

The Biosphere Reserves of Spain during 2008-2014: Implementation and Key Aspects for its Management*

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Abstract:

The Spanish Network of Biosphere Reserves (SNBR) has a monitoring programme enabling its degree of consolidation to be ascertained, as well as the levels of implementation and territorial assimilation of the Biosphere Reserves that it comprises. The statistical analysis carried out on the results of the SNBR implementation indicators for the period 2008-2014 stand out three fundamental aspects: i) two phases of implementation, ii) the improvements in the indicator scores in the second phase, and iii) the influence of the indicators on the levels of implementation achieved. Some key aspects are noted that could contribute to the enhancement of the implementation of these reserves.

Keywords: evaluation, indicators, local development, participation in management, sustainable development, UNESCO MaB Programme.

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Las reservas de la biósfera de España durante 2008-2014: Implementación y aspectos claves para su manejo

Resumen:

La Red española de reservas de la biósfera (RERB) tiene un programa de monitoreo que le ha hecho posible alcanzar su grado de consolidación, al igual que los niveles de implementación y asimilación territorial de las Reservas de la biósfera que abarca. El análisis estadístico llevado a cabo sobre los resultados de los indicadores de implementación de la RERB para el periodo 2008-2014 resaltó tres aspectos fundamentales: i) dos fases de implementación, ii) mejoramiento en los puntajes de indicadores en la segunda fase, y iii) la influencia de los indicadores sobre los niveles de implementación logrados. Se observan algunos aspectos claves que podrían contribuir al mejoramiento de la implementación de estas reservas.

Palabras clave: evaluación, indicadores, desarrollo local, participación en la gestión, desarrollo sostenible, programa MAB de la UNESCO.

As reservas da biosfera da Espanha durante 2008-2014: Implementação e aspectos chave para a sua gestão

Resumo:

A Rede espanhola de reservas da biosfera (RERB) possui um programa de monitoramento que possibilitou conseguir seu grau de consolidação, assim como os níveis de implementação e assimilação territorial das Reservas da biosfera que abrange. A análise estatística realizada sobre os resultados dos indicadores de implementação da RERB para o período 2008-2014 remarcou três aspectos fundamentais: i) duas fases de implementação, ii) melhoria nas pontuações de indicadores na segunda fase, e iii) a influência dos indicadores sobre os níveis de implementação alcançados. Observam-se alguns aspectos chave que poderiam contribuir para o melhoramento da implementação dessas reservas.

Palavras-chave: avaliação, indicadores, desenvolvimento local, participação na gestão, desenvolvimento sustentável, programa MAB da UNESCO.

Introduction

The Man and the Biosphere (MaB) Programme was created by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1971 to help to reconcile biodiversity conservation with human development (Schliep & Stoll-Kleemann, 2010). The MaB Programme is "an Intergovernmental Scientific Programme that, since its outset, has aimed to establish a scientific basis for the improvement of relationships between people and their environments" (UNESCO, 2013). By means of this programme, UNESCO sought to devise solutions to human impacts on natural ecosystems, the conservation of natural areas and the management of large structures and artificial systems, all of which were issues that, at the time, various interest groups were suggesting should receive more attention (Ishwaran, 2012). It was also hoped that the programme would furnish the scientific basis

and the appropriate personnel needed to tackle problems related to the exploitation of natural resources and human settlements (Fernández-Galiano, 1987).

The MaB Programme is implemented in practice in the Biosphere Reserves (BR) that together make up the World Network of Biosphere Reserves (WNBR). BR are areas in which “methods for managing natural resources are put to the test while simultaneously fostering economic development” (UNESCO, 2008). However, the mere designation of an area as a BR does not guarantee the real and complete implementation of the concept (Bridgewater, 2016; Fernández-Galiano, 1984; Ishwaran, 2012; Walker & Solecki, 1999). This is why, over the course of the 46 years that the MaB Programme has been in existence, various official documents have been drawn up to coordinate, direct and evaluate the management and state of the WNBR. These documents have set out the goals, challenges and activities that the institutions responsible for the BR will need to address and carry out over specific periods of time, for the sake of ensuring that they become veritable places of excellence for the testing and demonstration of sustainable development (Bridgewater, 2016; Ishwaran, 2012).

In 1995, during the Seville international conference, it was agreed that the competent authority should review the state of each BR every 10 years and draw up a report on the fulfilment of the criteria on the basis of which it was established (UNESCO, 1996). However various authors (Price, 2002; Reed & Egunyu, 2013) suggest that the 10-year interval between successive reviews is excessively long, creating challenges in terms of monitoring the BR. These challenges affect the efficiency of the periodic review process as an effective mechanism of quality control and of its degree of implementation (Coetzer, Witkowski & Erasmus, 2014; Price, Park & Bouamrane, 2010). Among the alternatives suggested to overcome these challenges is the establishment of an information system with mechanisms and indicators that enable the state and effectiveness of the implementation of the BR to be reviewed and that are much more closely linked to the process of periodic review (Price, 2002; Price et al., 2010; Reed & Egunyu, 2013).

The Spanish MaB Committee (SMaBC) established the Spanish Network of Biosphere Reserves Monitoring Programme (SNBRMP) in 2010. The SNBRMP was designed to ascertain the state and evolution of the Spanish BR (SBR) in order to be able to evaluate the milestones secured in them in the contexts of the goals set out by the MaB Programme. Within the SNBRMP framework, SBR have been evaluated over three periods: 2008-2010, 2010-2013 and 2013-2014. The SNBRMP is analysed and evaluated by the Council of Managers and the Scientific Council, both of which are consultative bodies affiliated to the SMaBC on an ongoing basis. As a result of these evaluations, various modifications to the SNBRMP indicators and variables have been implemented.

In its initial stages, SNBRMP had a total of 17 indicators by which it sought to ascertain: i) the degree of consolidation of the Spanish Network of Biosphere Reserves (SNBR); ii) the degree of implementation (fulfilment of the basic requirements deriving from their status) of the SBR, and iii) its territorial assimilation. Nowadays, the degree of implementation of the BR that make up the SNBR is evaluated using eight indicators; in other words, with two more than at the start of the SNBRMP. Moreover, so-called “lock” variables have been included in some of these indicators. “Lock” variables are those associated with a basic requirement of the MaB Programme such that, when they obtain a score of zero for total non-compliance, it means that the indicator to which they correspond is considered to be non-assessable (Organismo Autónomo de Parques Nacionales [OAPN], 2015).

The chief goal of this article is to analyse the results expressed in the implementation indicators for the SNBR BR over the 2008-2014 period, endeavouring to answer two questions: How did implementation of the BR in Spanish territory perform over the course of the 2008-2014 period?; And: is “Participation in management” the indicator that has had greatest impact on the implementation of SBR?

