Assessing Management Effectiveness: Manglares El Salado Fauna Production Reserve Study Case

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Abstract. The Manglares El Salado Fauna Production Reserve in Guayaquil, Ecuador has not updated its Management Plan since 2013 and none of the management actions have been carried out. In this sense, is vital to assess its management effectiveness through two methodologies, in order to study whether this natural space has the ideal conditions to promote ecotourism activities. From the results obtained, Manglares El Salado Fauna Production Reserve evidenced a moderately satisfactory, which means that this protected area possessed many resources and means for its management but lacked elements to reach a minimum acceptable level. In the national scope, Control and Surveillance and Biodiversity Management programs were the most worrying due to their low management effectiveness levels. Also, Planning, Inputs and Processes areas registered the same preoccupying scenario.

Keywords: Management Effectiveness Evaluation · Fauna Production Reserve · Protected areas

1 Diagnosis of the Current Situation

The Manglares El Salado Fauna Production Reserve (RPFMS by its acronym in Spanish) is part of the National System of Protected Areas and is located at northwest of the estuary of the Gulf of Guayaquil and southwest of the city of Guayaquil. It was categorized as a reserve on 15 November 2002 by Ministerial Agreement No. 142, and in 2007 its boundaries were rectified, adding Manglares of Puerto Hondo. At present, according to the last rectification made in 2017, the RPFMS has 15,535.56 hectares of extension [1].

In the perimeter of the reserve, some housing developments stand out, such as Cooperativa Puerto del Sol, Puerto Azul and Bello Horizonte; as well as industrial warehouses, the International Port Terminal (IPT) dock, the Puerto Hondo Spa and Recreational Centre, and the Intervention and Rescue Group (IRG) camp [2].

The RPFMS is made up of salt marshes, remnants of tropical dry forest, mangrove forest and three estuaries: Mongón, Plano Seco and Salado. Its flora and fauna accumulate

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48 plant species, 79 bird species, 12 mammals, 7 amphibians and reptiles, 20 fishes, 18 mollusks and 13 crustaceans [3]. Thus, the RPFMS has provided economic resources to the inhabitants of its shores, with artisanal fishing as the main source of income [1].

Furthermore, it has an appreciable ecotourism potential based on a great variety of attractions and resources that are currently not adequately valued, in order to be considered a local ecotourism pole. One of the consequences of this undervaluation is the low number of visitors, which could be increased through the implementation of diversification options for tourists, with new ideas, recommendations and proposals for tourism development in the area and, specifically, in the community of Puerto Hondo [4].

According to the World Tourism Organization, tourism comprises "activities undertaken by people during their travels and stays in places other than their usual environment for a consecutive period of time of less than one year, for leisure, business or other purposes" [5]. Tourism has therefore become one of the most important industries worldwide. In our country, the 2018 figures reflect that the tourism balance grew compared to 2017, leaving a positive balance according to the Central Bank of Ecuador. In addition, tourism contributed to the Ecuadorian economy, maintaining it as the third source of non-oil income, after bananas and shrimp. Even in the nine national holidays of 2018, the economic dynamization was 425.8 million dollars, with Carnival being the busiest [6].

Although tourism has diversified over time in order to satisfy a growing demand from travelers according to their preferences and the search for new experiences, the health emergency resulting from the COVID pandemic19 has significantly limited and conditioned global tourism; as mentioned, it is a reality that domestic visitors prefer fun activities in the first place, followed by visits to protected areas and to a lesser extent by the practice of sports, according to the Integrated Tourism Marketing Plan of Ecuador "PIMTE 2014", as shown in Table 1.

Table 1. Activity preferences of domestic visitors (Source: [7]).

Activities	Total visitors	Percentage
Playing sports	326,317	12.2
Observing flora and fauna	79,232	3.0
Visiting, naturalizing in protected areas	695,169	26.1
Visiting communities	4,473	0.2
Visiting shamans, healers	1,608	0.1
Visiting archaeological and historical sites	77,126	2.9
Fun	1′214,990	45.6
Gastronomy	170,882	6.4
Making purchases	52,381	2.0
Other	44,137	1.7
Total	2′666,315	100.0

Coincidentally, the PIMTE 2014 reflects that at the national level the most marketed tourism product is ecotourism and nature tourism, while in the international market this product is the second, constituting 21% of the supply [7]. As highlighted in the Strategic Plan for the Development of Sustainable Tourism for Ecuador "PLANDETUR 2020", our country has a privileged position to develop tourism thanks to its mega biodiversity housed in its protected areas [8].

