social and economic well-being of populations.

Within the MAB, special sites are designated where to apply the principles and pursue the purposes of the programme: Biosphere Reserves (BRs). According to UNESCO³, BRs are areas composed of terrestrial, marine and coastal ecosystems, which are also "living labs", places where to support science and education. BRs are specially designated areas for the purpose of assessing and managing changes and interactions of socio-ecological systems, in an effort to protect the environment and to cope with biodiversity loss and face climate change.

The implementation of MAB's work in the field is based on the World Network of Biosphere Reserves (WNBR) and on thematic networks and partnerships favouring knowledge sharing and participatory decision-making. The WNBR currently counts 714 sites in 129 countries all over the world, including 21 transboundary sites⁴.



Figure 2. The Mediterranean Biosphere Reserves Network (source: <https://fr.zone-se-cure.net/114683/1265175/#page=22>)

Moreover, the WNBR of the MAB Programme promotes North-South and South-South collaboration and represents a unique tool for international co-operation through sharing knowledge, exchanging experiences and promoting best practices. Its ultimate mission is to ensure environmental, economic and social (including

³ <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/>

⁴ WNBR map at <https://unesdoc.unesco.org/ark:/48223/pf0000259695>

cultural and spiritual) sustainability through participatory dialogue, poverty reduction and human well-being improvements, respect for cultural values and society's ability to cope with change.

In this context, several regional networks have been created within the World Network, including the Network of Mediterranean Biosphere Reserves (MedBR), which since June 2015 acts as a platform for the exchange of knowledge between the two shores of the Mediterranean, with around 70 BRs distributed among 15 countries (Algeria, Bulgaria, Croatia, France, Greece, Israel, Italy, Jordan, Lebanon, Morocco, Montenegro, Portugal, Slovenia, Spain and Tunisia).

2. Policy frameworks

2.1. MAB Strategies and Action Plans⁵

Sustainability issues are at the heart of the international debate, as human activities continue to alter the Earth's systems, with profound impacts on freshwater resources, the ocean, the atmosphere and climate, as well as on ecosystems, habitats and their biodiversity. All of the above will have a significant impact on all societies and are likely to be accentuated in the coming decades. Hence, the global community is advancing towards the implementation of a comprehensive set of 17 related Sustainable Development Goals (SDGs) and targets to simultaneously address human needs and environmental change. These explicitly take into account other global imperatives, such as the targets set under the United Nations Framework Convention on Climate Change (UNFCCC) and its protocols, and the Convention on Biological Diversity's (CBD) Strategic Plan for Biodiversity 2011-2020 and 2021-2030.

2.1.1. The MAB Strategy within UNESCO's Medium-Term Strategy

Peace and sustainable development are the overarching objectives of the UNESCO Medium-Term Strategy 2014-2021. UNESCO emphasizes the critical importance of knowledge sharing in order to induce the transformative changes needed to address the complex and interrelated challenges of sustainable development. UNESCO is therefore promoting international scientific cooperation and integrated scientific approaches to support Member States in effectively managing natural resources, sharing knowledge within and among countries, and building bridges for dialogue and peace.

The important role of MAB and its WNBR is emphasized in UNESCO's Medium-Term Strategy 2014-2021, notably in relation to UNESCO's Strategic Objective 5: 'Promoting international scientific cooperation on critical challenges to sustainable development', as well as Strategic Objective 4: 'Strengthening science, technology and innovation systems and policies – nationally, regionally and globally'.

⁵ More information in UNESCO (2017), A New Roadmap for the Man and the Biosphere (MAB) Programme and its World Network of Biosphere Reserves. Available at <https://unesdoc.unesco.org/ark:/48223/pf0000247418>

2.1.2. Vision and Mission of the MAB Programme

"A world where people are conscious of their common future and interaction with our planet, and act collectively and responsibly to build thriving societies in harmony within the biosphere": the MAB Programme and its World Network of Biosphere Reserves (WNBR) serve this vision within and outside biosphere reserves. Its mission for the period 2015-2025 is to:

- Develop and strengthen models for sustainable development in the WNBR
- Communicate the experiences and lessons learned, facilitating the global diffusion and application of these models
- Support evaluation and high-quality management, strategies and policies for sustainable development and planning, as well as accountable and resilient institutions
- Help Member States and stakeholders to urgently meet the Sustainable Development Goals through experiences from the WNBR, particularly through exploring and testing policies, technologies and innovations for the sustainable management of biodiversity and natural resources, and mitigation and adaptation to climate change.

2.1.3. The MAB Strategy 2015-2025

The MAB Programme with its WNBR constitutes a valuable partner and instrument for research and experimentation on the ground, to build knowledge on practice-based sustainable development and to share it globally. Thanks to this practical approach, the MAB Programme supports the efforts of UNESCO Member States to address critical issues related to biodiversity, ecosystem services, climate change, and other aspects of global environmental change, thus working towards the Sustainable Development Goals and contributing to implement the 2030 Agenda for Sustainable Development.

MAB's Strategic Objectives for 2015-2025 derive directly from the three functions of biosphere reserves identified in the Seville strategy and Statutory Framework for the WNBR⁶ and the key global challenge of climate change, identified in the Madrid Action Plan for Biosphere Reserves.

1. Conserve biodiversity, restore and enhance ecosystem services, and foster the sustainable use of natural resources
2. Contribute to building sustainable, healthy and equitable societies, economies and thriving human settlements in harmony with the biosphere
3. Facilitate biodiversity and sustainability science, education for sustainable development (ESD) and capacity building
4. Support mitigation and adaptation to climate change and other aspects of global environmental change

The Strategic Objectives and Strategic Action Areas of this MAB Strategy are being implemented through the associated MAB Action Plan and they are being assessed using a specific Evaluation Framework.

⁶ http://www.mext.go.jp/component/a_menu/other/micro_detail/___icsFiles/afieldfile/2019/08/09/1358624_5.pdf

2.1.4. The Lima Action Plan 2016-2025

The Lima Action Plan includes targeted outcomes, actions and outputs that will contribute to the effective implementation of the Strategic Objectives contained in the MAB Strategy. It also specifies the entities with prime responsibility for implementation, together with time range and performance indicators.

Both the MAB Strategy 2015-2025 and the Lima Action Plan 2016-2025 are founded on the continuity of the Seville Strategy and the Statutory Framework of the World Network of Biosphere Reserves (WNBR) (UNESCO 1996) and based on the findings of the evaluation of the implementation of the Madrid Action Plan for Biosphere Reserves (2008-2013).

2.2. National frameworks

2.2.1. Introduction

The Seville strategy (UNESCO, 1996⁷) recommends countries to integrate Biosphere reserves in strategies for biodiversity conservation and sustainable use, in land planning policies, research and monitoring programmes, school and communication programs at national level.

2.2.2. Lebanese national framework

Present in Lima, Peru, in March 2016, during the final drafting of the Lima Action Plan 2016-2025, hundreds of representatives from Biosphere Reserve (BR's) across the planet had the opportunity to interact, comment and propose changes to the circulated text in order to better reflect their views. This was effected within the regional clusters constituting the MAB organization: AfriMAB; ArabMAB; EuroMAB; IberoMAB; AsiaPacific MAB.

Lebanon (through Jabal Moussa BR's representative) was present and active as part of ArabMAB and sought to strengthen links with other regional clusters, in particular EuroMAB and the newly constituted Mediterranean Network of Biosphere Reserves (MedMAB). Upon his return, the JMBR representative met with the President and Secretary of the Lebanese Committee for Man and Biosphere (LebMAB) (Profs Tohmé and Jaradi), specifically reporting on the Lima proceedings and results. As a result, in April 2016, the Lebanese Committee for Man and Biosphere (LebMAB), which is headed by the Lebanese "CNRS" (Centre National de la Recherche Scientifique), which in turn reports directly to the Office of the Lebanese Prime Minister, decided to enlarge the LebMAB Committee from three to six members, in order to reflect the increased burden of work on the committee due to the positive evolution of Biosphere Reserves in Lebanon, which have become an example for BR's in the Arab World. One representative for each Biosphere Reserve (Chouf, Rihane, Jabal Moussa) was added to the committee, which unfortunately, has had limited activity since then.

⁷ UNESCO (1996). Biosphere reserves. The Seville Strategy and the Statutory framework of the World Network. Unesco PARIS, <https://unesdoc.unesco.org/ark:/48223/pf0000103849>

As mentioned above, Lebanon's BR's are also active participants in the ArabMAB cluster (33 BR's in 12 countries). In recent months leading to the 50th year celebration of the MAB Programme and World Network of Biosphere Reserves (WNBR) in 2021, several e-meetings and conferences, also involving Lebanon's two active BR's have been organized by Dr. E. Sattout, focal point for ArabMAB activities.

Conferences and meetings (involving Lebanon's active BR's) have also taken place at Castellet Castle near Barcelona, headquarters to the International Center for the Mediterranean Biosphere Reserves, in order to launch and establish the MedMAB network and strengthen ties between both shores of the Mediterranean. Noteworthy is that the IUCN (Int'l Union for the Conservation of Nature) Centre for Mediterranean Cooperation was also actively involved through its Programme Director Antonio Troya. The Edu-BioMed Project is a direct consequence of the excellent networking and knowledge-sharing opportunities taking place at Castellet.

2.2.3. Moroccan national framework

Moroccan MAB Committee was created in 1995, close before its first BR was established (the Arganeraie Biosphere Reserve declared in 1998). As other southern Mediterranean countries (e.g. Lebanon), Morocco does not have any specific legal instrument -for the transposition/implementation of MAB programme into national law and policy- regulating the application of MAB provisions. Therefore, the regulations that incorporate the commitments to the MAB Program of Morocco are limited to the signature and ratification of international agreements (such as the Convention on Biological Diversity in 1996; CHMBM) and the official support to each BR itself (i.e. declaration, framework and actions plans, UNESCO's periodic reviews).

The national Master Plan for Protected Areas of 1996 led to the establishment of a national network of protected areas, in which BRs were not included. The operation of BRs, as areas of protection and development, aims to promote, additionally to the network of PA, solutions reconciling the conservation of biodiversity and its sustainable use (the overall concept of land use planning) at the national level. Morocco has officially committed itself from the beginning to a policy of creating the latest-generation biosphere reserves, the most demanding of all. However, this choice poses many implementation problems and the BR's concept and governance model are still in the institutional debate, 20 years after the nomination of the first BR. Regarding administrative and managerial responsibilities, BRs are positioned between two levels: i) the national level (Parks and Natural Reserves Division of the Department of Water and Forests, in Rabat) that coordinates and supervises the national implementation of the UNESCO MAB Program, the general issues of Moroccan BRs and the governmental partnerships regarding BRs (e.g. German cooperation for the RBA, French cooperation for the RBOSM or Spanish cooperation for the RBIM); ii) the regional level where there is no official structure and/or management body for Biosphere Reserves that deals with the sectorial mechanisms and policies of the various governmental and administrative stakeholders that map the future of each BR.

The Law n° 22-07 of July 16, 2010, on Protected Areas does not include the existence of Biosphere Reserves (BRs) in Morocco either, although they are all in charge of the same department; which is the Department for Water and Forests. This is explained by the nature and purpose of Biosphere Reserves, which are generally very large in size, and for which the law on protected areas may become less restrictive in relation to the international label of recognition of these BRs (UNESCO), which exceeds national legislative powers.

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2.2.4. French national framework

France established a MAB national committee in 1973, not long time after MAB was launched by UNESCO. The first BRs were established in 1977. Their recognition in French law is recent. The law doesn't describe BR as a new category of Protected area, as the panel is yet very diverse.

The French law on biodiversity recovery (Article 66, 2016) considers that biosphere reserves concur to the objective of sustainable development, "Biosphere Reserves and wetlands of international importance". The French legislation refers to the UNESCO text: it is stipulated that: "In application of Resolution 28C/2.4 of the General conference of UNESCO which approved the Seville Strategy and adopted a Statutory Framework for the World Network of Biosphere Reserves on 14 November 1995, local authorities, their grouping, the syndicats mixtes mentioned in chapter VII of part V of the general code of local authorities, associations and national administrative public institutions of parks can implement a biosphere reserve. A biosphere reserves concur to the objective of sustainable development as defined in II of article L. 110-1 of the present code. The national strategy for biodiversity promotes the development of biosphere reserves in France metropolitan and overseas. "

The BRs are recognized in the national strategy for biodiversity, which promotes the development of biosphere reserves in France metropolitan and overseas areas. MAB France is part of the national Committee for biodiversity of Ministry of environment, and the National Protected areas conference, under the umbrella of National Office for Biodiversity (OFB). This Office was recently created with a wide approach on biodiversity conservation, in connection with the society. This implies a stronger support to MAB approaches than before.