Materials and methods

Scope of study

The SNBR (figure 1) comprises 48 spaces that account for 10.9% of the total surface area of Spain (more than 5.5 million hectares), including a population of almost two million inhabitants (4.12% of the national total). The statistical analysis performed in this article excluded 14 of the BR because they either lacked information regarding the implementation indicators for at least one time period or they had not carried out any evaluation of the indicators. Table A in the complementary material provides a list of all the BR that make up the SNBR. The BR excluded from the study are listed in table B in the complementary material.

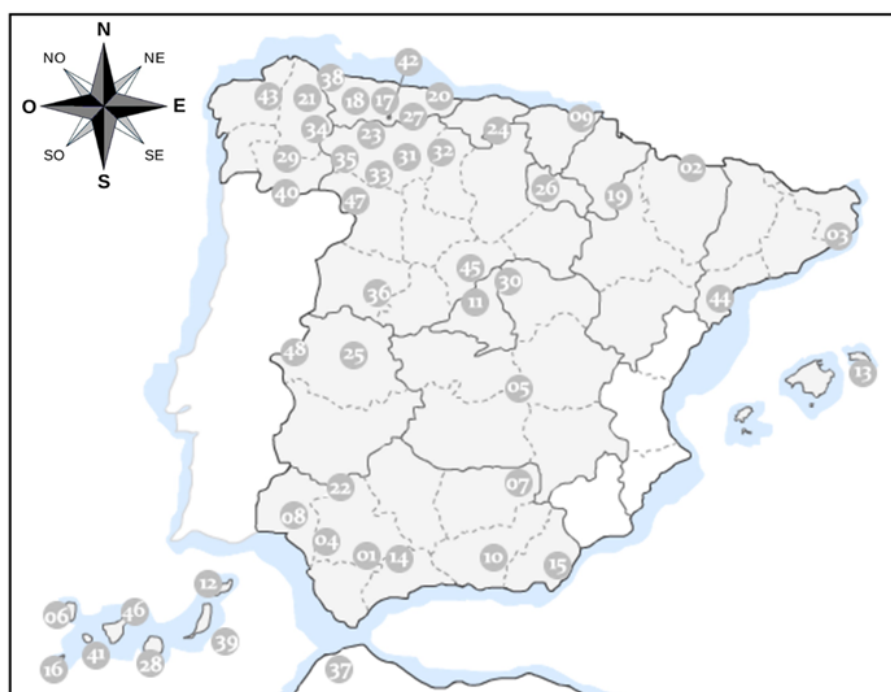


FIGURE 1

THE BIOSPHERE RESERVE NETWORK OF SPAIN

SOURCE: RED ESPAÑOLA DE RESERVAS DE LA BIOSFERA (RERB) (2017)

Origin of the data used

The data used in this article are drawn from the findings of the implementation indicator assessments for the SNBR BR carried out in the periods 2008-2010, 2010-2013 and 2013-2014. These data were obtained from the SMaBC, through the application of the SNBRMP (OAPN, 2015; Tragsatec & OAPN, 2011, 2013). The scores obtained by each BR in each indicator for the three periods are shown in tables C, D and E in the complementary material.

The fact that the number of indicators in the 2008-2010 period was different from that of the other two periods constituted the first difficulty in carrying out the statistical analysis for the entire 2008-2014 period. To overcome this it was necessary to conduct a series of statistical inferences in order to derive data for the indicators not scored in one or other of the periods.

Both the newly-calculated indicators and some of those obtained by the SNBRMP in the three periods were used in the statistical analysis.

Calculation of new indicators

The “Initiatives for the fulfilment of functions” indicator was included in the SNBRMP indicators only in the period 2008-2010. Analysis of its methodology revealed that it was made up of variables that equated to some of the new indicators from the 2010-2013 and 2013-2014 periods. Therefore, bearing in mind the contribution of each of these variables, their corresponding value was calculated in the indicator for the 2008-2010 period. The variable-indicator equivalences were as follows:

- “Number of initiatives that fundamentally contribute to fulfilment of the conservation function” was considered to be equivalent to the “Initiatives for fulfilment of the conservation function” indicator.
- “Number of initiatives that fundamentally contribute to fulfilment of the development function” was considered to be equivalent to the “Initiatives for fulfilment of the developments function” indicator.
- “Number of initiatives that fundamentally contribute to fulfilment of the logistics support function” was considered to be equivalent to the “Initiatives for fulfilment of the function for logistics support” indicator.

Meanwhile, Indicator 4, “Management plan (and action programme)” from the 2010-2013 and 2013-2014 periods was not included in the SNBRMP indicators for the 2008-2010 period. The data used in the statistical analysis of this indicator were drawn from those of Indicator 3 “Instruments for planning and management” in the 2008-2010 period. The concept, the methodology of calculation and the variables that comprised it enabled these two indicators to be treated as equivalent.

Finally Indicator 8, “Participation in networks”, from the 2010-2013 and 2013-2014 periods, was not included in the SNBRMP indicators for the 2008-2010 period. This indicator’s missing data for the 2008-2010 period were calculated using a qualitative analysis of each of the variables that make up each of the indicators of the three periods under scrutiny, in turn combining this with multiple regression techniques using the information available for all SBR.

The scores of the indicators calculated to carry out the statistical analysis are set out in table F in the complementary material.

The indicators that were scrutinised for the entire 2008-2014 period as well as the abbreviations used in their statistical analysis are set out in table 1.

TABLE 1
INDICATORS ANALYSED FOR THE BR OF THE SNBR (2008-2014)

Abbreviation	Name
IND. 1	Indicator 1 “Zoning”
IND. 2	Indicator 2 “Management body (Institutional authority or device for coordination)”
IND. 3	Indicator 3 “Participation in management”
IND. 4	Indicator 4 “Management plan (and action programme)”
IND. 5	Indicator 5 “Initiatives for fulfilment of the conservation function”
IND. 6	Indicator 6 “Initiatives for fulfilment of the development function”
IND. 7	Indicator 7 “Initiatives for fulfilment of the logistics support function”
IND. 8	Indicator 8 “Participation in networks”

Source: own elaboration

Methodology for the statistical analysis of the data

An exploratory analysis of the data was carried out using the Anova (Minitab) procedure. This enabled the normality and the homogeneity of the indicator variances to be assessed to a 95% level of confidence.

The variance analysis and the test of means were carried out using the GLM procedure (Statistical Analysis System [SAS] Institute) with a level of significance of 0.05. In the variance analysis the three periods being studied (2008-2010, 2010-2013 and 2013-14) were taken as treatments. Tukey’s studentised range test (SAS) was used in the test of means. As well as providing the mean for each period, the test of means enabled identification of the minimum significant differences. These two analyses (the analysis of variances and test of means) were used in conjunction to compare the means of the indicators over the different periods of study. The comparison made it possible to determine the differences between the three periods in terms of two basic aspects: i) the performance of each indicator and ii) the degrees of implementation achieved. All these made it possible to establish the importance of one or more periods of time.