This natural wealth contrasts with unsustainable consumption and production systems that threaten the integrity of Ecuadorian ecosystems. This reality presents an enormous challenge in order to accelerate the introduction of best practices such as cleaner production, eco-efficiency and the application of more environmentally responsible behavior [8].

On the other hand, in the technical report of the Marine and Coastal Biodiversity Conservation Project of Ecuador, it was found that the management plan for the Manglares El Salado Fauna Production Reserve is out of date, despite the fact that the year it was created (2008) was mentioned as the last update [9]. In 2013, the Reserve's Management Plan was updated, reinforcing, complementing and restructuring what was stated in the 2008 Plan, through the following analyses: physical-climatic; biological and ecosystemic; socio-economic and cultural; basic services and infrastructure; land use; socio-organizational; and socio-environmental conflicts. In terms of the initial proposal, the

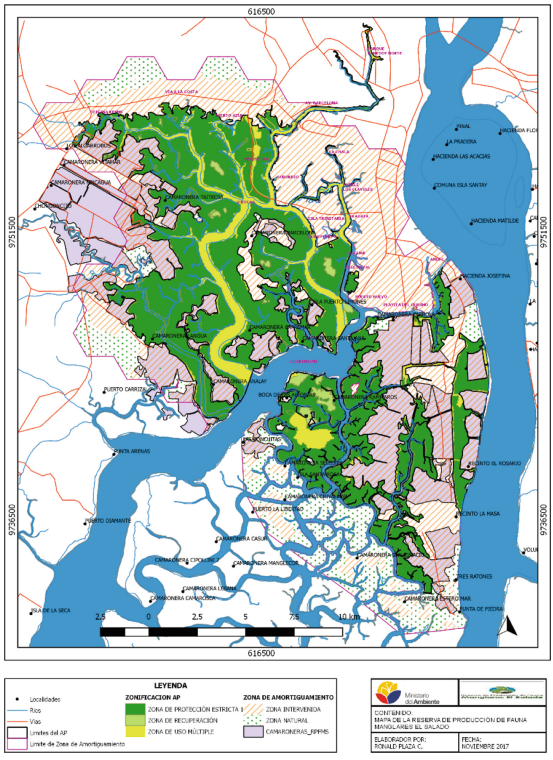

Fig. 1. Zoning of the Protected Area (Source: [3]).

reserve's programs were adjusted to the following: Biodiversity Protection; Research and Monitoring; Education, Communication and Public Relations; Public Use; Sustainable Development; and Organizational Development. In addition, the zoning proposed in 2006 was changed from 6 to 5 zones: Strict Conservation (ZCE); Multiple Use (ZUM); Tourism and Recreation Use (ZUTYR); Ecological Restoration (ZRE); and, Sensitive to Industrial Use and Domestic Discharges (ZSUIDD), as shown in Fig. 1 [3].

Therefore, in 2013, according to experts in the area, reserve's management plan update was documented; however, the new management plan has not yet been implemented [3]. To date, as an updated management plan has not been carried out, there have been no periodic evaluations of management effectiveness of the protected area, which does not allow us to have a perspective of the obstacles it faces.

Protected areas Management Effectiveness Evaluation serves multiple purposes, among which the following are specified [10]:

- Document the management of the Protected Area (PA), as it describes and systematizes the state of the area. It constitutes an "institutional memory" and makes it possible to collect and make reliable data available;
- Improve the planning and decision-making process by identifying lessons learned that can be used to improve future planning and management;
- Stimulate management excellence through adaptive management by comparing the progress of Coastal Marine Protected Area (CMPA) management over time;
- Enable APMC staff to evaluate and take ownership of the continuous improvement process. In other words, the information is used to improve the performance of protected area staff, both individually and collectively;
- Promote the efficient and effective use of resources and investments;
- Increase participation by enabling support to be obtained from interest groups and the most significant actors in the PA;
- Identify work priorities;
- Develop policies that promote the adoption of best practices in the protected area;
- Continuous improvement;
- Increase transparency in the use of information and enable accountability.

Given that tourism is one of the main sources of development in Ecuador; protected areas are natural spaces that have the conditions to promote ecotourism activities; and that the management plan for the area in question has not yet been updated, it is necessary to carry out an evaluation of the effectiveness of the Reserve's management.

