

Mosaics of Protected Areas: a tool for strengthening biodiversity conservation in Brazil

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Biodiversity, Protected Areas and Ecosystems Directory

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Changes in land use and ecosystem fragmentation are the main cause for biodiversity loss in Brazil, and the creation of protected areas (PA) is the instrument to avoid that loss. The establishment of protected areas is the most efficient way to ensure the maintenance of biological diversity in situ. This strategy is advocated in the Convention on Biological Diversity (CBD), an international treaty that establishes to its signatories, obligations related to the protection of biological diversity. Brazil is one of the signatory countries of this convention.

Throughout history, Brazil has created several protected areas; however, it was only from the mid-1970s that scientific criteria were used to create those today understood as UC (Leuzinger, 2007). Before that, the determination of these areas was mainly due to aesthetic issues and political circumstances, or with the main objective of ensuring control over the management of certain resources, such as wood or water (Medeiros, 2006).

According to Brito (2000), Brazil has an undeniable progress on the conservation of biological diversity, especially in relation to the creation of protected areas, but it is also undeniable that many problems presented today in 2016 are the same reported since the creation of the first Brazilian PA. The author points out the main problems such as:

- Lack of conditions for the effective implementation of the units (human and financial resources, administrative capacity, elaboration and execution of inspection plans, etc);
- The centralization of actions occurs at all levels of government, be it in the relationship between Federations, States and Municipalities, or in the relationship of institutions with social actors affected by the units, or in interinstitutional relations, etc .;
- The historical context of the creation of the units and consequent lack of representativeness of the biomes (total protected area and protection conditions);
- Conflicts with populations (inland and surrounding), the main problems - hunting, deforestation and illegal exploitation of flora and fires;

Although the establishment of conservation units is fundamental for the maintenance of biological diversity, its isolation in the landscape turns out to be a management problem. Restricted protected areas such as parks and biological reserves become "conservation islands" with no human presence, but with enormous pressures and conflicts in their surroundings (Diegues 2004, p 117). According to Metzger (2001), to reconcile land use and environmental, social and economic sustainability, it is necessary to plan the occupation and conservation of the landscape as a whole. In order to obtain an effective conservation, no protected area can be managed in isolation, considering that there are biological, social and economic connections between different places and different components of the system, integrating them into the dynamic process of system planning, which goes beyond Simple sum of the integral parts (Gidsicki, 2013).

In the 1990s, during the discussions for the elaboration of the SNUC (the Brazilian law

for protected areas), the mosaics emerged as a possible instrument of spatial planning in areas of conflict between protected areas and the local population (Delelis et al, 2010). In addition, they would also function as integrated management tools for protected areas as a way to prevent their isolation and to ensure the conservation of ecosystems on a landscape scale. Its final definition was legally established at SNUC, in its chap. IV art. 26.

“When there is a set of public or private protected areas of different categories or not, near, juxtaposed or overlapping, constituting a mosaic, the management of the whole set should be done in an integrated and participatory manner, considering their Conservation objectives, in order to reconcile the presence of biodiversity, the valorization of sociodiversity and sustainable development in the regional context.”

Among the main motivations for the integrated management of protected areas are: greater scale in nature conservation, integrated management, social and political-institutional benefits, resource optimization and infrastructure integration, reduction of conflicts and strengthening the relation of belonging of the Residents with protected areas, integration between the municipal, state and federal management spheres, integration between the themes related to conservation, territorial development (Pinheiro, 2010).

The Mosaics of Protected Areas (MAP) exist to promote an integrated and participative management between close or overlapping protected areas, valuing the territory's social diversity and sustainable development. While the protected areas focus on the biome conservation, mosaics act in territory environmental management. They were created as tools for the integrated management of protected areas with the areas where live those traditional communities as indigenous groups, quilombolas and small property farmers (Franca *et al.*, 2015).