Biosphere reserves are also integrated in biodiversity National monitoring system (Inventaire National du Patrimoine Naturel) held by Museum national d'Histoire naturelle

2.2.5. Spanish national framework

The Spanish State adopts the MAB program since since the creation in 1975 of the Spanish MAB Committee. Since then, the regulations that incorporate the commitments to the MAB Program evolved until today.

The Law 42/2007 of 13 December on natural heritage and biodiversity is the first state regulation with the status of law that takes into account the existence of Biosphere Reserves (Articles 3.31, 65, 66 and 67). Later in 2015, it has updated through the law 33/2015 of 21st September.

Hierarchically lower, the Royal Decrees 342/2007, of 9 March 2007, and 387/2013, of 31 May, regulate the development of the functions of the MAB Programme, as well as the Spanish Committee of the aforementioned programme, in the Autonomous Body National Parks (Organismo Autónomo de Parques Nacionales).

In addition to this, Spain counts of the Montseny Action Plan of the Network of Spanish Biosphere Reserves 2009-2013 (PAMO), which was definitively approved by the Spanish MAB Programme Committee at its meeting on 8 March.

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3. Governance

3.1. International level

The MAB Programme is governed by its International Coordinating Council (ICC), under the overall authority of the UNESCO General Conference and its Executive Board.

The role of the MAB ICC is:

- To guide and supervise the MAB Program;
- To review the progress made in the implementation of the Program (cf. Secretariat report and reports of MAB National Committees);
- To recommend research projects to countries and to make proposals on the organization of regional or international cooperation;
- To assess priorities among projects and MAB activities in general;
- To co-ordinate the international cooperation of Member States participating in the MAB Program;
- To co-ordinate activities with other international scientific program;
- To consult with international non-governmental organizations on scientific or technical questions.

The MAB ICC also decides upon new biosphere reserves and takes note of recommendations on periodic review reports of existing biosphere reserves and withdrawal of biosphere reserves by member states when they do not fulfil anymore the criteria of Statutory framework.

ICC has also decided that BR which not fulfils these criteria would be delisted from the World network after several recalls to member states. The first group will be withdrawn in 2020. After an excellence strategy will be established to avoid this situation and help the BR which has difficulties.

3.2. National level

MAB Governance at the national level is ideally through MAB National Committees. Each MAB National Committee should have a transdisciplinary membership, including representatives from the public, private, research and education sectors, and a wide range of other stakeholders, including representation from biosphere reserves.

Using the MAB Strategy 2015-2025 and Lima Action Plan 2016-2025 as the key points of reference, MAB National Committees are strongly encouraged to prepare their own strategies and action plans. These should be founded in national and regional realities and imperatives and will contribute both to addressing these and to implement the Lima Action Plan at the global level.

Thereupon, the four countries of the Mediterranean outline that are part of the Edu-BioMed project, adopt global strategies based on the aforementioned guidelines and follow decisions taken by the MAB ICC at international level.

3.2.1. Lebanon

Although designated by UNESCO, BRs are only protected to the extent local jurisdiction follows through with a relevant legal framework and appropriate law enforcement.

In Lebanon, the Natural Sites Protection law dates back to 1939 and, if and when enforced, affords a vast measure of protection to numerous natural and cultural landmarks.

A new Protected Area law (replacing a previous Nature Reserve law) was enacted in 2019 under the supervision of the Ministry of Environment. It encompasses both public and private protected areas and details the planning and management conditions required for initial designation and status preservation.

A different path was followed by the two active BR's in Lebanon in terms of UNESCO designation. Shouf BR (SBR) had been a protected Area (Nature Reserve) according to Lebanese law since 1996 and obtained the BR status thereafter, in 2005. Jabal Moussa BR first obtained the status of Biosphere Reserve in 2009 and subsequently was granted the status of Natural Site according to Lebanese law in 2012.

Government legislation, Law No. 532 of 24 July 1996 declared "The communal lands of Niha, Jba'a, Mrousti, Khraibe, Maasser, Barouk, Bmohreh, Ain Dara, Ain Zhalta villages, in addition to the Government owned lands on the eastern side of Barouk Mountain" a Nature Reserve. The SBR is under the authority of the Lebanese Ministry of Environment (MOE), which manages it through the Appointed Protected Area Committee (APAC) that includes among its members the Al-Shouf Cedar Society (ACS), the mayors of the larger villages, and independent environment experts.

3.2.2. Morocco

As stated at the beginning: *“MAB Governance at the national level is ideally through MAB National Committees. Each MAB National Committee should have a transdisciplinary membership, including representatives from the public, private, research and education sectors, and a wide range of other stakeholders, including representation from biosphere reserves.”*

This is not the case in Morocco. The general coordination of the BRs at national level is in charge of the Department of Water and Forests (DEF), through the Parks and Natural Reserves Division. However, for relevant BRs issues (e.g. periodic BR evaluations, congresses, or other events), the MAB committee and the administration are always coordinated.

The Moroccan MAB committee is structured and ensures constructive cooperation with all the departments of the State that collaborate with UNESCO. Among these departments are the Higher Education Department, which oversees this collaboration, the DEF, the Ministry of Agriculture and the Ministry of Culture (particularly for natural World Heritage sites) (Fassi et al, 2011).

Furthermore, the Moroccan MAB committee is an association whose membership is voluntary and altruistic (i.e. it is not a government body composed of civil servants as in Spain or other countries, nor a public institution). At present, its composition is predominantly academic. There is no broad representation of public and private stakeholders, nor are representatives of the BRs included, although the association's statutes do not prevent this.

Similarly as in the case of Lebanon and many other Arab-MAB States (Matar, 2015), Moroccan National MAB Committee is accused of not being sufficiently functional (IUCN, 2012, 2015; DREFLCD-SO, 2018), it does not meet very often and it is perceived to work far from the BRs' territories (despite its coordination with the DEF in Rabat and its participation in relevant events). This reality makes each BR government body to act quite independently and disconnected from others in general. The lack of a well-established and functional national network of Moroccan BRs fosters this perception.

There is a lack in legislative frameworks that allow creating and promoting the RB governance bodies. However, many Moroccan Departments made important initiatives to conceptualize and anticipate the creation of such bodies. For instance, the DEF defined three main bodies for the RB particularly managed by this department: the management body, the participation body and the scientific committee. The DEF has already started to operationalize these bodies in order to make of them a vector of development, modernization and organisation of the RB. This issue will be described in detail in the following sections.

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3.2.3. France

The French MAB Committee was created in 1973. From 1973 to 2015, the MAB Committee operated under the aegis and with the support of the French Commission for UNESCO. At this stage, its composition was essentially academic and with representatives of the ministries concerned (environment, foreign affairs, education). From 1991, representatives of biosphere reserves were associated with the MAB Committee. Its funding came mainly from the Ministry in charge of the environment. The ministries in charge of foreign affairs, education and research provided additional small amounts of funding. During the first few years, a researcher from ORSTOM (a cooperative research organisation, now the IRD) was in charge of the committee. From 1991, the MAB Committee recruited a scientific secretary thanks to funding from the Ministry of the Environment. From 2002, a CNRS researcher was also involved in running the MAB committee.

With the development of the national network of biosphere reserves, and in particular the arrival of three new sites in the network from 2012 to 2014, it became necessary to give the French MAB Committee a legal entity to run it: this would give it the visibility it lacked, enable it to carry out more ambitious projects, and better promote the "biosphere reserve" model in the French landscape of conservation and sustainable development of territories. This was done with the creation of the MAB France Association. The French MAB Committee is now hosted by MAB France, an association under the 1901 law, created in 2015. Now, MAB France, as a specific entity, involves BR network, the national scientific institutions (CNRS, INRA, CIRAD, MNHN, IFREMER, IRD), and public and private partners organizations dealing with biodiversity and sustainable development issues.

MAB France is implementing the Man and the Biosphere Programme with the main support of the French Office for Biodiversity. It animates and strengthens the national network of biosphere reserves and connects it with the French and international communities interested in this programme: the scientific community, the educational and academic world, organizations involved in the management and conservation of biodiversity, sustainable development and ecological transition. MAB France renewed its strategy in 2018.

The strategy of the MAB France association for the coming years aims to:

1. Strengthen the implementation of all Sustainable Development Goals in Biosphere Reserves
 - Continue to promote new adaptive governance
 - Support and accompany exemplary local initiatives
 - Promote and develop the Biosphere Reserve Trophies

- Strengthen the network of eco-actors, in France and beyond
 - Contribute to ambitious research programs on the territories, to understand and evaluate social interdependencies and all the contributions of nature to human well-being.
2. Spread and diffuse knowledge and practices for ecological and social transition
- Establish a broad and effective communication strategy, building on the MAB Global Strategy
 - Revitalize and develop the existing network of metropolitan and overseas biosphere reserves, as well as transboundary biosphere reserves
 - To help exchanges of experience between model territories in France and around the world
 - Supporting new international projects with our expertise
 - Synthesize and publish knowledge, share it during initial or professional training.
3. Finding the necessary means to work effectively for nature and future generations
- Strengthen the MAB France national coordination team,
 - Strengthen the means of coordination of biosphere reserves. They are the ones who run the MAB Programme on their territory, interact with researchers, facilitate consultation and participation by as many people as possible, and create links between their territory and the national and global network.
 - Strengthen, diversify and expand technical and financial partnerships: elected officials, national institutions, public and private companies, French and international NGOs.

MAB France has a strategy that aims to integrate social and ecological protection and transition objectives. It takes up the Sustainable Development Goals in its own right, and relies on the various associative, entrepreneurial and scientific stakeholders.

MAB France works closely with Co'MAB association, NGO specifically created to promote Youth engagement in MAB Programme and Biosphere reserves in France.

There is a large set of activities: website www.mab-france.org, newsletter, working groups, research and education projects, eco actors and BR trophies.

3.2.4. Spain

As a full member of UNESCO, Spain has been working during years to implement the aims and objectives of the MAB Programme at national level. This work was initially promoted by the Spanish MAB Programme Committee and has gradually been joined by other government bodies, as well as by private entities and stakeholders.

The Spanish Committee for UNESCO's MAB Programme, since its creation in 1975 within the Spanish Commission for Cooperation with UNESCO, has undergone a great evolution in which several stages can be identified.

Between 1975 and 1987 the Spanish MAB Committee functioned as a working group within the framework of the Spanish Commission for Cooperation with UNESCO. At this stage its composition was predominantly academic, although representatives from the management and administration fields were gradually incorporated.

In 1987, with the creation of a MAB Committee Support Office in the Directorate General of the Environment of the Ministry of Public Works and Urban Development (MOPU), the activities of the MAB Committee were given a strong momentum that, with time, began to focus on the biosphere reserve concept. As a result, a technical working group on biosphere reserves was set up in 1992, which marked the beginning of networking in Spain. The development of the tasks of this group culminated in the Spanish contribution to the II International Conference of Biosphere Reserves, Seville 95, convened by UNESCO. The period 1987-1996 can be considered a period of knowledge and mutual interest between the Spanish MAB Committee and the public institutions responsible for the Environment, both at state and regional level.

Royal Decree 1894/1996 of 2 August 1996, referring to the structure of the Ministry of the Environment, assigns the National Parks Autonomous Body (OAPN) the functions of coordination and development of the MAB Programme. These coordination functions have remained following the Royal Decree 1130/2008 of 4 July, referring to the organic structure of the Ministry of the Environment and Rural and Marine Affairs. Royal Decree 401/2012 of 17 February, which develops the basic organic structure of the Ministry of Agriculture, Food and the Environment, does not modify the functions of the Autonomous Body for National Parks with regard to the development of MAB Programme in Spain. Consequently, since 1996 OAPN has been providing support to a technical office to assist in the development of MAB Committee activities. During the period 1996-2007, the MAB Committee continued to carry out its activities, notably by increasing the number of Spanish biosphere reserves and the boost given by Spain to the IberoMAB Network.

Royal Decree 342/2007 of 9 March 2007 regulates the development of the functions of the MAB Programme, as well as the Spanish Committee and its advisory bodies (Scientific Council and Management Council), within the OAPN. This Royal Decree, which has specified the way in which the OAPN carries out its functions, has ensured institutional support for the operation of MAB Programme in Spain and has given a new boost to the development of Programme activities. Almost simultaneously, the inclusion of biosphere reserves in Law 42/2007 on Natural Heritage and Biodiversity has provided regulatory support and consolidated the Spanish Network of Biosphere Reserves.

The decree also specified the composition and functions of the Spanish MAB Committee, as well as its connections with the administration, making the Committee an effective institutional coordination body for biosphere reserves and for the transfer of initiatives to institutions. The Spanish UNESCO-MAB Committee is now a collegiate inter-ministerial body of a consultative nature, with representation from several departments of the General State Administration, from all the Autonomous Communities that have biosphere reserves in their territory, from the managers of the reserves of the biosphere, the scientific sector and other types of stakeholders. The MAB Committee has two advisory bodies: the Scientific Council and the Biosphere Reserves Management Council, which are very active in generating initiatives and in the implementation of Spanish biosphere reserves.