In addition, canonical discriminant analysis (CDA) (Hair, Black, Babin, Anderson & Tatham, 1998) was used to identify the influence that each of the indicators in question had on the degrees of implementation achieved in the SNBR. The CDA groups correspond to the periods under scrutiny. The statistical analysis was based on the following multivariate lineal model:

$$y_{ijkh} = \mu h + BR_{ih} + P_{jh} + \epsilon_{ijkh}$$

y_{ijkh} is the multivariate vector of the k observation relating to the h variable for the BR i and period j ; μ_h is the multivariate vector of general means relating to the h variable; BR i h is the multivariate vector of the effects of the BR i on the h variable, P j h is the multivariate vector of the period j on the h variable and ϵ_{ijkh} is the multivariate vector for random errors associated with the observations vector y_{ijkh} .

In the present study, the multivariate vector of the effects of interaction between BR i and the period j on the h variable was not included in the model, because no repetitions were present. With the standard variables obtained from the analysis, a canonical discriminant graph was drawn up (Medina, Orellana, Pino & Diaz, 2014).

Results

Exploratory analysis of the indicator data for the period 2008-2014 showed that none of the indicators presented any significant deviation regarding the assumptions of normality and homogeneity of the variances to a degree of 95% confidence. This fact revealed an absence of limitations for conducting the variance analysis of the data.

The variance analysis of the indicators, using a 0.05 degree of significance, revealed that Indicator 7 was the only one that not exhibiting significant differences (table 2).

TABLE 2
VARIANCE ANALYSIS FOR THE IMPLANTATION INDICATORS OF THE SNBR (2008-2014)

Indicator	Sum of squared error	Mean squared error	Value of F	Pr > F
IND. 1	74,332.07	750.83	7.67	0.0008
IND. 2	44,625.23	450.76	16.06	< 0.0001
IND. 3	72,419.23	731.51	7.30	0.0011
IND. 4	66,123.86	667.92	22.56	< 0.0001
IND. 5	47,897.70	483.82	17.75	< 0.0001
IND. 6	56,462.85	570.33	19.21	< 0.0001
IND. 7	35,981.45	363.45	0.96	0.3860*
IND. 8	42,962.58	433.97	5.59	0.0050

Source: own elaboration

* Pr > α = 0.05

The results of Tukey's test of means are shown in table 3. It is notable that seven of the eight indicators show no significant differences for the periods 2010-2013 and 2013-2014. The 2008-2010 period is significantly different from the other two periods for five of the eight indicators. The three periods analysed do not show significant differences for Indicator 7. The 2010-2013 period exhibits significant differences with respect to the other two periods for Indicator 1.

TABLE 3
TUKEY'S TEST OF MEANS FOR THE IMPLEMENTATION INDICATORS OF THE SNBR (2008-2014)

Variable	2008-2010	2010-2013	2013-2014	df
IND. 1	57,147 b	77,653 a	53,512 b	15,813
IND. 2	58,624 b	81,865 a	85,532 a	12,253
IND. 3	58,435 b	77,262 a	82,168 a	15,609
IND. 4	40,191 b	79,126 a	73,541 a	14,915
IND. 5	49,021 b	77,938 a	74,900 a	12,694
IND. 6	43,129 b	74,315 a	74,121 a	13,782
IND. 7	58,832 a	65,100 a	63,132 a	11,002
IND. 8	64,135 b	76,276 a	80,385 a	12,022

Source: own elaboration
Tukey's studentised range test (HSD) ($\alpha = 0.05$).
Scores with different letters in the same row differ significantly between periods.

The results obtained seem to suggest that the implementation of the SNBR BR has exhibited two markedly distinct phases: 2008-2010 and 2010-2014. The scores obtained from the test of means of the indicators seem to indicate that in the first phase there was a lesser degree of implantation than in the second. The indicators that improved in the second phase were: Indicator 2 "Management body", Indicator 3 "Participation in management", Indicator 4 "Management plan and action programme", Indicator 5 "Initiatives for fulfilment of the conservation function", Indicator 6 "Initiatives for fulfilment of the development function" and Indicator 8 "Participation in networks".

Indicator 7 "Initiatives for fulfilment of the logistics support function" exhibits a very similar performance over the three periods scrutinised. The indicator that exhibits the most contradictory performance is Indicator 1, "Zoning". The mean value of this Indicator during the second period is significantly different from and greater than the first and third. In other words it improved considerably in the second period with respect to the first, but its mean fell considerably in the third compared to the second, reverting to levels similar to those obtained in the first.

Multivariate analysis of the data applying CDA revealed a significant effect ($\alpha = 0.05$) for Wilks's lambda multivariate test statistic. The score obtained after carrying out the CDA test with this statistic (0.39 with $P < 0.0001$) indicates that the multivariate contrasts for explaining the relationship between the scores of the eight indicators of the 34 reserves in the three periods scrutinised is significant ($\alpha = 0.05$). This statistic also revealed that there is a separation between groups and a supposition of normality of multivariate errors. The statistics of multiple variables and the F approximations may be viewed in table H in the complementary material.

The CDA results for the interaction between the effects of the indicators of the BR and P indicate that this interaction (relationship) requires only two dimensions to be represented (table 4). Of these two dimensions however, only the first is significant ($\alpha = 0.05$), which enables the relationship to be described as one-dimensional. The proportion of the eigenvalue (or the proportion of the explained variability) of the first canonical variable

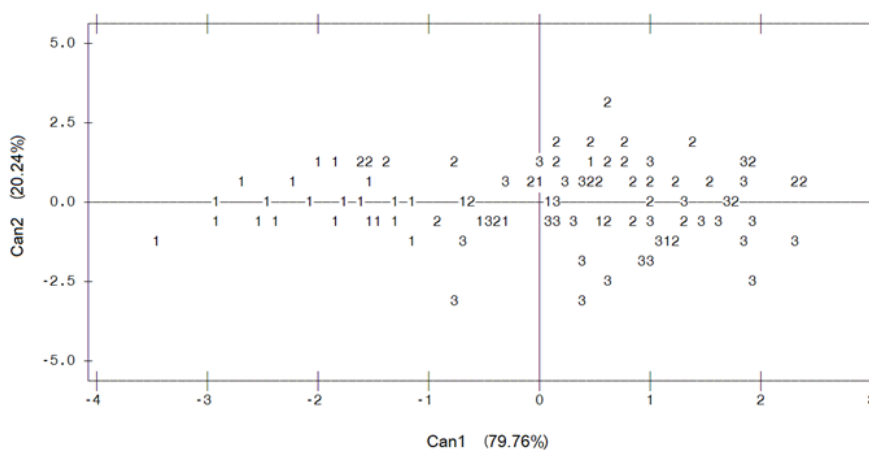
(Can 1) is 0.7976, which indicates that the first canonical function represents 79.8% of the total variation of the interaction between the effects of the BR and P (table 4). The second canonical variable (Can 2) accounts for 20.2% of this variation.