The creation of a Mosaic of Protected Areas is done by the Ministry of the Environment and only occurs upon request of the protected areas that will be part of it and with the agreement of the environmental agencies managers responsible for protected areas. The field procedures for the formation of mosaics are not determined by regulations, but the experiences that had their official recognition approved passed, in their majority, by the following steps, according to a REMAP - Mosaic Network of Protected Areas survey:

- Mobilization of managers of protected areas, and territorial actors directly involved;
- Identification of the general and specific objectives of the mosaic;
- Formalization of a working group;
- Construction workshops and detailing of the proposal;
- Preparation of a document containing, among others, justification and basic characterization of the proposed territory, legal documentation and maps of protected areas, mosaic map, declaration of voluntary adherence of the managing institutions of protected areas that comprise it, and of the institutions that should form the mosaic managing council;

Pinheiro (2010) points out that the most important criteria for the creation of a mosaic of protected areas are: own territorial identity; Improve the operability of management actions; Wide inter-institutional articulation; And definition of common objectives more ambitious than the sum of the objectives of the protected areas that compose it.

The mosaic has the purpose of compatibilizing and optimizing the management of a set of PAs near or overlapping each other (Ganem, 2010). According to Pinheiro (2010), mosaics are instruments of integrated territorial management that emerge to provide greater effectiveness in the governance of protected areas, and to promote strategies for biodiversity conservation actions through the integrated and systemic organization of

protected areas in the bioregional Planning and management. The main objectives for mosaic management are: to strengthen the integrated management of protected areas and the achievement of their individual objectives; Promote the physical and functional connectivity of ecosystems; Establish spaces of institutional articulation and public policies; Develop, recognize or strengthen territorial identity; Contribute to territorial planning and sustainable territorial development; Contribute to conflict resolution and management; Improve the operational capacity of all protected areas.

The mosaics, in addition to the biological connection between protected areas, are recognized as administrative management instances, and have as their central objective the integrated and participatory management of protected areas and other protected areas in the same regional context (Melo, 2012). They are managed by councils that congregate government and civil representations. These councils has a presidency or coordination, responsible for leading meetings and activities, and a secretariat, that organizes all materials produced by the council and is responsible for the interinstitutional articulation.

It should be noted that the Mosaic Advisory Councils are not hierarchically superior to the other councils of the conservation units. They should act agglutinating the protected areas and other territorial representations (Government, associations, NGOs, companies, forums, councils) in a system of governance that aims, in addition to their own objectives, to strengthen existing councils and local initiatives, without overlapping objectives, nor bureaucratizing the process in order to establish actions on an enlarged scale (Pinheiro, 2010).

The MAPs are not only a managing collegiate to discuss issues common to these areas but are also territories where the conservation of natural resources must be made compatible with the occupation and development of their human populations, especially their traditional communities. The purpose of the mosaic institution is to allow the integrated management of the various units, while maintaining the distinct objectives of each. The mosaic should also value sociodiversity and articulate the conservation of biodiversity with the development of the region (Ganem, 2010).

Another important aspect of mosaic governance is its internal governance, the division of power and responsibilities between the members of its councils and the institutions they represent. Grzybowski (2014) says that being a mosaic is not intrinsic, we who ultimately create the mosaic politically in the effort to preserve part of a common good that still resists and can be regenerated. Governance instances are formed through participation, which makes it the most important among the actors involved and at the same time a source of conflict.

According to Ferreira (2013), we have two major challenges in Brazil in the territory management: participatory management and management taking into account natural factors such as the river basin and its real limits of use and occupation. The greater or lesser capacity for governance is conditional on the creation of legitimate and efficient institutionalized channels of mobilization and involvement in the elaboration and implementation of policies, and great care must be taken with their excessive formalization. The biggest challenge is to turn mosaics councils into effective instances of social control over government and the marketplace.