The contribution of reserves to the functioning of the network comes from the institutions responsible for the biosphere reserves, their technical teams and social actors. The responsible entities determine the relations with the respective autonomous communities, which are represented on the MAB Committee; in quite a few cases, the autonomous community itself is the responsible entity. A very special role in each biosphere reserve is played by the technician accredited by his or her respective institution as a reserve manager and, therefore, as a member of the Management Council of the Spanish Network of Biosphere Reserves. This body constitutes the technical pillar of the Network. The Management Council functions as a working group, analysing the situation of the biosphere reserves and the RERB and identifying necessary actions, both at the

level of individual reserves and at the Network level. It usually holds two face-to-face meetings per year and intensive interaction through digital means. It is a very important source of initiatives.

The Spanish MAB Committee, depending on its composition, is a space for coordination between institutions involved in biosphere reserves and from these with other social actors. It plays an important role in setting guidelines, maintaining relations with the MAB Programme at international level, promote and assume commitments and endorse the action for the Network, whose origin may be the Board of Directors, the Scientific Council or the same OAPN. The MAB Committee usually meets twice a year. Both the Board of Directors and the Scientific Council contribute to the meetings of the MAB Committee the results of their respective work or their proposals.

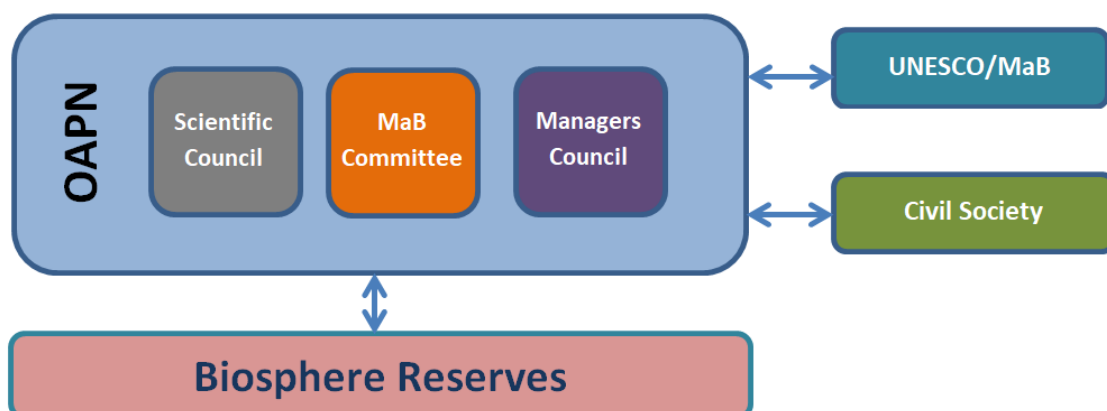


Figure 3. Scheme of Spanish MAB Governance at National Level

The Autonomous Body for National Parks (OAPN) is the coordinating body for the Network's activities and the development of the MAB Programme. It maintains an Office that serves as the secretariat of the Network and a hub for information distribution and exchanges. The OAPN develops initiatives of general support to the Network, such as the corporate image, the commissioning of a monitoring system, the dissemination of the Network, etc., working for its definition in close collaboration with the Management Board and the Scientific Council. There are often initiatives that have their origin in proposals from the Board of Directors. Since 2018, the OAPN is under the Ministry for the Ecological Transition and the Demographical Challenge.

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3.3. Biosphere Reserve level

3.3.1. Introduction

The Manual for the Management of Biosphere Reserves in Africa, published by the German Commission for UNESCO⁸, presents the governance structure according to two main categories, one called the "authority model" and the other "NGO model".

In the first model, the authority model - a management unit dependent on a ministry or other authority - the approach is top-down and the authority is mainly responsible for nature conservation and is often only responsible for the core (and sometimes buffer) zone; in this case, it can be difficult for the management unit to be active in areas concerned with sustainable development in the transition zone.

In the second model, that of NGOs, the management committee is composed of several private and public institutions and acts as a platform to bring together interests and communities. It is well suited to consultation but generally has no direct implementation competence and is often obliged to negotiate with other institutions to implement the decisions taken by the platform. In addition, it is more project-oriented than managerial. Integrated management with the core area is more difficult.

Jardin⁹ proposed another distinction between existing structures and ad hoc structures established for the biosphere reserve at the time of its creation. The first category includes the body in charge of a protected area, extended or not, or part of the area, for example, National Park, Nature Reserve, Marine Nature Park. It will have direct power of implementation, but arrangements will have to be made to meet the objectives of the biosphere reserve, in particular for the transition zone, where the body has no competence, and a management committee will have to be added for consultation. The case of IUCN category V protected areas must be treated separately, as it may include the transition zone and thus correspond to the boundaries of the biosphere reserve. It also includes a public governing body adapted to the needs of the Biosphere Reserve, such as a municipality with the addition of a management committee and associations, or the governance of an island (Menorca, Isle of Man) in which special provisions are made to address the objectives of the biosphere reserve. The second category includes a group of institutions and municipalities (syndicat mixte in France, public structure) or a group of partners, including associations (private structure). It may also include public/private partnerships. In the case of a private structure, its role will be advisory only.

3.3.2. Lebanon

Al-Shouf Cedar Nature Reserve is under the authority of the Lebanese Ministry of Environment (MOE) which manages it through the Appointed Protected Area Committee (APAC) that includes among its members the Al-Shouf Cedar Society (ACS), the Mayors of the larger villages, and independent environment experts. APAC liaises with the reserve's Management Team, which deals with the Reserve's day-to-day management.

In addition to the Ministry of Environment, the following government agencies have roles and responsibilities that impact on the environment and the Shouf Cedar Nature Reserve:

- The Ministry of Public Works is responsible for the Kefraya-Maasser Shouf road which passes through the SBR

⁸ Available at: https://www.unesco.de/sites/default/files/2018-01/Manual_BR_Africa_en-1.pdf

⁹ Jardin M. 2017. Man and the Biosphere Programme (MAB): governance of biosphere reserves. International workshop on MAB in South Caucasia. Turkey 7-9 nov. UNESCO.

- The Department of Antiquities has jurisdiction over the antiquities and ancient ruins in the SBR
- The Ministry of Information and the Maasser Municipality have authority over the T.V. transmitters in the SBR
- The Barouk Water Office has authority over water rights, especially the Barouk water, in the Shouf area.

The SBR needs the cooperation of all government and non-government sectors in order to fulfill its goal of conserving the natural and cultural heritage of the region, while also enhancing the well-being and income of the inhabitants of the villages surrounding the SBR. This can only be accomplished through the application of laws and regulations across and between the various jurisdictions within the reserve.

According to the Stable Institutional Structure for Protected Areas Management (SISPAM) project:

1- The responsibility of Protected Areas (PA) management in Lebanon is under the jurisdiction of the Ministry of Environment (MOE) which established two bodies to manage the reserve:

(a) The Appointed Protected Area Committee (APAC) is responsible for decision-making and achieving the objectives of the management of the site. APAC members consist of volunteers, designated by ministerial decision (MOE), representing the local communities (municipalities, district commissions), independent environment experts, environmental NGOs, or representatives of institutions (Ministry of Agriculture).

(b) The management team (MT), consisting of 7 key positions, is responsible for the operation of the PA (such as administration, management, technical and maintenance activities, protection, public awareness, communication and scientific investigation)

APAC forms the link between the MOE and the MT, whereby it works in close collaboration with both parties. APAC supervises the work of the MT and ensures the proper implementation of the management plan and the budget, and reports regularly to the MOE.

Since the ultimate authority of PA management is vested in the MOE, it is responsible for making sure the APAC and MT members are managing the PAs properly, in addition to authorizing contracts during recruitment and regulating resignations. The SBR Management Team currently employs 60 permanent and over 40 temporary staff all of whom are residents of the Shouf region.

The Association for the Protection of Jabal Moussa (APJM), a Lebanese non-profit NGO, manages the Jabal Moussa reserve. It is at the origin of cumulative international designations from UNESCO (RB), BirdLife Int'l (Global IBA), IUCN (example of "Best Practices" for PPA-Private Protected Areas), MedMAB, as well as Lebanese protection labels of "Protected Forest" (Ministry of Agriculture), "Natural Site" (Ministry of Environment) and "Protected Archaeological Sites" (Ministry of Culture).

The APJM consists of a Members' Assembly (annual meeting), a Board of Directors (quarterly meeting) and a management structure that manages the reserve on a day-to-day basis.

In 2012, the APJM presented its first 10-year sustainable management plan (supported by the Swiss MAVA Foundation and UNESCO Beirut) to the public at an interactive conference involving academics, researchers,

local elected officials, religious representatives, and local communities from the reserve's villages. This conference was the culmination of two years of work in cooperation with these same parties.

The main management guidelines in terms of biodiversity, culture/archaeology, university research and, above all, socio-economic development were defined at the time and were, of course, subject to constant development and ongoing dialogue with the parties involved in the 10-year plan at the outset.

A survey of the villages carried out by the specialist Professor of the Saint Joseph University of Beirut, Roula Abi Habib Khoury in 2009 and again in 2020 made it possible to detail this evolution as well as the local appreciation of the work of the APJM and the aspirations of the inhabitants, most of them socio-economic. The ten-year management and development plan should be updated in 2022.

3.3.3. Morocco

Although BRs in Morocco are not yet recognised in the legal framework, they are part of the national and regional strategies to combat desertification and poverty fostered towards the 1995-2000s (e.g. RBA and RBOSM) and the more recent strategies focused on biological conservation fostered since 2005 onwards (e.g. RBIM and RBC). This reflects two different periods of conservation strategies in the Moroccan government and administration.

In addition, governance at the Biosphere level in Morocco is different for each of the four BR, being the RBA and the RBIM the more active ones nowadays.

In any case, all the Moroccan RRBB correspond to the "authority model" mentioned in the introduction. The approach is in all cases top-down, with a management body dependent on a governmental authority (not always the same one) at the regional level. In the cases where this authority is the Regional Directorate for Water, Forests and the Fight Against Desertification (DREFLCD) mainly responsible for nature and forest conservation, the management of core, buffer and a big part of transition areas is easier because all forests are public domain in Morocco and under the responsibility of the DEF (inside and outside PAs). However, the management can become challenging in those areas not considered as forest, where the DEF has no direct implementation competence. These areas are under the responsibility of diverse sectoral administrations and the BR management body is often obliged to negotiate and coordinate with other institutions to implement the decisions taken regarding the BR.

The Regional Directorate of Water and Forests (DREFLCD) of the DEF is recognized as the management body in the case of the Arganeraie BR, RBIM and Atlas Cedar BR, according to the following missions:

- Implementation of the BR strategy;
- Application of the development and management plan of the BR;
- Preparation of annual programs;
- Planning of BR activities;
- Preparation and signing of partnership agreements;
- Administrative and accounting management;
- Drafting of BR activity reports;
- Coordination at the level of all stakeholders at the level of the BR
- Ten-Year Evaluation of the RB Action Plan

A network of local actors is involved in decision-making on the future of the BRs, too: local/regional authorities ("*communes et collectivités territoriales*"), public administrations and institutions, professional sectoral organizations, universities and research institutions, NGOs and representatives of the participation body of National Parks located in the BR. Its prerogatives are limited to the following missions:

- Review and approve the RB Management Plan submitted by the Management Authority;
- Make recommendations on any measures that may improve the management of the BR;
- Ensure coordination between the various stakeholders in the territory of the BR and the coherence of interventions;

The participation body is chaired by the President of the Regional Council. An annual meeting is organized at the request of the participation body. In addition, the Regional Directorate of Water and Forests (DREFLCD) acts as the Secretariat of the participation organization.

