



Sociedade & Natureza

ISSN: 1982-4513

Universidade Federal de Uberlândia, Instituto de Geografia,  
Programa de Pós-Graduação em Geografia

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Sociedade & Natureza, vol. 32, 2020, pp. 72-87

Universidade Federal de Uberlândia, Instituto de Geografia, Programa de Pós-Graduação em Geografia

DOI: <https://doi.org/10.14393/SN-v32-2020-36541>

Available in: <https://www.redalyc.org/articulo.oa?id=321364988006>

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# Comparative analysis of management tools: Management Plan of Itupararanga's environmental protection area and Municipal Master Plans

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## Abstract

The Itupararanga's environmental protection area (APA) was created in 1998 and includes areas from the municipalities of Aluminio, Cotia, Votorantim, Vargem Grande Paulista, Mairinque, São Roque, Piedade and Ibiúna. It is an important conservation area regionally because it was created to preserve the region's water source: the Itupararanga's reservoir. The goal of this study was to analyze the Management Plan of the APA and the Municipal Master Plans in the areas of intersection, surveying the possible conflicts of land use. The elaboration of Municipal Master Plans showed a small connection with the APA, which resulted in 12 conflicts of use and occupation of land (about 20% of APA area) in the zones between the APA and the area proposed by the Master Plan. Thus, we note the importance of reviewing the Master Plan and Management Plan for the APA to achieve the maintenance of environmental quality and sustainable development.

**Keywords:** Conservation Units. Environmental Management. Conflict. Land Use.

## Introduction

Environmental conservation is often at odds with economic interests. This conflict is accentuated when private economic interests take precedence over public interests in land administration plans.

The efforts of society and the scientific community to conserve biodiversity and natural resources resulted in the establishment of the National System of Conservation Units (in Portuguese, Sistema Nacional de Unidades de Conservação da Natureza - SNUC) in 2000, in Brazil. This system was designed to organize

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and discipline the existing conservation areas and define mechanisms to create new ones. The SNUC divides conservation units into two groups: sustainable use and integrated protection, distributed in 12 different categories (BRASIL, 2000).

The purpose of sustainable use conservation units – similar to Environmental Protection Areas (in Portuguese, Área de Proteção Ambiental - APA) – is nature conservancy and the sustainable use of natural resources (BRASIL, 2000). APAs are an environmental policy instrument based on the concept of sustainable development: humans must exercise their activities responsibly to preserve the environment's quality and integrity. Therefore, the importance of these APAs lies in the sustainable use of these areas, while also conserving their natural resources (CABRAL; SOUZA, 2005).

Because APAs do not require expropriation or major restrictions on use, their approval is easy at both political and administrative levels. As such, APAs are one of the most common types of Protected Areas (PA) in Brazil. At present, APAs make up 51% of Brazil's protected areas. Of these, 15% are federal, state or municipal environmental Protection Areas (MMA, 2019).

The Itupararanga APA (the focus of this paper) was established by a law (nº 10,100) passed in the State of São Paulo on December 1st, 1998 (SÃO PAULO, 1998), and its perimeter was extended (law nº 11,579) on December 2nd, 2003 (SÃO PAULO, 2003). These laws conferred APA status on the

hydrographic basin forming the Itupararanga dam, including areas of the Municipalities of Alumínio, Cotia, Ibiúna, Mairinque, Piedade, São Roque, Vargem Grande Paulista and Votorantim.

The first management plan (MP) for the Itupararanga APA was only elaborated and approved by CONDEMA (State Council for the Environment) in 2010. However, the development of a MP had been mandatory since the SNUC law was passed as well as being foreseen in the creation of the PA. The Itupararanga APA was one of the first APAs in the State of São Paulo to have a MP (BEU et al., 2011). The management council was set up at the same time and was very active in assisting land management. However, at some points, the council was not officially appointed.

According to Schiavetti et al. (2012), 40% of the APAs analyzed in the State of Bahia were insufficiently implemented, mainly due to the absence of managers, deliberative council and other management instruments. This appears to be a common feature of Brazilian APAs.

The main objective of the Itupararanga APA is to preserve, conserve and recover natural resources, especially water resources and forest remnants, across the hydrographic basin forming the homonymous dam (SÃO PAULO, 1998). The Itupararanga reservoir is the main water source for about one million inhabitants in the Sorocaba river basin. For this reason, the APA was created with the primary objective of protecting these water resources. The reservoir is also an important source of irrigation water for fruit and

vegetable production, and the APA assures its quality for this purpose (FUNDAÇÃO FLORESTAL, 2010).