Tambellini (2007) points out that in the Mosaico, different governmental institutions (federal, state and municipal) plan together and share their activities, surpassing their geographical political limits to reach the objectives of the mosaic. The same author argues that the effective functioning of the mosaic implies a harmonious articulation between different organs of different characteristics as to the mission, objective, legislation, purpose, goals, etc ... Therefore the way of functioning is of extreme

importance and must be continuously thought of. So that you can plan, decide, execute, monitor, evaluate, make changes, and prepare to seize opportunities.

Although mosaic management is a voluntary policy for the protected areas managing institutions, both within the states and the federation, there is a gap between the formal recognition of the mosaics and their operation. Integration between protected areas, especially among those from different spheres of government, is hampered when the mosaic instrument is not properly valued as public policy, with little institutional involvement in its implementation process (REMAP, 2016).

The main conflict that is present in the mosaic councils is the clash between government representatives and civil society. Gohn (2003) says that the main characteristic of management through councils tends to be a greater interaction between government institutions and civil society. This proves to be true in mosaic councils, where equal interaction between government and civil society brings conflict, unlike what occurs in the advisory councils of protected areas.

According to Melo (2012), if in protected areas the chief managers are the council's presidents; in the mosaics they assume another role, becoming one of the counselors, which changes the balance of forces in the management and decision-making process. The same author says that mosaic management requires the interpretation of social and political aspects in context in which social participation involves inter-institutional articulation between environmental agencies and other sectors of society on an extended scale of nature protection. Labruna (2015) argues that protected areas cannot be planning targets without integration with the territorial totality, and without also involving the socio-cultural management of the territories. Governance applied to MAPs presupposes the inclusion of civil society and its institutions as sources of power in the processes of management of protected areas, having as a space for discussion the councils, and participation is crucial for their sustainability (Pena, 2015).

In an interview to the members of the presidencies and coordinations of five mosaics in the state of Rio de Janeiro some questions about MAP management were made. The first questioning was about whether and how the Mosaics of Protected Areas strengthen protected areas and their management. All were unanimous in stating that the mosaics strengthen the PA. This strengthening would come as a mutual support for joint actions of inspection, environmental education and awareness events in the territory, and as articulation for positioning and pressure that the PA face threats, such as licensing large potential polluter in the territory. In the latter case, MAP motions and manifestations strengthen PAs, as they not only manifest themselves individually but also with the support of other PAs in the territory and civil society, thus increasing the impact of this position on the licensing bodies. Other forms of support mentioned were assistance in the structuring and implementation of municipal PAs, the implementation of forest corridors and other socio-environmental projects.

Next was asked what the main potentialities and challenges of Mosaics. The potentialities presented were:

- optimization of resources,
- the possibility of thinking about socio-biodiversity beyond the limits of PAs,
- the political force generated by the union of PAs and civil society, the improvement in the conservation of water resources,
- identification and resolution of problems common to various PAs, increased dialogue between PA managers, increased participation of PAs in licensing, insertion and improvement of community participation in the management of PAs, and improvement of the relationship between PAs from different spheres of government.

On the challenges, there was a unanimous statement on the lack of human and financial resources to keep the MAPs functioning, especially regarding the maintenance of the

executive secretariats, which are considered fundamental for the articulation and integration among the members of the mosaic councils. According to the managers, it is a very heavy task to be added to their assignments or to be requested voluntarily for members of civil society. The absence of an executive secretariat working full-time for the mosaic would also make it difficult for the councilors and other members of civil society to maintain interest in the lack of information on Mosaic actions.

These results were similar to the claims made by representatives of mosaics from all over the country at the National Mosaics Workshop, held in May 2016. Mosaics exist to contribute to protected areas in protecting biodiversity. However, it is necessary to have the understanding that without the support of communities and people living in a territory, this task will be much more difficult. Searching for ways to maintain MAP activity should be the council focus. However, this responsibility should not be attributed only to one sector, be it governmental or civil society.