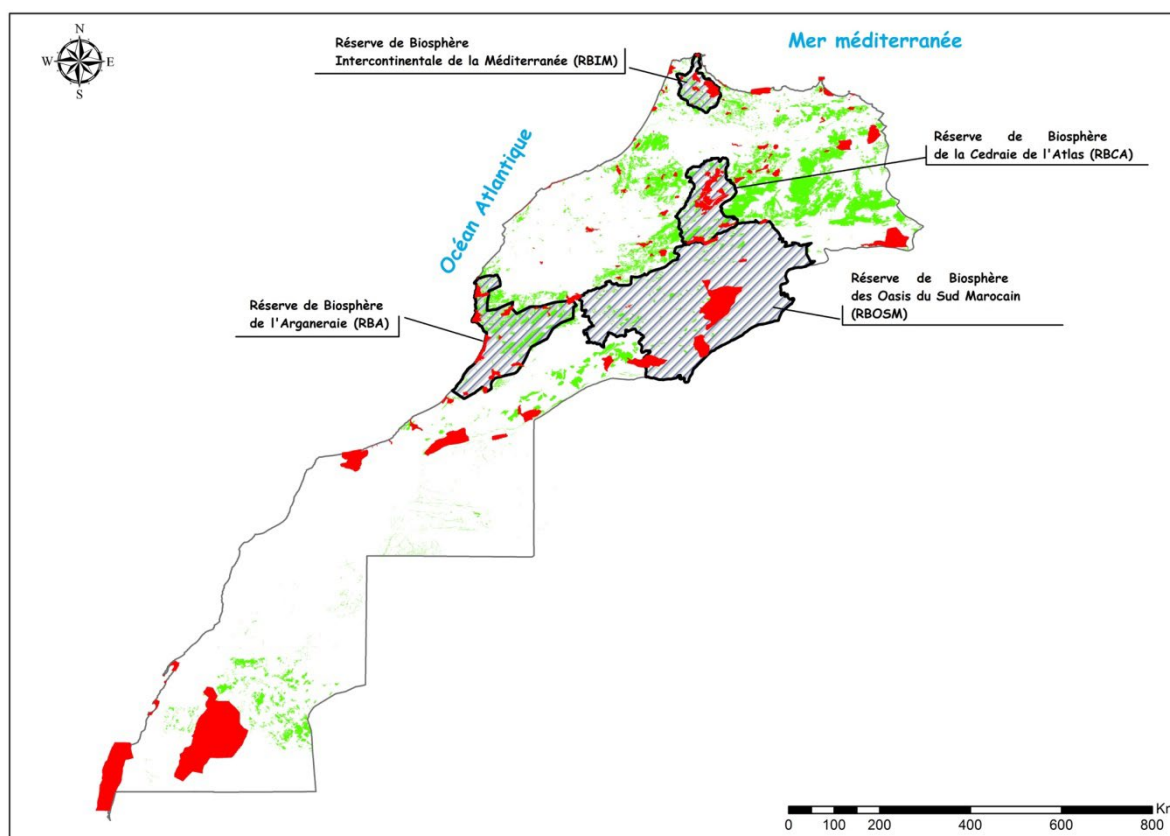


Figure 4. Map of the Moroccan Biosphere Reserves and the network of protected areas at regional level within the BRs. Source: DEF, 2016.

The Ministry of Agriculture (Ministry of Agriculture, Fishing, Rural Development and of Water and Forests) is recognized as the management body in the case of the RBOSM, even though this BR is quite silent last years.

Regarding the management plans, running and administration of each BR, each situation is different. For example, the RBOSM has its Framework Plan developed (not fully functional) since 2008 but no Action Plan implemented. The RBA, after its second UNESCO's periodic review (2018-2019) is in the process of reviewing its ancient Framework Plan and zoning (dated 2002) and has developed a new Communication Plan and Action Plan (the later still to be validated by its stakeholders). The RBIM, after implementing its Action Plan (2011-2015), in 2016 renewed the bilateral Memorandum (Morocco-Spain) for 10 years to face the next phase of the Action Plan; and in 2018 succeeded its first UNESCO's periodic review. The Atlas Cedar Biosphere Reserve is currently in the process of being set up, but at a relatively slow pace. A development and management plan is being approved, launched by the Regional Directorate of Water and Forests of the Middle Atlas. This biosphere reserve is spread over three large administrative regions, which will complicate the establishment of a management body and make it difficult to implement the management and development plan. Currently, the associative fabric remains the only active partner in the RBCA, which carries out actions to enhance biodiversity, promote ecotourism and support the local population. This has none of them functional yet, although there is in place an strategy lead by DEF for protecting the ecosystem and management plan for the three National Parks included in the BR (i.e. the 2015-2024 ten-year strategy¹⁰).

"Biosphere reserves are not the subject of an international convention, but simply obey common criteria that allow them to properly fulfil their three functions. They form a worldwide network that promotes the exchange of information and experience." (DEF¹¹).

3.3.4. France

Until 2016, French Biosphere Reserves had no existence in national law. In practice, the 14 French biosphere reserves rely on one or more management / coordination mechanisms: protected areas, local authorities, associations. The reserves do not receive funding for their operation as such, but generally through their management /coordination structures. Most of them correspond to the mixed model described by Jardin (2009), except Fontainebleau-Gâtinais, BR, NGO type.

BR	Designation date	Governance type	Surface (ha)	Population
Commune de Fakarava	1977 extension en 2006	Association de la réserve de biosphère de la commune de Fakarava	288 880	1500
Camargue (Delta du Rhône)	1977 extension en 2006	Parc Naturel Régional de Camargue, en collaboration avec le Syndicat mixte de la Camargue Gardoise	160 000	De 110000 à 220000 (en été)
Falasorma Dui Sevi Vallée du Fango	1977, extension en 2019	Parc Naturel Régional de Corse	23 500	450
Cévennes	1985	Parc National des Cévennes	325 000	50000

¹⁰ See <http://mapecology.ma/slider/ifrane-regeneration-de-cedraie-porte-plus-de-15-000-ha-hceflcd/2018/> and <https://www.marocnews.fr/2019/07/23/la-sauvegarde-de-la-cedraie-de-latlas-une-responsabilite-collective/2019>

¹¹ <http://www.eauxetforets.gov.ma/Biodiversite/GestionBiodiversite/Reserves-Biospheres/Pages/Reserves-Biospheres.aspx>

Îles et Mer d'Iroise	1988 extension en 2012	Parc Naturel Régional d'Armorique et Parc Naturel Marin d'Iroise	200 000	1400
Vosges du Nord Pfälzerwald	1989, trans-frontalière depuis 1998	Parc Naturel Régional des Vosges du Nord en France, Naturpark Pfälzerwald en Allemagne	310 300	337000
Mont Ventoux	1990	Parc naturel régional du Mont Ventoux	80 368	30000
Archipel de Guadeloupe	1992, extension en 2013	Parc National de Guadeloupe	69 707	124000
Luberon - Lure	1997 extension en 2009	Parc Naturel Régional du Luberon	244 645	170000
Fontainebleau - Gâtinais	1998 extension en 2009	Association de la RB de Fontainebleau et du Gâtinais	150 544	267665
Bassin de la Dordogne	2012	EPIDOR (Établissement Public Territorial de Bassin)	2 400 000	1200000
Marais Audomarois	2013	Parc Naturel Régional Caps et marais d'Opale et communauté d'agglomération de Saint Omer	22539	68900
Mont Viso	2013, transfrontière en 2014	Parc Naturel Régional du Queyras Parc du Po Cuneese	427 080	292 369
Gorges du gardon	2015	Syndicat mixte des Gorges du gardon	455	188653

Table 1. Specificities of French Biosphere Reserves: organization, surface, population

Thus, the delimitation of biosphere reserves corresponds to several logics:

- Either their perimeter is the same as that of their support structure. This is the case for the two national parks of the Guadeloupe Archipelago and Cévennes, governed by a renewed law approved in 2006: it considers that the core area of the Park is included in a larger zone according to a principle of "ecological solidarity", concept developed by Mathevet et al (2010), Mathevet 2012)¹². The BR and Park governance is merged: board including institutions, local authorities, socio-professional representatives, associations, etc. The management plan of the BR is assimilated to the Park's charter. It should be noted that the functions of the "new generation" National Park are very similar to those of the Biosphere Reserves

The same principle of superimposed perimeters, bodies and management documents (and functions) also applies to the Vosges du Nord (French part of the Franco-German transboundary BR) and Mont-Ventoux Regional Nature Parks. Here too, the functions of the two schemes are very similar.

These situations ensure stable funding and personnel.

¹² Mathevet R., Thompson J., Delanoë O., Cheylan M, Gil-Fourrier C, Bonnin M. (2011) La solidarité écologique : un nouveau concept pour une gestion intégrée des parcs nationaux et des territoires. *Natures Sciences Sociétés* 18, 424-433 ; Mathevet R (2012). La Solidarité écologique. Ce lien qui nous oblige. Actes sud Eds, 216 p.

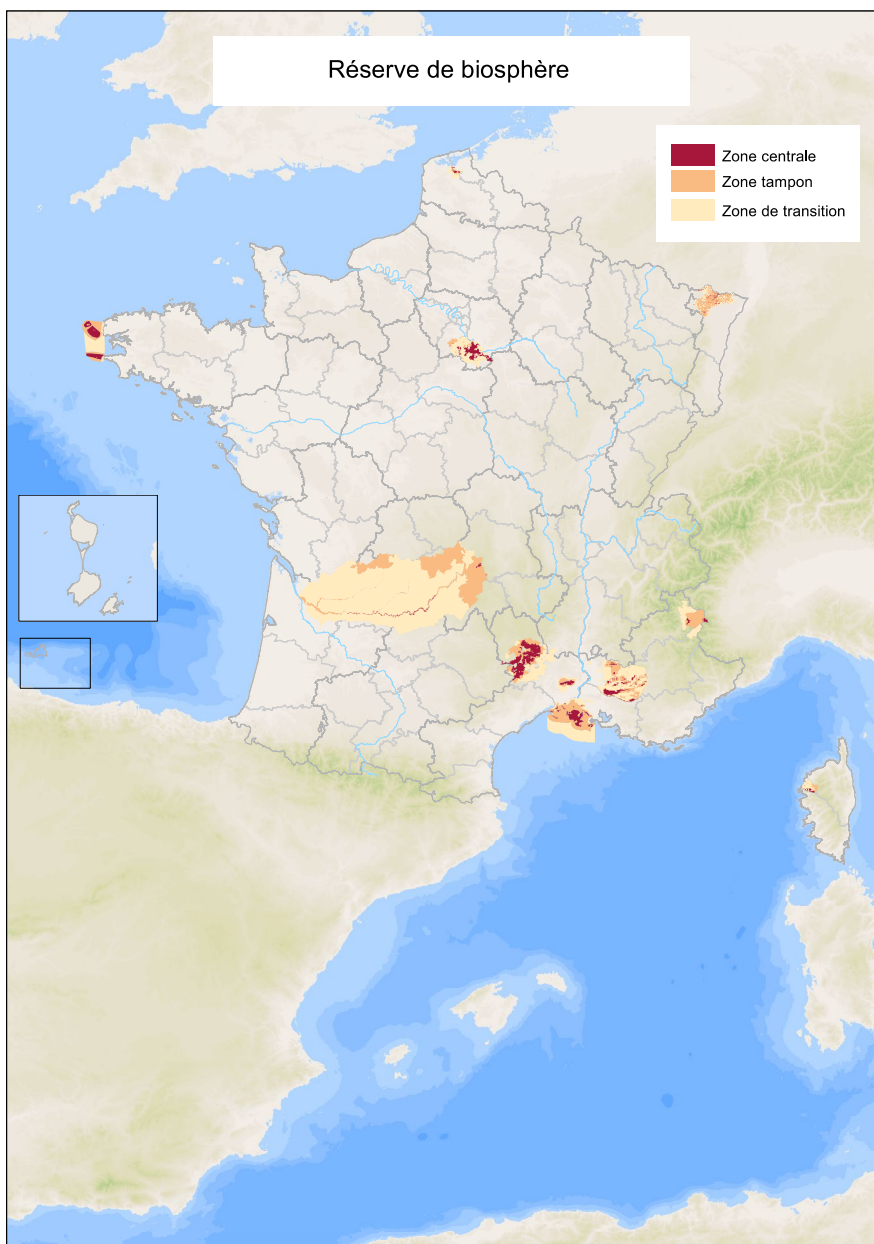


Figure 5. Map of French Biosphere reserves

- The RB of Falasorma Dui Sevi (extension of the Fango BR approved in 2020) constitutes a coherent and clearly identified sub-group in terms of perimeter and management of the Corsican Regional Nature Park. The decision-making structure is that of the nature park, but it is accompanied by a management advisory committee specific to the biosphere reserve, representing its various stakeholders, as well as a scientific council and a management policy defining specific objectives.
- The perimeter of the BR has a geographical, ecological or socio-cultural logic which requires the collaboration of several structures which co-manage a coherent set: this is the case of the Camargue (Rhône delta), one of the first French BRs (1977) extended in 2006. This is also the case for Marais Audomarois (the town of Saint Omer and its marshland), and îles et mer d'Iroise BR where a regional nature park and a marine park

co-manage the BR. In all cases, each structure is a decision-maker on its territory and applies its own management policy. Cooperation is defined for projects on the scale of the whole area, which respond to specific funding.

In the Fontainebleau Gâtinais BR, a specific association is responsible for the coordination of the BR. It involves cities and villages local authorities, a Regional Nature Park and several associations. A scientific council is specifically dedicated to it.