TABLE 4
SUMMARY OF THE CANONICAL DISCRIMINANT ANALYSIS FOR THE INTERACTION BETWEEN THE EFFECTS OF THE SNBR AND P FOR IMPLANTATION INDICATORS OF THE SNBR (2008-2014)

Canonical variable	Canonical correlation	Eigenvalue	Eigenvalue proportion	Accumulated proportion	Probability score
Can 1	0.71	1.0315	0.7976	0.7976	< 0.0001
Can 2	0.46	0.2618	0.2024	1.000	0.0024

Source: own elaboration

Figure 2 shows the graph of the canonical discriminant structure of the three periods analysed. The impact of both canonical axes on 100% of the total variability is evident. In the case of the first factorial plane (Can 1 vs. Can 2), 79.8% of the variation between the periods analysed is explained by the first canonical dimension (Can 1), whereas the second canonical dimension (Can 2) explains only 20.2% of the variation. It is apparent that there is no alignment of any of the three periods with respect to Can 1 or Can 2 in the spatial plane, although the 2008-2010 period has more influence over Can 2.



Note: 13 hidden observations

FIGURE 2

GRAPH OF THE CANONICAL DISCRIMINANT STRUCTURE OF THE THREE PERIODS ANALYSED
Key to abbreviations: 1 (BRi in the 2008-2010 period); 2 (BRi in the 2010-2013 period); 3 (BRi in the 2013-2014 period).

SOURCE: OWN ELABORATION

Table 5 shows the coefficients of the total canonical structure (also known as the correlation structure or canonical discriminant weightings), which indicate the correlations of the indicators with the canonical functions. It is evident from this table that Can 1 is dominated by indicators 4, 6, 5 and 2, all of them positive. Can 2 is clearly dominated by indicator 1, with a score similar to those dominating the first canonical axis, which is considerably removed from the scores of the other indicators. Thus it is evident that the total variation in the interaction between the effects of the indicators of the BR and P is chiefly due to indicators 4, 6, 5 and 2; therefore, these four indicators

are responsible for a major portion of the discrimination between the combinations of the indicators of the BR and P.

TABLE 5
COEFFICIENTS OF THE TOTAL CANONICAL STRUCTURE

Variable	Total canonical structure	
	Can 1	Can 2
IND. 1	0.150	<u>0.770</u>
IND. 2	0.694	-0.042
IND. 3	0.500	-0.086
IND. 4	<u>0.766</u>	0.269
IND. 5	<u>0.709</u>	0.206
IND. 6	<u>0.739</u>	0.108
IND. 7	0.178	0.118
IND. 8	0.442	-0.110

Source: own elaboration

In light of the results obtained it seems that the indicators that have the greatest influence on the levels of implementation attained by the BR in Spain are Indicator 4 “Management plan (and action programme)”, Indicator 6 “Initiatives for fulfilment of the development function”, Indicator 5 “Initiatives for fulfilment of the conservation function” and Indicator 2 “Management body (Institutional authority or device for coordination)”. The indicator that seems to have the least influence on the levels of implementation attained by the SBR is Indicator 1 “Zoning”, followed by Indicator 7 “Initiatives for fulfilment of the logistics support function”.

Discussion

Performance of the implementation

The two phases found using Tukey's test of means (table 3) and the better scores obtained in the second seem to indicate that the SBR have been improving their levels of implementation and, therefore, have increased their compliance with the basic aspects of the MaB Programme. For Reed and Egunyu (2013), a BR process of periodic review should be seen and used as a learning instrument. The results obtained here seem to show that both the system of indicators comprising the SNBRMP and the periodic revision have been used as learning and improvement instruments for the BR in Spain.

As far as the performance of Indicator 1, "Zoning", is concerned, it may be said that the more exhaustive reviews of the variables that comprise it are among the main causes of the fall in its value in the second period under scrutiny. Other causes could include the modification of the indicators that enabled basic cases of non-compliance with the MaB Programme to come to light, the influence of the "lock" variables on the annulment of this indicator in some BR and the possible differences of criteria in the application of the indicators over the three periods.

Meanwhile it appears that during the period under scrutiny, there were no improvements in Indicator 7 "Initiatives for fulfilment of the logistics support function" as far as Spain was concerned. This indicator assesses research and knowledge management, communication, visibility in the territorial area, environmental education and training and finally the evaluation that is made of the logistics function. Some authors argue that both the improvement of communication between the parties, and promoting the development of people's and organisations' capabilities to address the functions and the designation criteria of the BR can help to correct the weaknesses existing in the implementation of the concept (Schliep & Stoll-Kleemann, 2010; UNESCO, 2013). Therefore if the aim is to improve the implementation levels attained in BR in Spain, it would be advisable to carry out studies and initiatives to strengthen their logistics support function.

Influence of the indicators on the levels of implementation

The four indicators that arouse most controversy, in other words those that exhibit the main differences of criteria in terms of assessing their degree of scope, are Indicator 2 "Management body (Institutional authority or device for coordination)", Indicator 3 "Participation in management", Indicator 4 "Management plan (and action programme)" and Indicator 6 "Initiatives for fulfilment of the development function" (Comité Español del Programa MaB, 2013, 2014). It is notable that three out of the four indicators that have most influence on the levels of implementation achieved by the SNBR are found in this group (table 5).

The perception survey conducted among the stakeholders in the Vietnamese BR (Van Cuong, Dart, Dudley & Hockings, 2017) revealed that the following factors are considered to be the key influences on the management and therefore on the successful implementation of the MaB programme: i) Participation and collaboration; ii) Governance; iii) Funding and resources; iv) Awareness and communication; v) Management and implementation. Although the results and the methodology used to obtain them differ from those of the present study, it is worth

highlighting that in both studies “management” appears as one of the elements that has the most influence on the implementation of the BR.

Indicator 4, “Management plan (and action programme)”, assesses the content of the action plan, the degree of integration of the policies and the action programmes. Some SBR have a management plan that is specifically designed for them, while others only have the management and planning instruments of the protected areas that make them up (Comité Español del Programa MaB, OAPN & Tragsatec, 2015). In the latter case, in order to be accepted as BR management plans, the goals and functions of the BR to which the protected areas belong need to be explicitly set out in the aforementioned instruments. The results obtained seem to suggest that the levels of implementation attained by the SBR are due mainly to: i) the existence of management plans designed specifically for the BR and ii) the existence of management and planning instruments for the protected areas that satisfy the management requirements of those BR in which they are included.