There are 21 MAP in Brazil, 12 of them in the Atlantic Forest and 5 in Amazon. The Convention on Biological Diversity requires that signatory countries should establish a system of protected areas, develop guidelines for their establishment and management, promote sustainable development close to them, and respect the knowledge and practices of local and indigenous communities and encourage there are more widely applied with the approval and participation of holders of such knowledge, and encourage the equitable sharing of benefits arising from the use of such practices. According to Abirached et al (2010), it is imperative that traditional populations commit themselves to an adequate management of natural resources, constituting conservation partners. The competent public institutions, on the other hand, should promote management alternatives with traditional populations and support the sustainable production of communities. The mosaic has its focus on the integrated management of protected areas and their buffer zones, contributing directly to territorial planning and, mainly, to the valorization of regional identity with conservationist bases (REMAP, 2016).

According to Ganem (2010), such strategies represent a major advance in the design and implementation of public policies for the conservation of biodiversity because they aim to solve or at least minimize the contradiction between protected areas and their environment. The novelty lies in the recognition that isolated protected areas do not guarantee protection of biodiversity in the long term. Therefore, one can see a shift from a centralized conservation model focused on isolated areas to another, decentralized and focused on bioregional management, more consistent with the principles of sustainable development.

It is also considered that management by mosaics also tends to ensure the commitment of inseparability between natural and cultural aspects in the implementation of protected areas. This is because although the management of mosaics aims to conserve biodiversity and the sustainable use of natural resources, this does not refer only to the direct management of fauna and flora (Melo, 2012). For Loureiro (2014), mosaic purposes are related to the inspection and protection of landscapes, the guarantee of environmental services and the promotion of productive and cultural arrangements of traditional and original groups.

From the moment a MAP is established, it is understood as crucial the constitution of favorable institutional relations between the governmental spheres and search of the parity between representations from the government and the civil society. Another principle that governs the mosaic proposal is its intention to promote the integration of different territorial and economic policies to environmental policies, especially those related to conservation (Pena, 2015). The mosaic is a forum for institutional relations that has the potential to strengthen regional exchanges, establish exchanges of

experiences and promote mobilizations without, however, damaging autonomy in the management of each protected area (Delelis et al., 2010).

Delelis et al. (2010) points out that it is crucial to improve the regulation of mosaics, better equipping this tool and denying doubts that still generate practical conflicts in its application. According to her, it would be fundamental to clarify in the legal scope for the implementation of the mosaics on encompassing indigenous lands and quilombos, thus including the concept of protected areas provided in SNUC.

According to Pinheiro (2010), indigenous lands and quilombola territories are created with the objective of physical and cultural maintenance of those ethnicities and communities. However, they can also contribute to the protection of biodiversity as long their traditional management of natural resources is of low impact and does not compromise the resilience of the ecosystems covered by those areas. The autonomy of the managing boards of the mosaics to review which areas are part of their composition according to necessity is also an essential question that needs a normative definition.

This is reinforced by Delgado (2007), who says that networks of articulation of actors, institutions and programs reinforce the capacity of collective action of the local actors, stimulate the realization of alliances, strengthen the participatory implementation of public policies and favors "social creativity" and the effectiveness of the policy process, perhaps building institutional conditions for a growing articulation and integration of actions, often diverse and contradictory, geared towards local / territorial development, ends up showing this role of strengthening local actors in the territory That the mosaic exercises.

By enhancing the territorial identity and products of the region (certification, tourism, among others) and by recognizing the environmental services provided by protected areas, its inhabitants are allowed to value these areas and participate in their conservation and the conservation process. Participation in the mosaics, especially through its advisory councils and the search for sustainable development in the regional context, provide an environment conducive to the adoption of agreed decisions between different spheres of government and society, favoring the reduction of conflicts (REMAP, 2016). Social participation represents, therefore, a dynamic and unfinished process and an essential condition for the construction of democratic governance for the conservation of biodiversity and, consequently, for the management of protected areas (Irving, 2015). Increasingly, MAPs have been consolidated as one of the most important instruments to promote the integrated and participative management of these areas and their positive insertion in the territories (Gidsicki, 2013). The Mosaics of Protected Areas have been shown as one of the main instruments of Brazilian environmental policy that takes into account the perspective of regional management of the PA, allowing the socio-cultural management of the territories from a set of local / regional / global actors (Labruna, 2015).