The large Dordogne Basin biosphere reserve concerns its whole watershed. It is managed by a public structure whose competences concern the management of rivers and aquatic environments. This situation calls for the establishment of partnerships with other institutions or local authorities in order to ensure the range of missions required by BRs in terms of management (agriculture, forestry, economic development, urban planning, etc.), education, etc. In the absence of specifically dedicated funding and support from the public authorities, the BR is struggling to sufficiently broaden its partnerships and has ensured a leadership and presence on the scale of its immense territory.

- The biosphere reserve is larger than the perimeter of its support structure (Luberon Lure, Mont Viso, Gorges du Gardon). This requires political agreements with neighboring territories, which are not always formalized, and sometimes prefigures the extension of the support structure's boundaries.

3.3.5. Spain

The Spanish Network of Biosphere Reserves is made up of all the Spanish BRs that are designated by UNESCO. In 2019, it reached the number of 52. Spanish BRs are distributed among 16 of the 17 Autonomous Communities and three of them are transboundary, one of which is intercontinental.

The practical application of the biosphere reserve concept in Spain has evolved similarly to the international context. From the first biosphere reserves, named in 1977, until 1992 all the areas included in the Network were previously natural parks, national parks or nature reserves, except Urdaibai which was declared in 1983 and was covered by a specific law. In 1993, Spain broke this trend on an international scale and proposed two complete islands: Lanzarote and Menorca. They contained consolidated protected areas or those about to be declared, but were presented as projects for the integrated management of a complex territory, covering all the productive sectors, all the uses of the territory and all its inhabitants, as well as proposing an operational programme based on participation and goals in line with sustainable development. The impact of these two experiences on the approaches adopted in Seville in 1995 was significant. Between 1997 and 2006, there was a real emergence of biosphere reserves in Spain, with 23 new territories declared as biosphere reserves, without taking into account, in all cases, the recommendations of the Seville Strategy and the Statutory Framework.

From 2007 onwards the rate of declaration of new reservations decreases significantly, while that networking is strengthened, based on a restructuring of the MAB Committee and the support for the operation of biosphere reserves by OAPN. The new situation allows to offer a solid support to the Spanish Network of Biosphere Reserves and to enter a period of intense activity, aimed at deepening the integral deployment of the figure, in cases of biosphere reserves already structured, and to adapt their situation to the requirements of Seville, in the cases of biosphere reserves that lacked a minimum organizational structure.

The increased requirements, however, did not impacted territories that aspire to being part of the Network, on the contrary, seems to have had a claiming effect and are many who have expressed their wish to apply for the declaration of a biosphere reserve.

The requirements that are now underpinning new proposals are determined by the Law 42/2007 and for the functioning of the new structure of the Spanish MAB Committee and its advisory bodies, in accordance with Royal Decree 342/2007, which ensure that the Spanish biosphere are real experiences where they work trying to harmonize the conservation of resources with local development, and where knowledge and experience that enrich the Network.

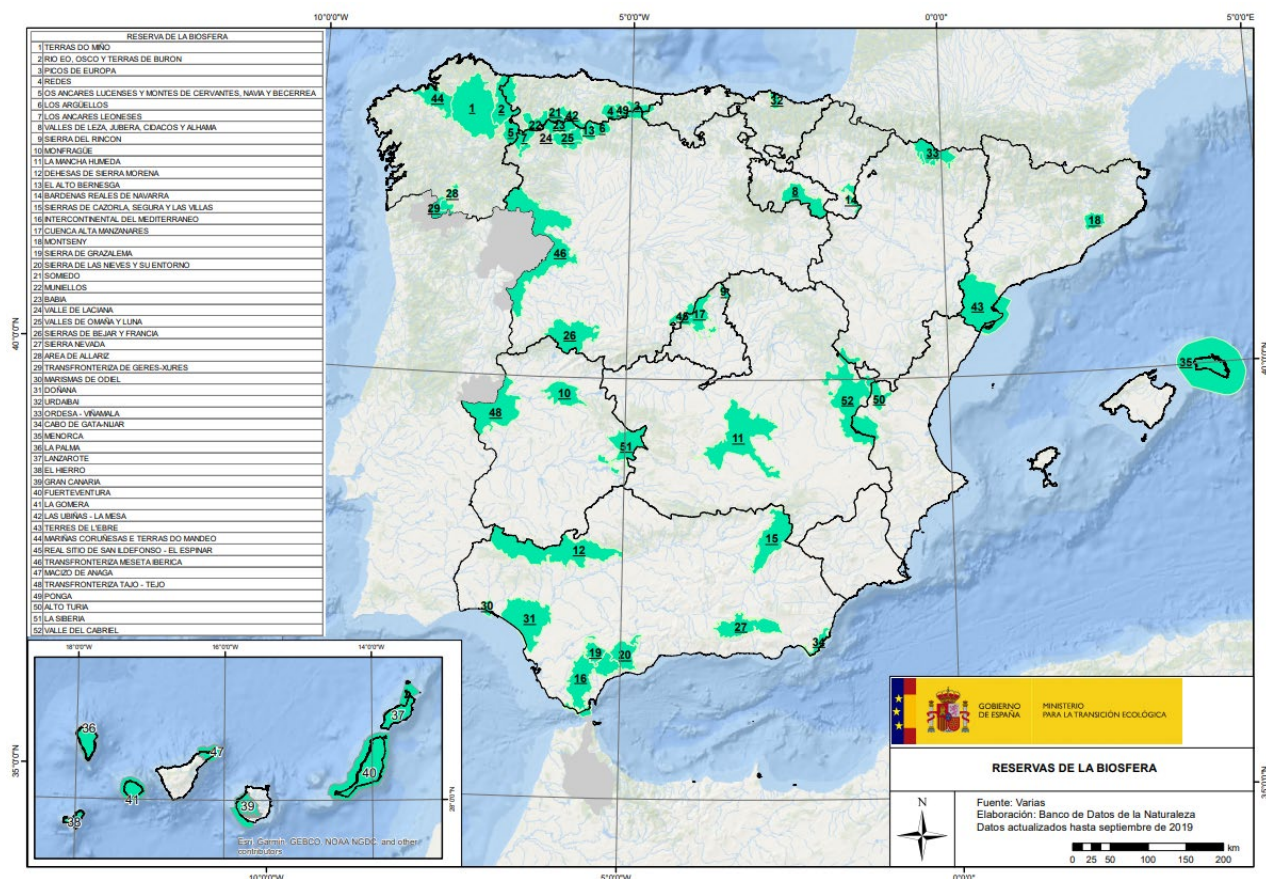


Figure 6. Map of the Spanish Biosphere Reserve Network (source: MITECO.gob.es)

The existing biosphere reserves in Spain make up a varied and representative mosaic of ecosystems and the relationship of man with his environment. To the important natural heritage they house, they add a wide range of organizational and participatory experiences, as well as numerous lines of sustainable development. Under the protection of Royal Decree 342/2007, the strong support of the Autonomous Body for National Parks for the Spanish Network of Biosphere Reserves, together with the support of other departments of the General State Administration, of the Autonomous Communities, of local entities and private agents, has stimulated intense networking activity.

As already discussed, the contribution of reserves to the functioning of the network comes from the institutions responsible for the biosphere reserves, their technical teams and social actors. The responsible entities

determine the relations with the respective autonomous communities, which are represented on the MAB Committee; in quite a few cases, the autonomous community itself is the responsible entity. A very special role in each biosphere reserve is played by the technician accredited by his or her respective institution as a reserve manager and, therefore, as a member of the Management Council of the Spanish Network of Biosphere Reserves.

The study by Santamaría Arinas (2015) provides the most comprehensive picture of the legal situation of Spanish Biosphere Reserves in the official regulations of each autonomous community, and highlights the most important deficiencies in each case. The mosaic of varieties of Institutional Governance schemes is shown in Figure 4.

As can be seen, half of the reserves (23) are governed directly from the corresponding environmental departments of the Autonomous Communities. Most of these coincide with other protected areas, following the traditional scheme of the late 20th century. This is the model chosen, for example, by the administrations of Andalusia, Extremadura, Madrid and Asturias. This model has the advantage of great budgetary security and a well-defined space in the administrative organization chart.

However, in some cases, they suffer from certain shortcomings in terms of meeting the objectives of the MAB Programme, by focusing most of their resources on conserving the protected area and providing logistical support for the core zone to the detriment of the other fundamental component of the biosphere reserve: socio-economic development. These spaces are regulated by specific regulations that define their functions in the field of conservation and with competences restricted in many cases to the environmental field, which can make it difficult to integrate other sectors that play a relevant role for the reserves: industry, tourism, culture, economy, etc.

It is interesting to highlight the case of the Sierra de las Nieves Biosphere Reserve for its exceptionality within the governance mechanism prevailing in the Andalusian reserves. The Sierra de las Nieves Biosphere Reserve incorporates a natural park within its territory. The management of the reserve and the park is carried out in a coordinated but autonomous manner. The body of management is articulated through a collaboration agreement that includes municipalities, an association and the autonomous community as responsible for the management of the natural park. The manager of the biosphere reserve is an employee of the grouping of municipalities (*mancomunidad*), which is responsible for the functions of the biosphere reserve in the territory and that it depends, to a large extent, on external opportunities for resources. This is an example of success that could well reference for other reserves.

Likewise, in the cases of the Odiel Marshes (Andalusia) and the Upper Basin of the Manzanares (Madrid) the traditional scheme of overlapping protected area and biosphere reserve is in place. However, at the request of UNESCO it was necessary to extend their boundaries beyond the corresponding natural parks.

In the case of Marismas del Odiel this extension was approved last year and has led to a model of governance that integrates municipalities and actors outside the park. The chosen formula was that of the Collaboration Agreement, still pending approval.

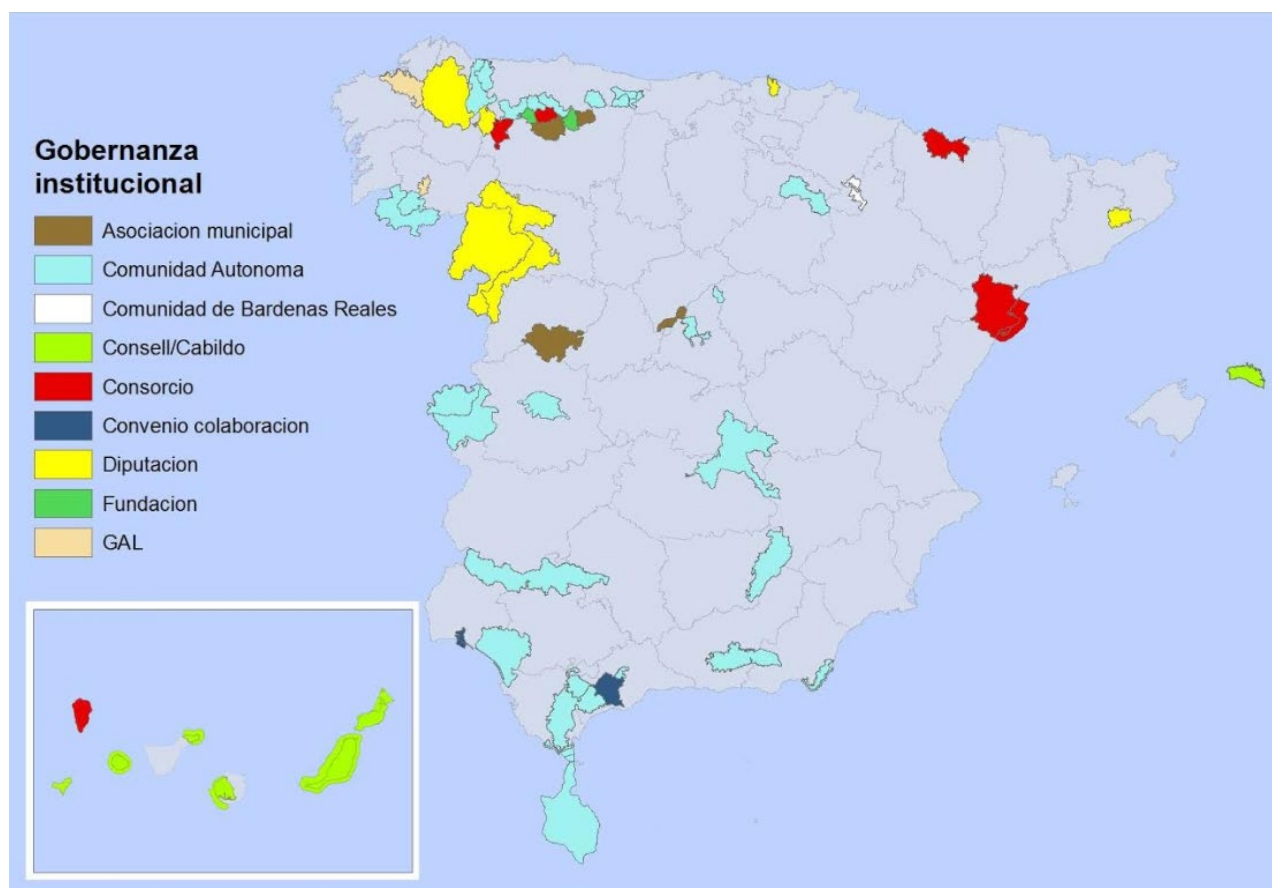


Figure 4. Typology of Institutional Governance in Spanish Biosphere Reserve (Oñorbe, 2018). In the legend, from the top to the bottom: Municipal Association; Autonomous Community; 'Bardenas Reales' Community; Consell/Cabildo; Consortium; Collaboration Convention; Provincial Council; Foundation; GAL

The extension of the Upper Manzanares River Basin, Biosphere Reserve of the Rivers Manzanares, Lozoya and Guadarrama according to the new denomination, will integrate 11 new municipalities outside the natural park. The integration of these territories will be an enormous management challenge that will require the agreement of new agents in the territory and will require the consensus of the municipal entities and the social agents. It will be interesting to follow its evolution.