2 Methodology

The research carried out had the aim of evaluating management effectiveness of the protected area. In this study case, working together with Reserve staff, two methodologies were used for the Evaluation of Management Effectiveness, the first is an adaptation of the World Bank - WWF Alliance instrument used to evaluate the management effectiveness of terrestrial protected areas, known as the METT questionnaire (Management Effectiveness Tracking Tool) [10]. The METT questionnaire consists of 34 questions, with a maximum score of 138 points, corresponding to 100%, distributed in six scopes: Context, Planning, Contributions, Product, Results and Consequences, as indicated in Table 2.

Table 2. Distribution and maximum score of METT survey questions by Scope (Source: [9]).

Scope	Questions	Supplementary questions	Maximum Score
Context	1–7	1.a, 3.a, 3.b, 5.a, 5.b	26
Planning	8–9	9.a, 9.b, 9.c, 9.d, 9.e, 9.f, 9.g, 9.h	14
Contributions	10–12	10.a, 11.a, 12.a, 12.b	14
Product	13–19	14.a, 15.a, 19.a, 19.b	25
Results	20–27	20.a, 20.b, 20.c, 20.d, 20.e, 20.f, 20.g, 21.a, 21.b, 21.c	33
Consequences	28–34	31.a, 31.b, 31.c, 31.d, 34.a, 34.b	26
		Total	138

The second methodology contemplates the evaluation of the management effectiveness of the State Natural Areas Heritage (PANE by its acronym in Spanish) through a methodological guide [11]. The following forms were used in this study: Form 1 (General Data), Form 3 (Evaluation of Management Effectiveness); and Form 4 (Strategic Actors of the protected area).

Form 1 includes name and category of the protected area, subsystem to which it belongs, legal document of creation, surface of the area, land tenure details, geographical location, number of staff, annual budget accrued at the end of the fiscal year and other nominations of the protected area.

Form 3 consists of 44 questions with four multiple choices (0 to 3) and its questions correspond in part to an equivalence with the METT indicators plus some additional questions elaborated for the PANE, which allow a better reflection of the reality of protected areas. Each question represents an indicator, which are coded and of which there are two additional indicators Impact or Result that are considered referential and are not evaluated numerically (EV1 and EV2), so they do not affect the total evaluation score.

Due to the nature of the protected area that is the object of this study case, as the public use and tourism program is not applied, 7 indicators associated with this program are discarded, leaving form 3 with a total of 35 indicators or questions, with a maximum score of 105 points. Tables 3 and 4 show the distribution and maximum score of the survey questions by program and scope.

Table 3. Distribution and maximum score of PANE survey questions by Program (form 3) (Source: [11]).

Program	Questions	Maximum Score
Administration and Planning	3 - 16	42
Control and Surveillance	17 - 23	21

(*continued*)

Table 3. (*continued*)

Program	Questions	Maximum Score
Environmental Communication, Education and Participation	24 - 30	21
Biodiversity Management	38 - 44	21
	Total	105

Table 4. Distribution and maximum score of PANE survey questions by Scope (form 3) (Source: [11]).

Scope	Questions	Maximum Score
Context	10, 14, 15, 16, 19, 20	18
Planning	3, 4, 5, 6, 11, 13, 39, 43	24
Inputs	8, 30, 18, 21, 22, 23, 38, 44	24
Processes	9, 12, 26, 17, 40, 42	18
Products	7, 24, 25, 27, 28, 29, 41	21
	Total	105

Form 4 measures the perception of the protected area's strategic stakeholders. The aim of this external assessment is to contrast the self-assessment of each area with the external perception. The questions correspond to 29 indicators also found in form 3, which are classified by type of stakeholder.

For the present case of study, only the communities were considered, so the evaluation was reduced to 13 questions addressed to the representatives of the inhabitants inside or on the borders of the protected area. Of the 13 questions, only 12 were considered, as the one related to the public use and tourism program was discarded, as shown in Table 5.

Table 5. Distribution of PANE survey questions for strategic stakeholders (form 4) (Source: [11]).

Actors	Questions
Communities	24, 25, 26, 27, 28, 29, 18, 20, 40, 42, 1, 2

3 Analysis and Results

3.1 World Bank – WWF Methodology

Table 6 presents the comparative summary of the Management Effectiveness Assessment, considering its different scopes, the years and the entities that carried out the measurement.

Table 6. Comparative summary of Management Effectiveness Evaluation.