The mosaics of RJ have been acting as forums for dialogue between civil society and government, on environmental issues in their various aspects, becoming important spaces for social participation. The present work of the mosaics in this sense has increased the participation of the population of the territory in its environmental management and giving voice to groups traditionally excluded from the decision spaces, such as traditional populations and small farmers.

IUCN (2003) defends as a premise for the conservation of biodiversity the recognition of social protagonism. The Durban Agreement (IUCN, 2003) describes governance as "encompassing the interaction between structures, processes, traditions and knowledge systems, which determine power, responsibility, and in which citizens and other stakeholders express their opinion."

The focus of action of the mosaics is the integrated management of protected areas and their buffer zones (Pinheiro, 2010). In this way, integrated management is the process through which governance proposes to take place in the mosaics and makes them an instrument of participatory management and social control acting in the territory. Costa (2015) defines governance as the sum of norms and regulations, the result of interactions between actors contained in initiatives, programs, policies and decisions aimed at solving a problem through collective action, which applies well to the MAP objectives.

The governance process involves the organization of management models that integrate the different socio-territorial networks with a view to ongoing negotiations for territorial planning based on biodiversity conservation, sociocultural valorization and the sustainable development of mosaics (Cardoso et al., 2009). Thus, mosaics act as a key piece in land-use planning.

Integrated management is the process by which governance proposes to take place in the mosaics and makes them an instrument of participatory management and social control that operates in the territory.

One of the major challenges for mosaic governance in terms of making them territorial management spaces (Irving & Matos, 2006) is the creation of mechanisms for articulating territorial public policies between ministries, secretariats and programs, and at the vertical level Among the federated entities, strengthening the National System of Environment - SISNAMA.

Costa (2015), in a study on the Bocaina Mosaic, makes observations that can be applied to all MAPs, he points out that it is both the role of the mosaic to function as an instrument for improving the management of protected areas, promoting the exchange of experiences and Integration between managers, and of them with civil society, as a privileged forum for the clarification of conflicts between traditional populations and the official institutionality and mission that these same managers are called to play and represent. The same author also treats the mosaic as a hybrid forum, whose governance is complex by nature, and even though the mosaic is not properly an executive instance of the public administration and does not have sufficient authority to carry out certain public issues that demand actions from governmental organizations. This ambiguity has led to impasses in governance, as it can create unrealistic expectations about delegation and effective and installed capabilities.

According to Carrillo (2009), the mosaic management model could, in theory, reinforce the importance of the integration exercise between different federal, state and municipal public policy instruments. Thus, they could represent a "locus" of integration between strategies of conservation of biodiversity and of economic and social development. To this end, the management process would challenge the internalization of the different territorial planning instruments and the different public management spheres, which overlap in the mosaic space.

The mosaics favor the expansion of social participation through their councils and actions of sustainable development fomented in the territory. They also enable the strengthening of protected areas in relation to licensing processes, such as the development of specific studies, among others (REMAP, 2016). Loureiro (2014) points out that along with this territorial management function there is a real need to strengthen the management capacity of the Mosaic Advisory Councils so that they operate in the perspective of participation and social control.

The main advantage of the principle of adoption of territorial management by ecological corridors and mosaics of conservation units and / or protected areas is the fact that these planning units are understood as part of a cultural, social and economic context (Costa, 2015).