The *Diputaciones*, *Cabildos* and *Consells* constitute an institutional governance mechanism of intermediate territorial entity between the Consejerías de Medio Ambiente and the minor local entities for which they bet a quarter of the reserves of the Spanish network (11). They maintain high levels of budgetary security, above all in the allocation of personnel, and although they have limited legal powers over the territory, they have management capacity. They function as a bridging body between autonomous communities and municipalities, generally showing good coordination of sectorial policies. As for the provincial councils, this is the model chosen by some peninsular provinces (Lugo, Zamora, Barcelona). Town councils and *consells* are present in most island administrations (Canary Islands, Balearic Islands). Special mention should be made of the La Palma Biosphere Reserve, which is managed by a foundation but with great involvement of the island's Council.

With regard to the Councils, the case of Montseny should be highlighted, which, after a process of extension to extend the limits of the reserve beyond the natural park, had to rearrange its management model. The solution adopted consisted of integrating the park into the Provincial Council's scheme within the reserve, making the park Director organically dependent on the reserve manager. Since then, the multifunctional model that drives the MAB Program has been exemplary in its performance. The park and its director focus on the conservation function in the core zone and the reserve are coordinated with it and work on the other functions of the buffer zones and transition: socio-economic development and logistical support.

The other biosphere reserves are managed by an amalgamation of local entities not necessarily driven by an administration (foundations, associations of municipalities, consortia). One of their main weaknesses is budgetary insecurity, but at the same time they are extremely flexible and have a great capacity to adapt. This is the management formula chosen, for example, by the biosphere reserves of Castilla y León and Aragón (Ordesa Viñamala). Special mention should be made of the Bardenas Reales Biosphere Reserve, managed by the Community of Bardenas with full jurisdiction over its entire territory since the 9th century, and the Mariñas Coruñesas e Terras do Mandeo (A Coruña) and Allariz (Orense) Biosphere Reserves managed by rural development associations under the supervision of the corresponding administrations.

A priori, the advantage of these more local models is that they allow for greater contact between the management bodies and the inhabitants, which favours their participation and involvement by complying with one of the fundamental components of the reserves, namely the participation of the inhabitants in the management of the territory. The main drawback of this management model is the lack of specific budgetary and/or staffing resources to manage the reserve.

Finally, we can summarize Santamaría Arinas' work in a few remarks:

- Five Autonomous Communities have not yet developed a national regulatory framework for biosphere reserves: Cantabria, Catalonia, Galicia, the Balearic Islands and Navarre are not up to date with the commitments they made with the approval of the PAMO. This does not necessarily mean that the biosphere reserves in these territories do not have their corresponding management bodies and instruments in practice. Although it is true that there is no express provision in this regard, there is nothing to prevent the Spanish MAB should bear this in mind when taking decisions. It could penalize biosphere reserves already existing or also could be the basis for unfavourable reports in the procedures for the declaration of new biosphere reserves in these Autonomous Communities (as long as they do not comply with Article 4.7 of the Statutory Framework which requires "having taken" measures to "equip" a number of "mechanisms of management" that, without prior regulation, remain weak).
- There are various situations that show that having regional rules on biosphere reserves does not necessarily mean that in these Autonomous Communities there is sufficient regulation of the organization and planning of their management. The content of the regulations still in force in Andalusia or Castile-La Mancha and, more recently, in Madrid and even, to a certain extent, in Castile and León, perfectly illustrates what may be considered another way of not materially fulfilling the commitments undertaken under the PAMO.
- The six remaining Autonomous Communities are partially meeting their commitments under the PAMO. It is true that there are significant differences in content between them which, in principle, are perfectly legitimate, respond to the local circumstances present in each case and provide an interesting diversity that can enrich the whole as well as the exchange of experiences. It is also true that in most cases it would be desirable

to enter adjustments or updates of different scope. But, generally, it can be said that the degree of compliance is higher in regard to the organization of biosphere reserves rather than in the management planning.

- In overcoming these difficulties, the Autonomous Communities could be missing the coordination task that corresponds to the State; a coordination with which it is not a matter of erasing legitimate differences but of proposing a minimum of common guidelines to clarify the doubts. In the meantime, this is not the only contribution that the state legislator could make to overcoming the above-mentioned problems, which are particularly complex when the biosphere reserves coincide with some national parks. Indeed, the state legislation on national parks introduces a rigidity that is most probably unnecessary.

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3.4. Mechanisms for the involvement of local communities

3.4.1. Lebanon

Local stakeholders involved in the management of the **Shouf Biosphere Reserve**

- 22 municipalities of the Shouf and Aley and West Beqaa districts
- Federation of Municipalities of the Higher Shouf (Moukhtara)
- Al-Shouf Cedar Society (ACS): a non-governmental organization that plays a critical role in the management of the SBR
- Appointed Protected Area Committee (APAC)
- Local NGOs: Green Orient, Friends of Green Environment, Lebanese Home for Environment
- Small and medium entrepreneurs in the rural economy sector: beekeepers, farmers, shepherds, collectors
- Agriculture-related enterprises (i.e. Kefraya Winery)
- Private land owners and providers of tourism services such as: restaurant owners (50); guesthouse owners(12); hotel/hostel owners(5); local guides(50);shop owners (50+)

- Local schools and education associations

The site enjoys inclusive and adaptive governance. Though complex, because it includes multiple municipalities and a mix of private and public lands and many access points and multi-use areas, its framework is representative of local authorities and community leaders. Stakeholders are fairly represented and very involved in different aspects of decision-making. Discussions and planning for site activities is regular and involves multiple actors. SBR recognizes the rights of the local communities that are represented in the consultation bodies, knowing that the municipalities of the surrounding villages are officially part of the governance.

The site uses an adaptive framework to amend plans and foresees new activities to help deal with issues. For example, work to engage refugee workers in land restoration activities was a pro-active response to the influx of population caused by the conflict in neighbouring Syria

Jabal Moussa

It is important to note that the Jabal Moussa site did not benefit from any protection before the constitution of the APJM. Given the many levels of protection (protected forest, natural site, archaeological sites obtained through the APJM), the ministries concerned (agriculture, environment, culture) should, in theory, also be part of the governance body of RB.

In practice, contacts with these bodies are also sporadic, because the institutions in question were initially approached to grant their protection to the site by the APJM, now have a host of other concerns and find, during their visits for festive events, inaugurations or the conclusion of projects, that the work is being done properly and the development is ongoing, with respect for the natural and cultural heritage.

APJM's face-to-face contact with local communities is therefore the key to successful management of the reserve.

We can focus here on the two surveys carried out, ten years apart, by Prof. Roula Abi Habib Khoury, from St. Joseph University in Beirut, to analyse the impact of ten years of APJM's work in the main villages of BR and to assess the perception of the inhabitants of the villages in and around the core area.

The ten-year comparison shows that BR is now perceived as a significant employer and that the feeling of "encroaching on freedoms" is less acute. The concept of ecotourism, after an increase in the annual number of visitors from 300 to 30,000, is well understood and, for the most part, accepted due to the number of jobs created (employees, guides, guards, guesthouses, local products).

Young people (employees, guides) and women (guesthouses, local products) make up the majority of the beneficiaries. Part of the population continues to demand unlimited access to all activities, both legal and illegal, while another fears the proliferation of wild animals.

All the meetings held over the years with the mayors of the villages and the inhabitants reinforce the following reality:

Given the general impoverishment and the (growing) economic crisis, the main demand is for direct socio-economic benefit. Local participation is therefore usually limited to a desire to direct the ecotourism windfall and the purchase of products towards one's village. The network of eco-actors remains an objective to be

instituted once the circuits and direct activities have been sufficiently developed. Jealousies are feared and a "soft" introduction could soften the impact.

3.4.2. Morocco

In Morocco, the mechanisms for the involvement of local communities in Biosphere Reserves can be considered at different levels (e.g. local authorities, civil society organisations and local communities themselves). In general, key social and local stakeholders are invited to contribute (through their advice) and/or validate relevant strategic documents for a certain biosphere reserve (e.g. management plans); however the formal and informal contributions may operate under different mechanisms in each of the four BRs. For example, in the case of the most ancient Moroccan BR, the Arganeraie Biosphere Reserve (RBA), a network of local (i.e. province level) civil associations was fostered since the creation of the RBA. The "Network of Associations of the Arganeraie Biosphere Reserve" (RARBA) has become since then one of the main civil society actors participating in and contributing to the key debates and documents regarding the RBA. The RARBA remains a good example of civil society participation in the management of BRs. As a first example, it has succeeded in including the debate about BRs at the political level (e.g. in Tiznit province and the national Parliament); a second example, the RARBA has recently (i.e. January 2021) fostered a national initiative to create a national network of associations for the BRs in Morocco.

Despite the examples of the RARBA and the provincial political authority in Tiznit (i.e. "the Conseil Provincial des Élus"), major shortcomings remain in Moroccan BRs regarding social participation in BR management. Local and regional authorities (including communes, provinces and the Regional Councils) have not the resources, capacities and sometimes resolve to get involved in the RBA management as would be desirable. In addition, a communication strategy involving direct participation of local communities and civil society, the use of social networks, and the involvement of young people and women for example, is lacking.

As in the case of other countries in the consortium, Moroccan biospheres reserves first, do not have a formally constituted and functional participatory organism, due to multiple factors, although it is their aim. Second, they are not visible to the general public; that is, there is a lack of ownership by the civil society, politicians and inhabitants in general, communication problems and insufficient promotion of the BR model.

The Regional Departments of Water and Forests come up with proposals for development actions after studies and consultations with the various regional and local stakeholders. These proposals must be validated by the central services of the Department for Water and Forests. All the local and regional stakeholders present themselves in the diagram of the structures of execution and action in the BR: territorial municipalities, external services of the various Ministries, provincial and communal services, the local socio-economic institutions, the cooperatives, the NGOs. Also the MAB-Morocco committee and some experts and academics promote participatory processes.

The fact that various regional/local authorities ("collectivités territoriales", i.e. communes) work in the BR, a representation of the executive committee (MAB-Services des Eaux et Forêts) at the level of these communes, evidences there is a great need to remind of the importance of the BR during the decision-making process.

A great flaw is the level of insufficiency of planning and management skills of BRs at the administrative regions level (Conseil de la Région). In addition, awareness and communication are weak in the case of Moroccan BRs. At the local level, it is the associations and socio-professional actors, particularly NGOs, the ones who deal with divulgation and information.

3.4.3. France

French Biosphere Reserves are all established according to bottom-up approaches. In 1998, a guide to assist in the management of French Biosphere Reserves (BIORET et al, 1998) was inspired by a reflection on the implementation of the Seville strategy (UNESCO 1995). It proposed a reflection on the role of the manager, a term used at the time, which has now been replaced by the word coordinator, more appropriate. Before the emergence and development of participatory approaches, it proposed to set up territorial animation approaches. More recently, some researchers have proposed a model approach to organize local participation, which is the one that is now recommended and underway within several sites. It combines several participatory approaches to concern population (public workshops, Town hall meetings, ARDI (*Acteurs, Ressources, Dynamiques, Interactions*) methodology...).

The staff of each support structure animates the participatory processes, sometimes with the support of animation professionals or MAB France, and always with methodological support if desired.

The difficulties for its implementation arise mainly from the overlapping of French Biosphere Reserves with different types of protected areas.

Often, the executive power is the one in charge of the support structure of the BR. It is completed, in all French Biosphere Reserves, by thematic commissions involving local public and private partners: elected officials, partners in agriculture, forestry, tourism, fisheries, cultural associations, naturalists, sports... These commissions have major roles, particularly in the preparation of strategic or management documents. All these support structures areas that have management documents of different scope (management plans, charters, planning documents, urban plans, etc.), usually established in participatory way.