On the other hand, the high degree of influence that Indicator 6, “Initiatives for fulfilment of the development function”, seems to have on the implementation of BR in Spain may be indicative of the efforts made by the various BR management institutions to: i) promote sustainable development at local scale, ii) foster research in support of the development function and iii) integrate development with conservation. The results obtained seem to suggest that advances have been made in SBR in learning about the rational exploitation and conservation of natural heritage, promoting integrated human development at local scale, which are basic goals of all BR. This fact lends support to the affirmation that the protected natural spaces that currently make up the BR have become places where the environment is valued as a basic productive resource in sustained economic growth, a key element of sustainable development (Gessa & Toledano, 2011).

Turning next to Indicator 3, “Participation in management”, it is notable that this indicator is not found among the group of indicators that seem to have had the greatest influence on the levels of implementation achieved in SBR. This finding may reflect the fact that the participatory processes in these BR have not been completely developed (Schultz, Duit & Folke, 2011). Some authors suggest that the participatory processes in a BR generate social learning, the construction of relationships and an improvement in the understanding of other participants’ perspectives (Onaindia, Ballesteros, Alonso, Monge-Ganuzas & Pena, 2013) and that such processes can in turn contribute to overcoming those aspects that hinder implementation of BR (Schliep & Stoll-Kleemann, 2010). Hence, as has already been suggested by Schultz et al. (2011), it is advisable to carry out more profound studies on the SNBR that would enable other factors related to participation, such as the structure of governance and management practice, to be analysed.

The monitoring indicators and the impact of the BR

The SNBR system of indicators has been useful for reviewing the state of BR implementation in Spain, enabling measurement of the degree of compliance with the basic requirements of the MaB Programme. One of the objectives of the implementation of the RB is to address the local issues of sustainable development, including progress in the Sustainable Development Goals of the UN 2030 Agenda and the maintenance of ecosystem services on which economic development of the local communities is based (UNESCO, 1996, 2008, 2017). In this sense, the improvement in the levels of implementation of the SBR could have benefited not only the local development of the territories in which they are located, but also the well-being of the population that inhabits them. Therefore,

the monitoring indicators of the SRB could also provide information on the actions that are being carried out to contribute to the local development of the territories that comprise them.

However, the SNBR system of indicators does not allow the attainment of the goals set out in their management instruments to be assessed; in other words, it does not provide elements that enable the impact of the initiatives carried out in the BR to be evaluated. The effectiveness of the handling and management of the protected areas, including the BR, is a fundamental element if they are to become secure areas for the conservation of biodiversity and consequently for providing services to ecosystems that contribute to human wellbeing (Geldmann et al., 2013; Halpern, 2014; Hutchings et al., 2012; Juffe-Bignoli et al., 2014; Watson, Dudley, Segan & Hockings, 2014). For this to happen, as other authors have already pointed out, there is a need to develop performance indicators for the BR that would enable the effectiveness of management in the attainment of its goals and consequently its contribution to the global goals of conservation and sustainability to be evaluated (Matar & Anthony, 2017).

In addition, BR are considered as places of excellence for trials, experimentation and the demonstration of sustainable development methods on a regional scale (Price, 2002; UNESCO, 1996). In this context, an excellent complementary feature for the SNBR system of monitoring indicators would be a methodological process enabling evaluation of the progress made by SBR regarding the achievement of sustainable development. Such evaluation would moreover favour the periodic review of the BR (Reed & Eguny, 2013), enabling the generation of essential information to create policies and strategies appropriate to the territory concerned, providing effective responses to the current context of global socio-ecological change (Kristjanson, Harvey, Van Epp & Thornton, 2013).

Conclusions

The statistical methods employed revealed that during the 2008 – 2014 period the BR that make up the SNBR improved their levels of implementation; in other words, they increased their compliance with the basic requirements of the MaB Programme and, therefore, also increased their contribution to both the local development of the territories that make up the BR and the well-being of the populations that inhabit them. The analyses carried out suggest that participatory processes have not had a high degree of influence on the implementation of SBR and that, for this reason, different initiatives need to be enacted for their reinforcement and development. The present study has also shown that, according to various methodologies, aspects related to the management of the BR are among those that have most impact on their implementation.

The implementation indicators of the SNBR monitoring programme have become elements that contribute to the management of SBR and, therefore, are highly valuable within the Spanish MaB Programme. Given that the indicators are designed to assess compliance with basic aspects within the statutory framework of the WNBR, it is suggested that such indicators could be adapted and applied to contexts other than Spanish territory. For this to happen it would be necessary to take into account the elements that Spain has contributed to the evolution and development of the aforementioned indicators.

Lastly, to complement the information supplied by the implementation indicators of the SBR, there is a need for complementary studies to be carried out for a deeper understanding of the characteristics, quality and impact of the initiatives enacted in the reserves. The results thereby obtained would potentially provide greater elements for the evaluation not only of compliance with the designation criteria and the appropriate functions of the BR, but also the contributions that such areas make to the global goals of conservation and sustainability.

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Notes

- * Artículo de investigación.

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Annex A. Biosphere reserves of Spain

BR number according to figure 1	BR name
1	Sierra de Grazalema
2	Ordesa - Viñamala
3	Montseny
4	Doñana
5	La Mancha Húmeda
6	La Palma
7	Cazorla, Segura y Las Villas
8	Marismas de Odiel
9	Urdaibai
10	Sierra Nevada
11	Cuenca Alta del Río Manzanares
12	Lanzarote
13	Menorca
14	Sierra de la Nieves y su Entorno
15	Cabo de Gata - Níjar
16	Isla de Hierro
17	Somiedo
18	Muniellos
19	Las Bardenas Reales
20	Redes
21	Terras do Miño
22	Dehesas de Sierra Morena
23	Valle de Laciana
24	Picos de Europa

Source: RERB (2017)

BR number according to figure 1	BR name
25	Monfragüe
26	Valles de Leza, Jubera, Cidacos y Alhama
27	Babia
28	Gran Canaria
29	Área de Alláriz
30	Sierra del Rincón
31	Alto Bernesga
32	Los Argüellos
33	Valles de Omaña y Luna
34	Ancares Lucenses
35	Ancares Leoneses
36	Sierras de Béjar y Fancia
37	Reserva Intercontinental del Mediterraneo
38	Río Eo, Ocos y Terras de Burón
39	Fuerteventura
40	Reserva Transfronteriza de Gêres-Xures
41	La Gomera
42	Las Ubiñas - La Mesa
43	Mariñas Coruñesas e Terras do Mandeo
44	Terres de L'Ebre
45	Real Sitio de San Ildefonso - El Espinar
46	Macizo de Anaga
47	Meseta Ibérica
48	Tajo-Tejo