Mosaic management councils can act by identifying conservation gaps in the territory and acting on them, supporting the creation of new PAs or encouraging the implementation of environmental policies that minimize ongoing degradation actions or even prevent them. Its ultimate goal is to maintain the structure and resilience of ecosystems, and the continuous supply of its services to human populations. According to Delelis and Kurihara (2015), the mosaic, as an integrated management system, emerges to provide greater governance effectiveness of protected areas, serving as a possible territorial ordering tool in areas of conflict between PA and local population.

In addition, in areas where rural poverty is striking and where fragmentation and economic and social disarticulation predominate, mosaics can play an important role in leading the construction of a development strategy for the territory. This was verified in the Mosaico Sertão Veredas-Peruaçu, where the implementation of a community-based territorial development plan allowed the improvement of the quality of life of the local population, currently responsible for conducting the mosaic through the associations and cooperatives formed in the implementation of the same.

Another relevant aspect of MAP in land use planning is the licensing of large industrial plants and other big enterprises. Isolated, the local communities or even protected areas would not have the strength to prevent actions that would have a major negative impact. However, united in the mosaics, these figures can act together seeking a common goal for the territory and avoiding activities that threaten nature conservancy, even if they have great support from the economic capital and higher levels of government.

Finally, an effective implementation of the mosaics can make them an essential tool for the development of the territory, with social and environmental justice in harmony with the maintenance of the native ecosystems and having this nature conservation as the basis for this development through sustainable economic alternatives.

The Mosaics of Protected Areas are instruments of management and territorial planning for the protection of the natural and cultural patrimony. They are characteristic for the horizontal participatory management between communities and representatives of civil society and governmental entities, represented mainly by the protected areas.

According to the SNUC and its regulatory decree, the mosaics exist to carry out in an integrated and participative way the management of a set of PAs. The valorization of the local populations would be the way to strengthen the relation and integration with the populations existing inside or around PAs. But for many councilors, the mosaic is more than that, it is the form of local communities, with the support of protected areas, to manage the territory, inhibiting factors such as real estate speculation, disorderly urban growth, industrial expansion among others menaces that cause great damage to the regional natural heritage.

Unfortunately, the mosaics are not given due attention by PA management institutions, which fail to take advantage of this instrument to carry out a truly participatory biodiversity conservation policy.

As a worker on the state environmental agency of Rio de Janeiro, I emphasize the importance of the governmental sector, in all three spheres, assuming its responsibility with the support for the management of MAPs. Mosaic PA managers need to work with managers from other spheres, seeking greater integration of their actions. Without real support and integration of government agencies and PA managers, mosaics become fragile because they disassociate easily as strategic figures move away from their organization. Likewise, the upper levels of those management institutions should support and enable PA managers to fulfill this function, as well as take better advantage of the opportunities that mosaics bring to protected areas.

Mosaics exist to contribute to protected areas in the protection of biodiversity. However, it is necessary to have the understanding that without the support of communities and people living in a territory, this task will be much more difficult. Bringing the human dimension to the management of the territory and its natural remnants is the difference of the mosaics of protected areas in relation to other conservation instruments, but the implementation of this idea has not yet been fully assimilated by PA management institutions and by these groups of civil society. As long as we see the social component disconnected from the environmental component, we will not achieve the real possibility of developing the territory in a sustainable way.

Within the mosaic councils civil society feels more heard than in the protected areas advisory councils. This is because the mosaic works as a more parity forum, while in the advisory councils of PA the dominance of governmental power is evident. On the other hand, some PA managers seem to resent this greater influence of civil society in the mosaics, and some even refuse to participate because they do not accept this greater participation of civil society, especially traditional communities.

The mosaics can act as instruments for the conservation of socio-biodiversity that unites public power and civil society in the same platform of discussion about the territory. If both sides do not assume their responsibilities with this management tool, acting transparently and cooperatively, the current obstacles will hardly be overcome.

As a proposal to strengthen protected areas and bring improvements to biodiversity conservation in Latin America, MAPs are a successful Brazilian experience, interesting to be replicated and even improved in other countries, integrating conservation with greater social participation in the territory natural and cultural management.

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