There are technical teams for the Biosphere Reserves, which work with local authorities. They are various, but usually (when BR is also a national park or PNR), they have multidisciplinary skills in the field of sustainable development, and in particular in the organization of local participation: biodiversity, support for local development, mediation, local participation, conflict management, education, communication, awareness raising.

Concerning visibility, BRs are expert/institutions-oriented and they often work with organizations and associations' representatives. Their ability to be visible to the general public is weak or non-existent. There is a lack of readability of the BR/support structure, communication problems, lack of ownership by the general public, insufficient promotion of the BR model. A wider communication is now expected: this implies developing a modern communication strategy, with more direct participation, use of social networks, and involvement of young people, which should clearly be strengthened.

Finally, the BR is mobilized by MAB France 2/3 years before the UNESCO deadline for the periodic review (a new participatory mobilization and discussion on future challenges) in order to organise participation. Often, Master MAB students are involved in the process during projects or traineeship.

3.4.4. Spain

In order to assess the level of representativeness of the social actors and the capacity of influence of the Autonomous Body for National Parks periodically produces a report on the indicators of the Spanish Network of Biosphere Reserves. The results of the last report indicate that there is no direct correspondence between the model of management body management and success in social participation. If anything can be highlighted, it is that, contrary to as expected, the biggest shortcomings are found in the direct management municipal bodies. This is because these reserves do not have a formally constituted participatory organism, due to the scarcity of financial resource and/or the specific personnel invested as BR management staff.

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3.5. Financing instruments

3.5.1. Lebanon

The Lebanese BR's have a high level of transparency in sources and uses of funds. While uses are mainly salaries, maintenance, and cost of projects, sources include projects, sustainable sales revenues (entry tickets, sale of products, seedlings etc...), private donations, general fundraising exercises and, in case of Shouf BR, government subsidies. Sources are further detailed below:

- Projects: both Shouf and JMBR have been a part of international projects (sometimes together) funded by embassies, social cooperation entities, global foundations focused on both environmental and social work as well as sustainable tourism.
Numerous EU-funded projects are currently ongoing (EU, USAID, MAVA Foundation, CEPF, AFD, WFP, UNDP...)
- Sustainable Sales Revenues: Shouf BR receives over 100,000 visitors a year, Jabal Moussa over 30,000. Such visitors plant trees from BR's nurseries, purchase traditional food products, artifacts and publications at reserve entrances, have lunch at BR-sponsored guesthouses, sleep at BR - sponsored bed and breakfasts... These revenues constitute the sustainable backbone of BR finances and, as more visitors (within the limits of carrying capacity) are convinced of the conservation value of what they visit, the protection function is enhanced. In addition, because these visitors directly benefit the BR inhabitants, the latter's desire to protect grows. Instead of a "protected" area, the BR becomes a "protecting" area for nature, culture, local people and visitors alike.

The SBR is establishing ecotourism maps for each of the villages to reduce the pressure on the core area, and to provide the local communities with income generating opportunities: <http://shoufcedar.org/front-page/publications-2-2-3/index.html#1588849639883-3f408e1e-c8b7>

- Private donations and fundraising exercises:
CSR-minded corporate donors are targeted by both Lebanese active BR's for sponsorship. Annual fund-raising events (such as Shouf's "Jabalna") are famous nationally. Fund-raising campaigns or dinners have become customary. These constitute an important funding source (not valid for SBR)
- SBR has now a Development and M&E Department, responsible for the design, implementation, management, monitoring and evaluation of programs/projects.
- SBR has initiated a Destination Management Organization works on the economic development and the support to livelihoods in the region.

3.5.2. Morocco

There is not a specific financial mechanism designed and allocated specifically for Biosphere Reserves, neither at national nor biosphere reserve level in Morocco. However, the main sources of funding come from sectoral administrations with direct responsibilities over each biosphere reserve (such as HCEFLCD or Agriculture) and international funders and donors. For example, out of the current four biosphere reserves, the initial application or candidacy projects for the UNESCO-MAB BR label of the three first BRs were co-funded and supported by international partners and funders (e.g. German cooperation for the RBA, French cooperation for the RBOSM and Spanish cooperation for the RBIM).

At the national level, it is the sectoral administration of Waters and Forests (DEF), in charge of the national network of protected areas and national responsible for BRs, the one allocating budget for both protected areas and conservation projects (mainly related to forests). Besides, other sectoral administrations and public agencies such as the Ministry of Agriculture or the ANDZOA (for the RBA and RBOSM) may allocate internal funding resources for development projects addressed to areas within BRs, and for studies or initiatives regarding a BR. In all these cases, the funding allocated (to projects with an impact on the BR) depends primarily on the sectoral administration or public agency priorities and it is set annually by the national and regional responsible of the aforementioned institutions.

In parallel, another relevant source of funding for Moroccan biosphere reserves territories comes from specific projects (generally development projects) implemented by Moroccan administrations or institutions in collaboration with international funders and/or NGOs such as GIZ, PNUD, Canadian Cooperation, Japanese Cooperation, MAVIA, etc. Again in this case, the project-driven funding (as for the public sectoral funding), the priorities are not necessarily aligned with those set by the BR, despite they tend to be highly positive.

Furthermore, an outcome of the lack of national legal framework for BRs, is that they are not an internal priority for none of the sectoral administrations involved. The main consequences are: (a) the scarcity of resources (financial, human and technical) at the national, regional and local levels; and (b) the non-permanent and dispersed funding schemes, hindering long-term funding, planning and management of the BRs.

Finally, national MAB Committee does not have funding either, its members contribute to it voluntarily. And the RARBA (network of associations of the RBA), for example, asks for funding to the different administrations (local, provincial or regional authorities) or the international funders for their activities (e.g. Ministry of Environment, GIZ, DREF, ...).

3.5.3. France

There is not a specific financial mechanism designed and allocated specifically for Biosphere Reserves at local level in France. Each Biosphere Reserve receives its own funding from state, regions, departments, according to its specific support structure or organization. It also applies to European projects.

For the BR networking activity, MAB France is mainly funded by the French Office for Biodiversity. It gets also support from its members, scientific institutions and Biosphere reserves. Its applies to National or European projects.

3.5.4. Spain

The financial capacity and sources depend on the governance model of each Biosphere Reserve, as already outlined in the related paragraph. The following table resumes the panorama:

Governance model / body	Financing
Environment agency of the autonomous community	High financial security
Diputaciones, Cabildos and Consells (Provincial governments)	High financial security
Local Administration	Scarcity of resources

3.6. The Scientific Committees

3.6.1. Lebanon

Since the Lebanon BR committee is an integral part of the Lebanese CNRS (Centre National de la Recherche Scientifique), the scientific component has been constantly present. Both of Profs. Georges Tohmé (President) and Ghassan Ramadan Jaradi (Secretary) of the committee have extensively supported both BR's over the last decades, providing support since UNESCO nomination, through special studies on mammals, birds and plants, periodic reviews etc...

Of course numerous other scientists, on an ad-hoc basis, support the BR's. Currently some of the most well-known experts from national and international reputed universities are involved in studies involving biology, biodiversity, architecture, archaeology, geology as well as social sciences and economics.

For Jabal Moussa, in addition to the six endemic plants, the discovery and naming of the heretofore unknown "Micropterix Jabalmoussae" by entomologists from the University of Helsinki was a highlight. This followed the sighting of the "Salvia Peyronii" , once thought extinct, by Profs. Georges and Henriette Tohmé in the Jabal Moussa core area.

SBR has a Research and Monitoring Department whose role is to supply high quality scientific information and to facilitate informed and responsible management by undertaking, promoting and supporting appropriate scientific research and monitoring.

A “monitoring of biodiversity” programme started in the Shouf BR in 2018. Its aim has been to generate the scientific knowledge needed to understand the links between biodiversity and cultural values that is critical to inform, implement and monitor all actions towards the preservation and restoration of the ecological functionality and cultural heritage of the landscape. It is defining the baseline data to monitor the effectiveness of the restoration, sustainable management and effective governance interventions.

For this purpose, SBR designed and setup monitoring systems and tools to assess the evolution of the ecological and cultural values of the agro-silvo-pastoral systems and traditional practices, the natural habitats, and key species populations.

3.6.2. Morocco

Formal scientific committees of the Moroccan BRs are either inexistent or inactive, depending on each BR, and for different reasons (e.g. non implementation of management plans, dormant BRs, lack of validation of the different BR's management bodies, etc.). However, non-formal scientific committees exist and are composed of researchers and academics involved in the BR. The role of the Scientific Committee is limited to the following aspects:

- Support the Management Authority in monitoring the ecosystems of the BR;
- Conduct research and investigations on the conservation status and evolution trends of BR ecosystems;
- Propose scientific and technical innovations for the management of BRs.

The scientific committees deal with the popularization of information and research within the BR through periodic organization of scientific events and workshops, sharing and exchange of knowledge in BRs. As with the case of Lebanon, except for academic expertise, there is a lack of links between the scientific research programs and the strategies of the BRs.

In this sense, there is insufficient coordination between universities and research centres and the BR governing bodies and/or administrations in charge. As a result, there is significant research done in BR territories but: (1) it is fragmented and uncoordinated and (2) it is aligned with each research institution's needs, not with the BR needs. An interesting initiative trying to address this issue in the RBA, is the National Centre for the Argan Forest lead by the ANDZOA (in collaboration with the GIZ), which aims, among others, to build a database of scientific research done in the RBA. Other relevant example of initiatives trying to foster scientific exchange, coordination and communication in BRs is the International Congress of the Argan forest (CIA) organised by the ANDZOA each two years since 2011.

In all the BRs, there exist informal consultations from the BR managers, to either different researchers and academics or the MAB Committee, when they need scientific advice. There are also in all the BRs, individual researchers and academics (considered as key informants or key actors of the BR) who are consistently invited to the diverse meetings regarding BRs and who play a relevant role as decision-makers in a given or several Moroccan BRs.

3.6.3. France

MAB France's purpose is to bring together the French network of biosphere reserves and its stakeholders, scientific institutions, researchers, personalities and other partners. Half of its board is composed of researchers and the other half, of biosphere reserve managers. It does not have a scientific committee as such, but its composition is capable of creating an effective interface between research and management / decision-making.

MAB France has set up a specific working group on how to better connect research with management and decision making in a context of transition towards more sustainability. It gives rise to thematic reflections and workshops, involving researchers, managers and stakeholders. It promotes the identification of issues shared by several Biosphere Reserves, raises awareness of different topics related to sustainability (territorial ecology, agro-ecological transition, ecosystem services, etc.), provides a framework for the development of co-constructed research projects, and helps to translate managers' expectations for their territories into research questions. It is also a place for reflection on the role of scientific councils. It can facilitate a common response to calls for research proposals, and introduces institutional partners to biosphere reserves as experimental sites. A CNRS researcher works at strengthening relationships between researchers and BR.

On another note, each Biosphere Reserve is invited to establish its scientific committee (SC), but not all do so. They are consultative institutions. Sometimes, the SC is one of its supporting structures: thus, the SC of the Cévennes Biosphere Reserve is the same one as the National Park's. In this case it advises the managers on projects. Sometimes, the SC is specific to the Biosphere Reserve, as in the Audomarois BR. In the Fontainebleau Gâtinais Biosphere Reserve, the Biosphere Reserve's SC is also that of the French Gâtinais Regional Natural Park (which covers only half of its territory). Some are developing specific approaches to formalize their relations with researchers: it is the case of the framework programme for research in the Northern Vosges, under preparation in the Falasorma Dui Sevi Biosphere Reserve, or the territorial Science project in the Dordogne Basin Biosphere Reserve.

Concerning the process of integration of scientific research into the Biosphere Reserves governance mechanisms, except when there is a statutory scientific council (as in national parks), it is not possible to talk about the integration of research into the governance of biosphere reserves at the local level. However, even an informal scientific council is a more or less effective platform for interaction between management and science.

Additionally, all Biosphere Reserves receive students or groups of students for master's internships, or more rarely theses. Some even contribute to financing theses. In these cases, the subject of the thesis is co-constructed with the biosphere reserve management team. Biosphere reserves can also be partners in projects led by researchers and evaluated by academic ways. It appears that the measures put in place are generally in the direction of collaborative research designed in consultation with stakeholders.

The "monitoring" component is generally organized by the Biosphere Reserves themselves. They receive methodological support from the French Agency for biodiversity and/or the Muséum National d'Histoire Naturelle, in connection with the national inventory of natural heritage.