Source: RERB (2017)

Annex B. List of BRS excluded from the analysis due to lack of information

BR number according to figure 1	BR name
11	Cuenca Alta del Río Manzanares
16	Isla de El Hierro
18	Muniellos
24	Picos de Europa
32	Los Argüellos
33	Valles de Omaña y Luna
41	La Gomera
42	Las Ubiñas – La Mesa
43	Mariñas Coruñesas e Terras do Mandeo
44	Terres de L'Ebre
45	Real Sitio de San Ildefonso-El Espinar
46	Macizo de Anaga
47	Meseta Ibérica
48	Tajo – Tejo

Source: own elaboration

Annex C. Implementation indicators of the SNBR BR (2008-2010)

Abbreviation	Indicator name
IND. 1	Indicator 1 “Zoning”
IND. 2	Indicator 2 “Management body”
IND. 3	Indicator 3 “Participation in management”
IND. 4	Indicator 4 “Planning and management tools”
IND. 5	Indicator 5 “Available resources”
IND. 6	Indicator 6 “Initiatives for the fulfilment of functions”

Source: own elaboration

Annex D.a. Implementation indicators of the RERB BRS, expressed as percentages (2008-2010)

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	BR synthesis
Andalusia	Sierra de Grazalema	23.33	53.33	76.67	33.33	50.00	48.00	47.44
	Doñana	43.33	48.33	76.67	33.33	50.00	48.00	49.94
	Sierra de Cazorla. Segura y las Villas	23.33	53.33	76.67	33.33	50.00	48.00	47.44
	Sierra Nevada	55.00	48.33	76.67	33.33	50.00	48.00	51.89
	Marismas del Odiel	43.33	53.33	76.67	33.33	50.00	48.00	50.78
	Sierra de Las Nieves	56.67	46.67	65.00	66.67	100.00	40.67	51.50
	Cabo de Gata-Nijar	66.67	53.33	76.67	33.33	50.00	48.00	54.67
	Dehesas de Sierra Morena	56.67	38.33	0.00	16.67	50.00	48.00	34.95
	Intercontinental	66.67	86.67	45.00	50.00	33.33	48.00	54.94
Aragon	Ordesa-Viñamala	23.33	28.33	0.00	0.00	33.33	29.33	19.06
Asturias	Muniellos	100.00	68.33	76.67	50.00	50.00	40.67	64.28
	Somiedo	100.00	68.33	76.67	66.67	50.00	48.00	68.28
	Redes	100.00	68.33	76.67	66.67	50.00	48.00	68.28
	Picos de Europa (ASTURIAS-CANTABRIA)	45.00	48.33	76.67	16.67	50.00	33.33	45.00
	Río Eo (ASTURIAS-GALICIA)	66.67	5.00	33.33	0.00	33.33	40.67	29.83
Balearics	Las Ubiñas – La Mesa							
	Menorca	88.33	100.00	100.00	83.33	100.00	40.67	85.39
	La Palma	78.33	100.00	100.00	83.33	100.00	81.30	90.50
Canary Islands	Lanzarote	90.00	86.67	100.00	83.33	100.00	66.67	87.78
	El Hierro	88.33	61.67	88.33	33.33	100.00	59.33	71.83
	Gran Canaria	68.33	43.33	0.00	0.00	66.67	33.33	35.28
	Fuerteventura	66.67	86.67	100.00	66.67	83.33	74.00	76.78
Castilla - La Mancha	La Gomera							
	Mancha Húmeda	23.33	28.33	0.00	0.00	33.33	14.67	16.61

Source: Tragsatec and OAPN (2011)

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	BR synthesis
Castilla y León	Babia	33.33	50.00	53.33	0.00	33.33	33.33	33.89
	Alto Bernesga	33.33	23.33	53.33	0.00	33.33	48.00	31.89
	Los Argüellos	33.33	45.00	0.00	0.00	0.00	14.67	15.50
	Valles de Omaña y Luna	33.33	23.33	53.33	0.00	33.33	33.33	29.44
	Sierra de Béjar y Francia	56.67	71.67	53.33	66.67	83.33	52.00	63.95
	Los Ancares leoneses	33.33	50.00	0.00	0.00	0.00	7.33	15.11
	Real Sitio de San Ildefonso-El Espinar							
	Valle de Laciana	33.33	75.00	53.33	50.00	33.33	48.00	48.83
Catalonia	Montseny	78.33	81.67	76.67	66.67	66.67	62.67	72.11
	Terres de l'Ebre							
Extremadura	Monfragüe	66.67	61.67	100.00	33.33	50.00	59.33	61.83
Galicia	Os Ancares lucenses	33.33	0.00	0.00	0.00	0.00	26.00	9.89
	Gerês-Xurés	78.33	81.67	0.00	66.67	33.33	40.67	50.11
	Mariñas Coruñesas							
	Área de Allariz	45.00	80.00	90.00	83.33	33.33	33.33	60.83
	Terras do Miño	33.33	18.33	43.33	0.00	33.33	33.33	26.94
The Rioja	Valles del Leza.							
	Jubera. Cidacos y Alhama	45.00	86.67	76.67	50.00	100.00	59.33	69.61
Madrid	Cuenca Alta del Manzanares	65.00	48.33	76.67	33.33	50.00	14.67	48.00
	Sierra del Rincón	78.33	81.67	53.33	50.00	100.00	48.00	68.56
Navarre	Bardenas Reales	55.00	48.33	76.67	33.33	50.00	55.33	53.11
Basque Country	Urdaibai	100.00	86.67	100.00	83.33	100.00	40.67	85.11
Spain synthesis		57.71	57.21	58.96	37.50	54.17	43.62	51.26

Source: Tragsatec and OAPN (2011)

Annex D.b. Implementation indicators of the SNBR BR (2010-2014)

Abbreviation	Indicator name
IND. 1	Indicator 1 “Zoning”
IND. 2	Indicator 2 “Management body (Institutional authority or device for coordination)”
IND. 3	Indicator 3 “Participation in management”
IND. 4	Indicator 4 “Management plan (and action programme)”
IND. 5	Indicator 5 “Initiatives for fulfilment of the conservation function”
IND. 6	Indicator 6 “Initiatives for fulfilment of the development function”
IND. 7	Indicator 7 “Initiatives for fulfilment of the logistics support function”
IND. 8	Indicator 8 “Participation in networks”

Source: own elaboration

Annex E. Implementation indicators of the SNBR BR, expressed as percentages (2010-2013)