Scope	BID 2009	MAE 2009	PCBMC 2015	PCBMC 2016	ISTVR 2019
Context	0	9	17	18	18
Planning	4	3	13	12	9
Contributions	3	1	10	6	6
Product	0	2	17	14	13
Results	0	0	15	13	15
Consequences	7	4	21	14	12
MEE (Pts)	**14**	**19**	**93**	**77**	**73**
MEE (%)	**10.14%**	**13.77%**	**67.39%**	**55.80%**	**52.90%**

Figure 2 shows the variation that the Management Effectiveness Evaluation has undergone, according to the different years and entities in charge of the measurement. It is notable that its lowest values occurred in 2009, with an upturn in 2015; however, from 2015 onwards, the trend has been decreasing considering the current measurement carried out by this study.

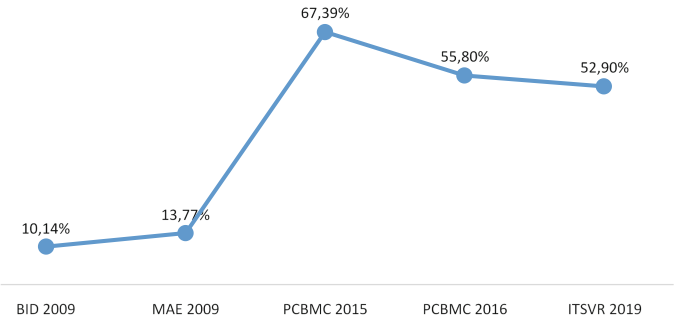

Fig. 2. MEE trend from 2009 to 2019.

3.2 PANE Methodology

Prior to the calculation of the management effectiveness assessment, form 1 was filled in, reflecting the information in Table 7.

As part of the process of obtaining the Management Effectiveness Assessment percentage for a protected area, it is necessary to score each of the indicators that make up Form 3 according to the scoring scale shown in Table 8. This table contains the scale from 0 to 3 and its respective meaning interpreted in the context in which it is being used.

Table 7. RPFMS General Data.

Item	Detail
Name and category	Manglares El Salado Fauna Production Reserve
Subsystem	State
Legal document of creation (Date and number)	No. 5 15 November 2002 Official Register 142; 22–01-2003
Total area	15,535.56 ha (20% Land and 80% Marine)
Land tenure	State (92%) Private (8%)
Geographical location	It is located at the northern Gulf of Guayaquil Province: Guayas; Canton: Guayaquil
Number of staff	Head of area (1) Technicians (1) Park Rangers (11) Administrative staff (0)* *The technician carries out the administrative activity together with the head of the protected area due to lack of personnel
Annual accrued budget at the end of the fiscal year of assessment	MAE Funds ($ 3,475.00) FAP Funds ($ 40,000.00) Total ($43,475.00)
Other nominations of the Protected Area (UNESCO World Heritage Site, RAMSAR Site, etc.)	It does not have

Table 8. Scoring Scale for indicators.

Score	Meaning
0	No progress or minimal progress
1	Shows some level of progress
2	Corresponds to good progress, with room for improvement
3	Optimal situation

With the individual results of the indicators, three ways of analysis are defined: the first considering the total percentage of the Management Effectiveness Evaluation of a protected area, the second with the percentage of Management Effectiveness Evaluation by Management Programs, and the third, taking into consideration the percentage of Management Effectiveness Evaluation by Management Scopes.

Based on the corresponding expressions, the calculations for the Management Effectiveness Evaluation (MEE) in the RPFMS protected area, which is the subject of this research, were computed, obtaining the following results.

Total percentage of MEE in protected area:

$$\%\ \text{MEE in PA} = \frac{\sum_{i=1}^{35} p_i}{(35)(3)} * 100 = \frac{49}{105} * 100 = 46.66\% \tag{1}$$

where p_i is the score obtained in each of the 35 indicators

Percentage of MEE by Management Programs:

Administration and Planning

$$\%\ \text{MEE in PA} = \frac{\sum_{i=1}^{14} app_i}{(14)(3)} * 100 = 52.38\% \tag{2}$$

where app_i is the score obtained in each of the 14 indicators of this program

Control and Surveillance.

$$\%\ \text{MEE in PA} = \frac{\sum_{i=1}^{7} cvp_i}{(7)(3)} * 100 = 42.86\% \tag{3}$$

where cvp_i is the score obtained in each of the 7 indicators of this program.