3.6.4. Spain

The Scientific Council also has an important role in overseeing the proper implementation of MaB's tenets in Spanish biosphere reserves. It is made up of twenty-one components and its function is to assess and guide new proposals, evaluate existing reserves, and gather and generate useful knowledge for the application of the biosphere reserve concept in the field. Its members meet a variable number of times a year, according to needs, and continue contacts by digital means between meetings, and each one works individually in response to the commissions received.

References:

Red Española de Reservas de la Biosfera (2020). El programa MAB en España. Available at <http://rerb.oapn.es/el-programa-mab-de-la-unesco/programa-mab-en-espana> [Accessed 11/03/2020]

4. SWOT analyses

In order to process and order the collected information, the approach that was chosen to analyze the state of the art and then come up with recommendations at the level of policy frameworks and governance mechanisms for the implementation of MAB in the project countries was the analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT analysis).

4.1. LEBANON

Strenghts

- International certifications: UNESCO Biosphere Reserve; Global Important Bird Area; IUCN.
- Local designations: Ministry of Environment; Ministry of Culture; Ministry of Agriculture.
- Rich biodiversity: endemic flora species of international importance.
- Unique geological features.
- A rich archaeology, of rarity in high mountains, with diverse heritage sites and finds since the Paleolithic.
- Diversity of trails and beautiful, wild landscapes.
- Engagement of locals in the tourism value chain (guides; guards; guest-houses, B&Bs...).
- Local production with locally sourced raw material.
- Comprehensive knowledge of the socio-economic profile.
- Knowledge and research of natural & cultural heritage.
- Motivated & talented team.
- Products marketed under a registered trademark.
- Existence of a well maintained tourism infrastructure.
- Diversity of species grown in the native tree nurseries.
- A destination for all seasons.
- Rural, authentic skills and traditions.
- Presence of online communication platforms.
- Willingness of locals to be part of the tourism offer.

Weaknesses

- Negative perception of some locals.
- Previous and current risk of damaging the ecosystem and looting of cultural sites.
- Risk of losing traditional crafts and know-how.
- Insufficient accommodation facilities and limited accommodation space.
- Limited number of local eco-friendly initiatives.
- Limited number of direct beneficiaries of the ecotourism and agro-food initiatives.

Opportunities

- Growing interest of tour operators both nationally and internationally.
- Growing interest in ecotourism, eco-friendly crafts, and all-natural dried fruits and nuts.
- Institutional support of the Ministry of Tourism; the Ministry of Culture; the Ministry of Environment.
- Interest in tourism paths on regional level (Union of Municipalities).
- Tourism trends evolving towards authentic, experiential tourism.
- Themed festivals and events attracting thousands of visitors.

Threats

- Violations: Illegal quarrying; hunting; logging; uncontrolled grazing.
- Presence of, mostly imported, handicrafts in the market with competitive prices.
- Urbanization.
- Fire risk.
- Economic situation.

4.2. MOROCCO

Strenghts

- Biosphere Reserves are officially created and recognized at national and international level.
- Morocco integrates Biosphere Reserves in the framework of the various conventions and provisions signed and ratified at national level since one decade (e.g. Clearing House Mechanism on Biodiversity of Morocco -CBD-).
- It exists a National MAB Committee.
- It exists an institutional will in adopting a Morocco MAB Strategy.
- A network of local actors is ready to be involved in decision-making on the future of the BRs.
- A scientific committee exists.
- Active participation and strong commitment of civil society organizations and local actors when the opportunities are offered.
- Strong commitment of researchers and active mobilization in the field of research, despite limited resources and despite lack of coordination.
- High interest in environmental education, notably at the level of local, regional and national associations.
- Advanced level of international collaboration in the field of BR management.

Opportunities

- Revitalising the role of the MAB Morocco Committee and creating regional MAB Committees closely in touch with each BR management body.
- Implementation of the *acquis* of the new Constitution of 2011 and “Advanced Regionalisation” policies.
- Implementation texts of the new Law on Protected Areas.
- State commitment to cultural heritage issues and effective engagement in SDGs, IPBES, Aichi targets and MAB Programme.
- The redefinition of the territorial plans and functionalities of the territories according to their typology and to the MAB provisions.
- Accountability of population at local level regarding biodiversity conservation.
- Collective responsibility. Conciliation and consensus building.
- Creation of the BRs Scientific Committees and/ or a national BRs Scientific Committee.

Weaknesses

- Invisibility and lack of knowledge of Biosphere Reserves among the Moroccan public.
- Lack of communication and awareness of the “Biosphere Reserve” concept among local and regional authorities, public administrations and local institutions.
- Mismatch between scientific research carried out in BRs and the priorities established by the BRs management bodies.
- Poor mechanisms of social participation in decision-making and access to information.
- Poor awareness of the MAB Programme and Biosphere Reserve concepts and principles by the politicians in general and by most of the local and regional authorities hinders their involvement in the decision making and this is a major constraint in the proper implementation of BRs.
- Regional institutionalisation of MAB provisions and institutionalisations of most BRs is lacking.
- Scarcity of financial, human and technical resources; together with lack of appropriate capacity building mechanisms adapted to the BRs specificities and complexities.
- Lack of federation among different stakeholders and actors and lack of interface organisations adapted to complexity and to the specificities of BRs.
- Lack of link between research and local action and lack of efficiency accounts for the impact of the research results.
- The territories of the BRs sometimes cover several administrative regions, which complicates the coordination and harmonization of actions in the same territory.

Threats

- Poor awareness of the MAB Programme and Biosphere Reserve concepts and principles by civil society and the local communities, which may hinder their involvement in the decision making.
- Lack of legal basis for institutionalisation and explicit recognition in national legislation makes it difficult in practice for regional administrations to apply the provisions of BRs. For example, when requiring compliance in the environmental impact assessment of projects.

4.2. MOROCCO

- Encouragement of existing support for research in BRs and reorienting research towards an action result.

- Both inconsistencies and contradictions between sectoral policies, normative dispositions, interests and priorities are a major constraint for the implementation, management and governance of BRs. They may result in operational choices of territorial development not appropriate to territorial balances and sustainable development.
- General lack of appropriate anticipation and monitoring mechanisms regarding changes and trends affecting biodiversity, production systems, cultural identity, etc.
- Constraints linked to the fairly large size of the BRs.
- Low ecosystem resilience, particularly acute in the two southern BRs (RBA and RBOSM), which renders them vulnerable to global change.
- Continued human pressure on ecosystems.

4.3. FRANCE

Strenghts

- The French MAB Committee was created and consolidated since 1973.
- MAB France new governance (association) is efficient and more visible.
- MAB France new governance is inclusive: Research institutions, BRs, and others public and private partners adhere and contribute.
- MAB network is active, develop innovative projects (eco actors...).
- BR are in the national law.
- BR concept is attractive, several new projects.
- High flexibility, adaptability to transition.
- High diversity of governance in the national network.
- Financial security for BRs supported by national or Regional nature parks.
- Master MAB, which allows dissemination in France and elsewhere.
- The master MAB and Co'MAB association, for youth involvement.
- Researchers' and experts' voluntary involvement in MAB activities.

Opportunities

- A lot of new BR candidates.
- Few territorial organizations refer to SDGs.

Weaknesses

- A low support from ministries.
- A low political support.
- MAB France highly dependent on funding from a single organization.
- A low organization for networking at national level compared with the broad issues to consider.
- Very few direct possibilities (funding) to mobilize BRs in common projects.
- No direct financial support for BR.
- Frequent superposition with structures with narrower functions than BR, without means to compensate.
- BR considered as a label more that as an efficient tool.
- Low visibility according to superposition with support structures.

Threats

- Risk of team reduction.
- Changes to come soon in a very stable team.
- A lot of new candidates, without new human and financial means.
- Partnership between research and BR is sometimes difficult to put into practice on the ground.

4.4. SPAIN

Strenghts

- The MAB Program in Spain is being adopted, promoted, integrated and consolidated since 1975.
- The Spanish MAB committee was created in 1975 and is still active.
- The governance mechanism at national level is 'oiled' and functions properly.
- High number of BR established.
- Diversity of governance arrangements.
- High financial security for BR managed by autonomous communities and provincial governments.
- Important and active role of Scientific Council.

Weaknesses

- Five Autonomous Communities have not yet developed a regulatory framework for biosphere reserves: Cantabria, Catalonia, Galicia, the Balearic Islands and Navarre.
- Having regional rules on biosphere reserves does not necessarily mean that in these Autonomous Communities there is sufficient regulation of the organization and planning of their management.
- The degree of compliance is weak in regard to the management planning.
- Biggest shortcomings are found in the direct management municipal bodies. This is because these reserves do not have a formally constituted participatory organism, due to the scarcity of financial resource and/or the specific personnel invested as BR management staff.
- Scarcity of financial resources for BRs governed by local administrations.

Opportunities

- Most of the reserves (23) are governed by the Autonomous Communities, which confers great budgetary security and a well-defined space in the administrative organization chart.
- Horizontal governance models as Sierra de las Nieves BR to the whole Iberian Network are exemplary experiences, to be valued.
- The diversity of governance arrangements provides sources of inspiration as both success/unsuccessful stories.
- The complex articulation of MAB in Spain is a source of precious knowledge for other countries to take as example of analysis of what could/should (or could/should not) be done.
- Each governance arrangement can teach to and learn from one another.

Threats

- Given that most of BRs are managed as natural parks by Autonomous Communities, risk of missing the socio-economic development aspect in the integration of policies.
- The state legislation on national parks introduces a rigidity that is most probably unnecessary.
- No direct correspondence between the model of management body management and success in social participation.

5. Recommendations for policy makers

5.1. Lebanon

Increased institutional support by the various ministries, Tourism, Culture and Environment, bodes well for Lebanon's BR's. While the local denominations (Protected Area/Nature Reserve in case of Shouf BR, Natural Site in case of JMBR) link these reserves to the Ministry of Environment, the formal MAB link is with the CNRS, which reports to Lebanon's Prime Minister.

In the future, it is recommended to:

1. Intensify links by Lebanon's BR's, working together, with all concerned ministries to raise the visibility and enhance coordination with authorities.
2. Revitalize and enlarge the scope of activities of the Lebanon MAB committee and increase cooperation with both ArabMAB and MedMAB.
3. Seek better enforcement of regulations by the appropriate national law enforcement agents in order to decrease violations, particularly those that could have an irreversible impact on the BR's natural and cultural heritage.

5.2. Morocco

It is recommended to policy makers to :

- 1- Recognize BRs as a space for reconciling economic development and the conservation of natural resources, and as an important factor in maintaining the environmental balance of Morocco's regions.
- 2- Integrate BRs in all land use and rural development projects.
- 3- Make BRs an ecological label and a charter for the sustainable development of the territories concerned.
- 4- Promote BRs in the policy of decentralization and advanced regionalization while giving the regional councils the possibility of regulatory tools for setting up, managing and promoting BRs in their territories.
- 5- Provide the BRs, when they are located in more than one region, with a unified autonomous management body, to coordinate with all the institutions covering the territory of the BRs.

5.3. France

MAB France has now a legal and organizational framework which allows BR implementation.

However, it is recommended to improve:

- recognition and support by the ministries (in charge of the environment, tourism, agriculture, education, research) as effective innovative mechanisms for the implementation of SDGs;
- increase permanent and specifically dedicated human and financial resources at national level (MAB France) and at each biosphere reserve level to implement policies that will enable the expected UNESCO objectives to be achieved;
- improve visibility through flagship projects and actions, strong partnerships and communication.

5.4. Spain

Based on the SWOT analysis, one can conclude that policy makers should focus the following priority directions:

- Push for the development of regulatory frameworks in all the Autonomous Communities;
- Development and enforcement of compliance mechanisms;
- Replicate more horizontal governance models as in Sierra de las Nieves BR to the whole Iberian Network;
- Develop mechanisms for the inclusion of BR citizens in the governance of their territory, which in turn would inform on the socio-economic reality of the BR for a better management;
- Find mechanisms for stable financing of staff in charge of governance and management of BRs at the local and regional levels.

5.5. Key messages

* The UNESCO Man and the Biosphere (MAB) program, through its strategies and Action Plans, promotes international scientific cooperation on critical challenges related to sustainable development and biodiversity conservation.

* Each Member State differently adopts MAB program directives; and the reality of the various countries analyzed (Lebanon, Morocco, France, Spain) provides a diverse picture of the adaptation of the MAB Program in the Mediterranean area.

* At the National legislative framework level, while European countries are familiar with the MAB program since the '70s; the adoption of the MAB Program directives in MENA countries is quite young and has some inertias to overcome, despite the strong interest in its principles by public institutions.

* With regards to governance, the panorama in the Mediterranean region is quite diverse. In each Country, governing bodies and mechanisms ramified and evolved differently, everyone under the spirit of the MAB 'umbrella'.

* Recommendations to policy makers articulate around five main axes: networking and cooperation capacities; awareness raising; law enforcement; recognition and support by public institutions; resources allocation.