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	IND. 7	IND. 8	BR synthesis
Andalusia	Sierra de Grazalema	100.00	100.00	76.67	76.67	93.33	93.33	71.67	90.00	87.71
	Doñana	100.00	100.00	86.67	76.67	100.00	100.00	68.33	90.00	90.21
	Sierra de Cazorla, Segura y las Villas	100.00	100.00	90.00	76.67	93.33	93.33	80.00	90.00	90.42
	Sierra Nevada	100.00	100.00	100.00	100.00	100.00	100.00	75.00	100.00	96.88
	Marismas del Odiel	56.67	93.33	66.67	76.67	76.67	60.00	66.67	90.00	73.33
	Sierra de Las Nieves	90.00	41.67	66.67	53.33	83.33	76.67	65.00	100.00	72.08
	Cabo de Gata-Níjar	100.00	100.00	66.67	76.67	83.33	86.67	71.67	90.00	84.38
	Dehesas de Sierra Morena	100.00	93.33	86.67	76.67	90.00	86.67	58.33	90.00	85.21
	Intercontinental	100.00	83.33	66.67	86.67	93.33	93.33	45.00	90.00	82.29
Aragon	Ordesa-Viñamala	66.67	81.67	0.00	0.00	73.33	6.67	33.33	46.67	38.54
	Somiedo	86.67	90.00	90.00	100.00	100.00	86.67	80.00	70.00	87.92
	Redes	86.67	58.33	56.67	53.33	33.33	16.67	41.67	46.67	49.17
Asturias	Río Eo (ASTURIAS-GALICIA)	43.33	0.00	10.00	20.00	40.00	40.00	26.67	46.67	28.33
Balearics	Menorca	86.67	100.00	90.00	100.00	100.00	83.33	78.33	100.00	92.29
	La Palma	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Canary Islands	Lanzarote	66.67	100.00	90.00	76.67	76.67	73.33	55.00	100.00	79.79
	Gran Canaria	100.00	91.67	90.00	100.00	66.67	66.67	75.00	66.67	82.08
	Fuerteventura	66.67	66.67	90.00	66.67	43.33	66.67	60.00	100.00	70.00
Castilla - La Mancha	Mancha Húmeda	86.67	33.33	43.33	90.00	66.67	36.67	35.00	46.67	54.79

Source: Tragsatec and OAPN (2013)

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	IND. 7	IND. 8	BR synthesis
Castilla y León	Babia	60.00	86.67	100.00	100.00	63.33	93.33	68.33	80.00	81.46
	Alto Bernesga	60.00	100.00	90.00	100.00	100.00	100.00	71.67	70.00	86.46
	Sierra de Béjar y Francia	66.67	60.00	90.00	90.00	30.00	76.67	81.67	70.00	70.63
	Los Ancares leoneses	43.33	76.67	90.00	86.67	70.00	83.33	56.67	90.00	74.58
	Valle de Laciana	40.00	83.33	76.67	73.33	70.00	70.00	40.00	23.33	59.58
Catalonia	Montserrat	90.00	91.67	76.67	90.00	90.00	66.67	93.33	90.00	86.04
Extremadura	Monfragüe	86.67	76.67	90.00	86.67	76.67	83.33	60.00	33.33	74.17
Galicia	Os Ancares lucenses	73.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	96.67
	Gerês-Xurés	66.67	91.67	80.00	53.33	56.67	36.67	26.67	33.33	55.63
	Área de Allariz	43.33	66.67	70.00	76.67	33.33	43.33	53.33	66.67	56.67
	Terras do Miño	73.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00	96.67
The Rioja	Valles del Leza, Jubera, Cidacos y Alhama	60.00	83.33	63.33	86.67	100.00	90.00	58.33	70.00	76.46
Madrid	Sierra del Rincón	60.00	83.33	63.33	86.67	60.00	83.33	75.00	23.33	66.88
Navarre	Bardenas Reales	80.00	63.33	80.00	53.33	100.00	83.33	75.00	90.00	78.13
Basque Country	Urdaibai	100.00	86.67	90.00	100.00	86.67	50.00	66.67	100.00	85.00
Spain synthesis		75.69	80.45	76.26	74.96	71.95	68.78	61.02	72.20	72.66

Source: Tragsatec and OAPN (2013)

Annex F. Implementation indicators of the SNBR BR, expressed as percentages (2013-2014)

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	IND. 7	IND. 8	BR synthesis
Andalusia	Sierra de Grazalema	100.00	100.00	100.00	86.67	93.33	93.33	65.00	93.33	91.46
	Doñana	100.00	100.00	100.00	100.00	100.00	100.00	75.00	93.33	96.04
	Sierra de Cazorla, Segura y las Villas	33.33	73.33	100.00	100.00	100.00	93.33	80.00	93.33	84.17
	Sierra Nevada	100.00	100.00	100.00	100.00	100.00	100.00	66.67	100.00	95.83
	Marismas del Odiel	0.00	65.00	80.00	53.33	66.67	60.00	55.00	93.33	59.17
	Sierra de Las Nieves	33.33	75.00	76.67	56.67	93.33	86.67	65.00	100.00	73.33
	Cabo de Gata-Níjar	33.33	73.33	66.67	76.67	76.67	86.67	71.67	93.33	72.29
	Dehesas de Sierra Morena	33.33	73.33	86.67	80.00	100.00	86.67	71.67	100.00	78.96
	Intercontinental	100.00	73.33	56.67	76.67	93.33	86.67	58.33	93.33	79.79
Aragon	Ordesa-Viñamala	100.00	100.00	100.00	76.67	83.33	66.67	66.67	80.00	84.17
Asturias	Somiedo	100.00	95.00	90.00	63.33	60.00	60.00	53.33	53.33	71.88
	Redes	100.00	95.00	90.00	63.33	60.00	60.00	53.33	53.33	71.88
	Río Eo (ASTURIAS-GALICIA)	33.33	73.33	0.00	0.00	30.00	16.67	13.33	26.67	24.17
Balearics	Menorca	73.33	100.00	90.00	100.00	100.00	83.33	78.33	100.00	90.63
Canary Islands	La Palma	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Lanzarote	53.33	100.00	100.00	100.00	76.67	86.67	50.00	100.00	83.33
	Gran Canaria	33.33	100.00	100.00	80.00	60.00	60.00	60.00	66.67	70.00
	Fuerteventura	33.33	100.00	100.00	90.00	100.00	100.00	86.67	100.00	88.75

Source: OAPN (2015)