Environmental Communication, Education and Participation

$$\%\ \text{MEE in PA} = \frac{\sum_{i=1}^{7} ecepp_i}{(7)(3)} * 100 = 52.38\% \tag{4}$$

where $ecepp_i$ is the score obtained in each of the 7 indicators of this program

Biodiversity Management

$$\%\ \text{MEE in PA} = \frac{\sum_{i=1}^{7} bmp_i}{(7)(3)} * 100 = 33.33\% \tag{5}$$

where bmp_i is the score obtained in each of the 7 indicators of this program

Figure 3 shows the percentages achieved by each of the programs considered in the PANE methodology.

Percentage of MEE by Management Scopes:

Context

$$\%\ \text{MEE in PA} = \frac{\sum_{i=1}^{6} cp_i}{(6)(3)} * 100 = 50.00\% \tag{6}$$

where cp_i is the score obtained in each of the 6 indicators of this scope

Planning

$$\%\ \text{MEE in PA} = \frac{\sum_{i=1}^{8} pp_i}{(8)(3)} * 100 = 45.83\% \tag{7}$$

where pp_i is the score obtained in each of the 8 indicators of this scope

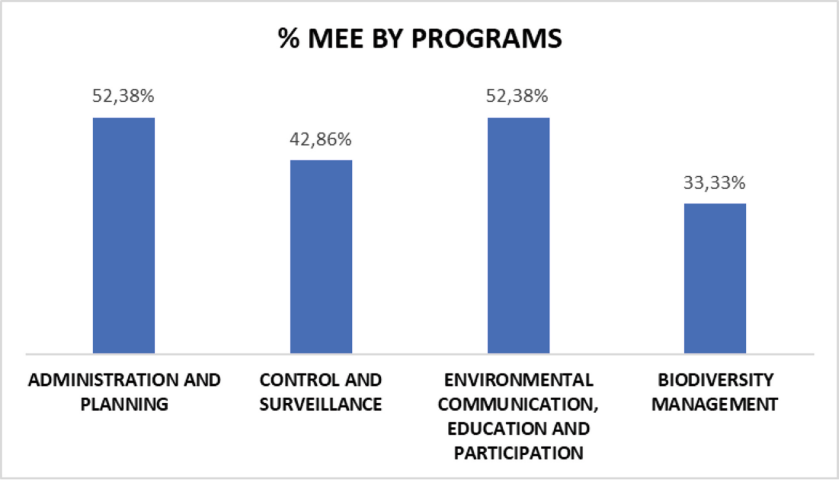

Fig. 3. MEE by Management Programs.

Inputs

$$\% \text{ MEE in PA} = \frac{\sum_{i=1}^{8} ip_i}{(8)(3)} * 100 = 41.67\% \tag{8}$$

where ip_i is the score obtained in each of the 8 indicators of this scope

Processes

$$\% \text{ MEE in PA} = \frac{\sum_{i=1}^{6} procp_i}{(6)(3)} * 100 = 44.44\% \tag{9}$$

where $procp_i$ is the score obtained in each of the 6 indicators of this scope

Products

$$\% \text{ MEE in PA} = \frac{\sum_{i=1}^{7} prodp_i}{(7)(3)} * 100 = 52.38\% \tag{10}$$

where $prodp_i$ is the score obtained in each of the 7 indicators of this scope

Figure 4 shows the percentages achieved by each of the scopes considered in the PANE methodology.

As part of this methodology, the strategic stakeholders of the protected area are also evaluated with form 4, proceeding to obtain the perceptions of the head of the Puerto Hondo community that adjoins the RPFMS. The also president of the Association of Small Farmers of Puerto Hondo, answered the 12 corresponding questions, in order to make comparisons between this external and internal perception on the management of the protected area. Figure 5 shows the results of the aforementioned comparison.