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	IND. 7	IND. 8	BR synthesis
Castilla - La Mancha	Mancha Húmeda	73.33	80.00	53.33	66.67	50.00	43.33	40.00	53.33	57.50
Castilla y León	Babia	0.00	86.67	100.00	90.00	73.33	93.33	68.33	100.00	76.46
	Alto Bernesga	0.00	63.33	80.00	76.67	56.67	76.67	60.00	80.00	61.67
	Sierra de Béjar y Francia	33.33	60.00	66.67	66.67	43.33	70.00	65.00	80.00	60.63
	Los Ancares leoneses	0.00	83.33	100.00	66.67	50.00	83.33	68.33	100.00	68.96
	Valle de Laciana	33.33	91.67	56.67	46.67	33.33	20.00	20.00	53.33	44.38
Catalonia	Montseny	80.00	90.00	86.67	76.67	100.00	86.67	66.67	93.33	85.00
Estremadura	Monfragüe	33.33	86.67	80.00	63.33	76.67	76.67	58.33	66.67	67.71
Galicia	Os Ancares lucenses	53.33	90.00	90.00	76.67	60.00	66.67	65.00	80.00	72.71
	Gerês-Xurés	33.33	85.00	66.67	0.00	60.00	43.33	40.00	66.67	49.38
	Área de Allariz	33.33	75.00	66.67	66.67	50.00	60.00	60.00	53.33	58.13
	Terras do Miño	53.33	90.00	100.00	76.67	66.67	66.67	73.33	80.00	75.83
The Rioja	Valles del Leza. Jubera. Cidacos y Alhama	100.00	90.00	56.67	90.00	100.00	83.33	58.33	93.33	83.96
Madrid	Sierra del Rincón	33.33	83.33	90.00	66.67	60.00	70.00	70.00	26.67	62.50
Navarre	Bardenas Reales	0.00	63.33	76.67	76.67	83.33	93.33	75.00	66.67	66.88
Basque Country	Urdaibai	100.00	93.33	86.67	90.00	90.00	60.00	88.33	100.00	88.54
Spain synthesis		48.94	81.95	78.13	68.05	69.59	68.46	57.64	73.82	68.32

Source: OAPN (2015)

Annex G. Implementation indicators used and/or calculated for SNBR 2008-2010 in percentages

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	IND. 7	IND. 8	BR synthesis
Andalusia	Sierra de Grazalema	23.33	53.33	76.67	33.33	66.66	33.33	66.66	64.64	52.24
	Doñana	43.33	48.33	76.67	33.33	66.66	33.33	66.66	64.64	54.12
	Sierra de Cazorla. Segura y las Villas	23.33	53.33	76.67	33.33	66.66	33.33	66.66	64.64	52.24
	Sierra Nevada	55.00	48.33	76.67	33.33	33.33	66.66	66.66	76.49	57.06
	Marismas del Odiel	43.33	53.33	76.67	33.33	66.66	33.33	66.66	64.64	54.74
	Sierra de Las Nieves	56.67	46.67	65.00	66.67	0.00	66.66	66.66	76.49	55.60
	Cabo de Gata-Níjar	66.67	53.33	76.67	33.33	66.66	33.33	66.66	64.64	57.66
	Dehesas de Sierra Morena	56.67	38.33	0.00	16.67	66.66	33.33	66.66	64.64	42.87
	Intercontinental	66.67	86.67	45.00	50.00	33.33	66.66	66.66	76.49	61.44
Aragon	Ordesa-Viñamala	23.33	28.33	0.00	0.00	33.33	66.66	33.33	59.60	30.57
Asturias	Somiedo	100.00	68.33	76.67	66.67	33.33	66.66	66.66	76.49	69.35
	Redes	100.00	68.33	76.67	66.67	66.66	66.66	33.33	59.60	67.24
	Río Eo (ASTURIAS-GALICIA)	66.67	5.00	33.33	0.00	66.66	33.33	33.33	47.75	35.76
Balearics	Menorca	88.33	100.00	100.00	83.33	33.33	33.33	66.66	64.64	71.20
Canary Islands	La Palma	78.33	100.00	100.00	83.33	66.66	100.00	100.00	105.25	91.70
	Lanzarote	90.00	86.67	100.00	83.33	66.66	66.66	66.66	76.49	79.56
	Gran Canaria	68.33	43.33	0.00	0.00	33.33	33.33	33.33	47.75	32.42
	Fuerteventura	66.67	86.67	100.00	66.67	100.00	33.33	100.00	81.54	79.36

Source: own elaboration

Autonomous community	BR name	IND. 1	IND. 2	IND. 3	IND. 4	IND. 5	IND. 6	IND. 7	IND. 8	BR synthesis
Castilla y León	Babia	33.33	50.00	53.33	0.00	33.33	0.00	66.66	52.78	36.18
	Alto Bernesga	33.33	23.33	53.33	0.00	66.66	33.33	66.66	64.64	42.66
	Sierra de Béjar y Francia	56.67	71.67	53.33	66.67	33.33	33.33	66.66	64.64	55.79
	Los Ancares leoneses	33.33	50.00	0.00	0.00	0.00	0.00	33.33	35.89	19.07
	Valle de Laciana	33.33	75.00	53.33	50.00	66.66	33.33	66.66	64.64	55.37
Catalonia	Montseny	78.33	81.67	76.67	66.67	66.66	100.00	66.66	88.35	78.13
Extremadura	Monfragüe	66.67	61.67	100.00	33.33	66.66	33.33	66.66	64.64	61.62
Galicia	Os Ancares lucenses	33.33	0.00	0.00	0.00	33.33	0.00	33.33	35.89	16.99
	Gerês-Xurés	78.33	81.67	0.00	66.67	33.33	66.66	33.33	59.60	52.45
	Área de Allariz	45.00	80.00	90.00	83.33	33.33	33.33	33.33	47.75	55.76
	Terras do Miño	33.33	18.33	43.33	0.00	33.33	33.33	33.33	47.75	30.34
The Rioja	Valles del Leza.									
	Jubera. Cidacos y Alhama	45.00	86.67	76.67	50.00	66.66	66.66	33.33	59.60	60.57
Madrid	Sierra del Rincón	78.33	81.67	53.33	50.00	33.33	66.66	66.66	76.49	63.31
Navarre	Bardenas Reales	55.00	48.33	76.67	33.33	66.66	33.33	100.00	81.54	61.86
Basque Country	Urdaibai	100.00	86.67	100.00	83.33	33.33	33.33	66.66	64.64	70.99
Spain synthesis		57.71	57.21	58.96	37.50	46.66	40.83	56.66	62.24	52.22

Source: own elaboration

Annex H. Statistics of multiple variables and F approximations of the implantation indicators of the SNBR (2008-2014)

Statistic	Value	F-Value	Num DF	Den DF	Pr > F
Wilks's Lambda	0.39	6.91	16	184	< 0.0001
Pillai trace	0.72	6.47	16	186	< 0.0001
Hotelling-Lawley trace	1.29	7.38	16	147	< 0.0001
Roy's largest root	1.03	11.99	8	93	< 0.0001

Source: own elaboration
The F statistic for Wilks's Lambda is exact