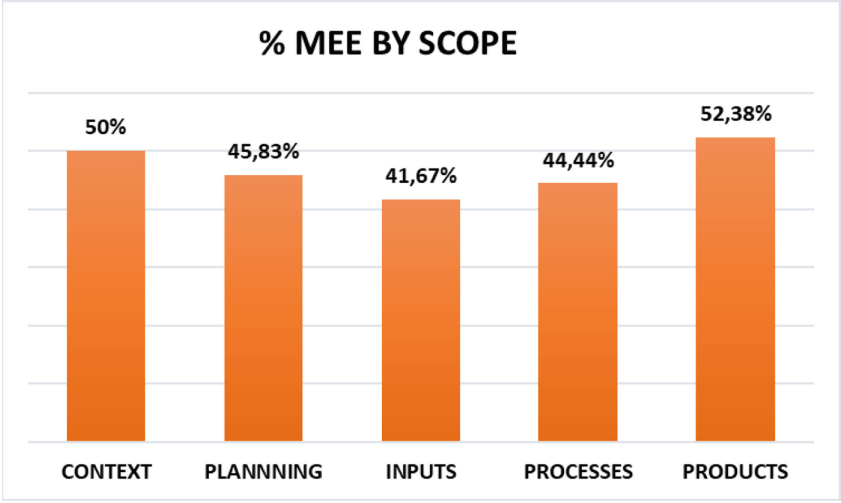

Fig. 4. MEE by Management Scopes.

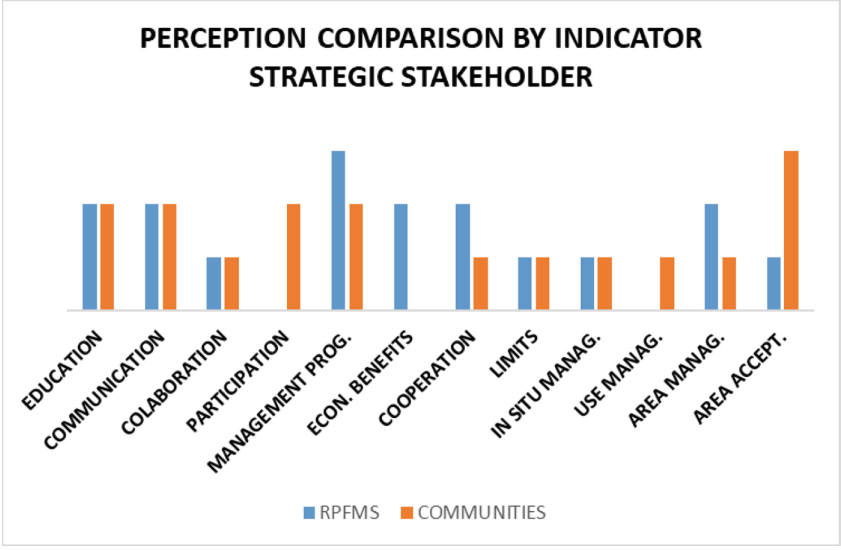

Fig. 5. Perception comparison between RPFMS and Communities.

From Fig. 5, it can be established that, in the indicators related to participation in management decision-making or planning processes in the reserve, with the existence of specific actions for the sustainable management of resources; and, with the level of acceptance of the protected area, the perception of the community or external perception is high.

On the other hand, in issues related to the participation of area personnel to improve the well-being of the community, with the provision of economic benefits, with the presence of other actors that support control and surveillance activities; and, with the current condition of conservation of the area, the perception of the external community is low.

Finally, in other aspects related to environmental education, environmental communication, collaboration, limits and on-site management, the internal and external perception coincide.

4 Conclusions

From the results obtained in the total percentage levels of the Management Effectiveness Evaluation, using the described methodologies, it can be concluded that in both cases similar results were obtained, since according to the METT questionnaire, the Manglares El Salado Fauna Production Reserve was categorized with a Management Effectiveness Evaluation percentage of 52.90%, from which it is established that the factors and means that make the management of the area possible are being adequately attended to, with room for improvement. Similarly, when analyzing the results of the total levels with the PANE questionnaire, the level of management effectiveness in the RPFMS was 46.66%, which shows that the area possesses many resources and means that are indispensable for its management, but that it lacks elements to reach a minimum acceptable level.

The methodology of national scope, using the PANE questionnaire, made it possible to analyze the results of the evaluation of management effectiveness by programs and by areas, identifying those in which urgent intervention is required. In this sense, in terms of the results by programs, those linked to Control and Surveillance and Biodiversity Management were the most worrying due to their management effectiveness levels of less than 50%. At the same time, with regard to the results by area, it was precisely those related to Planning, Inputs and Processes that registered management effectiveness levels below 50%.

The levels of management effectiveness obtained showed that the Manglares El Salado Fauna Production Reserve requires actions to help achieve efficient management in accordance with current demands in terms of the conservation of its resources, which is why the present project contemplates a specific, realistic, achievable and time-bound proposal, with activities that will improve the levels of effectiveness in the most vulnerable programs and scopes; and therefore, the management and operation of the protected area.

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