Bernardi (2011) demonstrated an almost 30% reduction in areas of natural vegetation in the APA between 2000 and 2010. This was in comparison with the mappings undertaken by Queiroz and Imai (2007). Native vegetation was replaced by pastures, crops and urbanized areas, that can cause soil loss and increased runoff of agricultural chemicals into water bodies, leading to contamination and silting.

In order to avoid negative impacts on natural attributes, it is essential to adopt effective management mechanisms to align the objectives of the PA with the municipalities' land use and occupation activities. The MP is the main tool to achieve this goal, and it should define the interrelationship between the PA and land use by the municipalities.

The PA's MP should also include area zoning, covering the definition of sectors or zones with specific management objectives and occupancy standards, in order to provide the means and conditions for all the PA's objectives to be achieved in a harmonic and effective manner (BRASIL, 2000). Thus, the MP is an essential tool in the land management process (ZANIN et al., 2005).

The stages involved in the elaboration, updating and implementation of a MP require contributions from the resident population, since the process of creation and management of PA must be done in a participatory manner. When a population is aware of the importance

of establishing a PA, it is easier to achieve its objectives (PIRES, 2001).

The environmental zoning defined in the MPs aims to indicate the potentiality, vocations, limits and fragilities of the territory, indicating which activities are suitable in different areas (FOLETO; ZIANI, 2013).

However, when it comes to legislating and authorizing this zoning, land use and occupation are prerogatives of the municipalities, as defined in Article 30 of the Federal Constitution of 1988. There is, however, controversy about the application of this article in environmental matters (FERREIRA, 2018). The main tool for controlling land management in the municipalities are their Municipal Master Plan (MMP) that can also define zones with use restrictions.

The City Statute (BRASIL, 2001), "[...] establishes rules of public order and social interest that regulate the use of urban property for the collective good, security and well-being of citizens, as well as environmental equilibrium". The statute also identifies the MMP as the basic instrument of municipal development and expansion, and that it should establish rules regarding zoning, land subdivision, land use and occupation, urban markers, protection and the environmental impact of neighborhoods (PHILLIPI et al., 2005). The drafting of a MMP should be clear and transparent, with popular participation ensuring community access (TEIXEIRA, 2008).

The environmental dimension is one of the themes that should be addressed in the

MMPs (SANCHES et al., 2008; HONDA et al., 2015). When PAs are present in the municipality they should also be integrated into the plan.

There are still many difficulties in reconciling the APAs' objectives with human activities because of the political and economic interests involved. Furthermore, there are legal issues such as the administrative autonomy of each municipality and the legal precedence of each instrument. Therefore, these two instruments – the MP and the MMP – must interact and complement each other in municipalities that have APAs. In the absence of this relationship, the conservation objectives of the area may be difficult to meet.

Lima et al. (2005) argue that a lack of effective management and environmental protection of Brazilian Protect Areas is one of the factors that contribute to the current insufficient conservation of biodiversity. This is taken together with the degradation of ecosystems promoted by the expansion of agriculture and by the management of these areas. It should be noted that creating PAs without the prospect of implementing them causes numerous regional problems, as well as undermining the unity of local communities. The creation of uncontrolled PAs and inadequate management tools means the conservation units exist in name only (MEDEIROS, 2006) – legally but not practically established.

This study investigated the compatibility between the Itupararanga APA MP and MMPs from municipalities within this region. In a

critical analysis of the management process, we sought to identify the mechanisms of territorial management, possible land-use problems and conflicts, as well as political and administrative obstacles.

## Materials and Methods

The study area (Figure 1) is located between the coordinates 23° 32'S - 23° 50'S and 46° 59'W - 47° 24'W, covering the municipalities of Vargem Grande Paulista, Ibiúna, São Roque, Mairinque, Alumínio, Piedade, Cotia and Votorantim. The predominant vegetation in this area is Dense Ombrophylous Forest, and much of the original vegetation cover has already been removed. (BERNARDI, 2011). Many of the vegetation remnants are composed of secondary forests or small fragments (CHINAQUE, 2017).

Zoning of land use and occupation defined by the municipal Master Plans and the environmental zoning determined by the APA management plan were analyzed.

A manual overlapping of topographic maps of land use zones of the municipalities that compose the Itupararanga APA with maps of the environmental zoning was undertaken because differences in the format of these charts and the absence of standardized files made it impossible to use GIS software. Comparisons of purpose and constraints of each overlapping zone were undertaken following the manual overlapping.

Qualitative research methods were used to analyze the MMPs with the establishment of

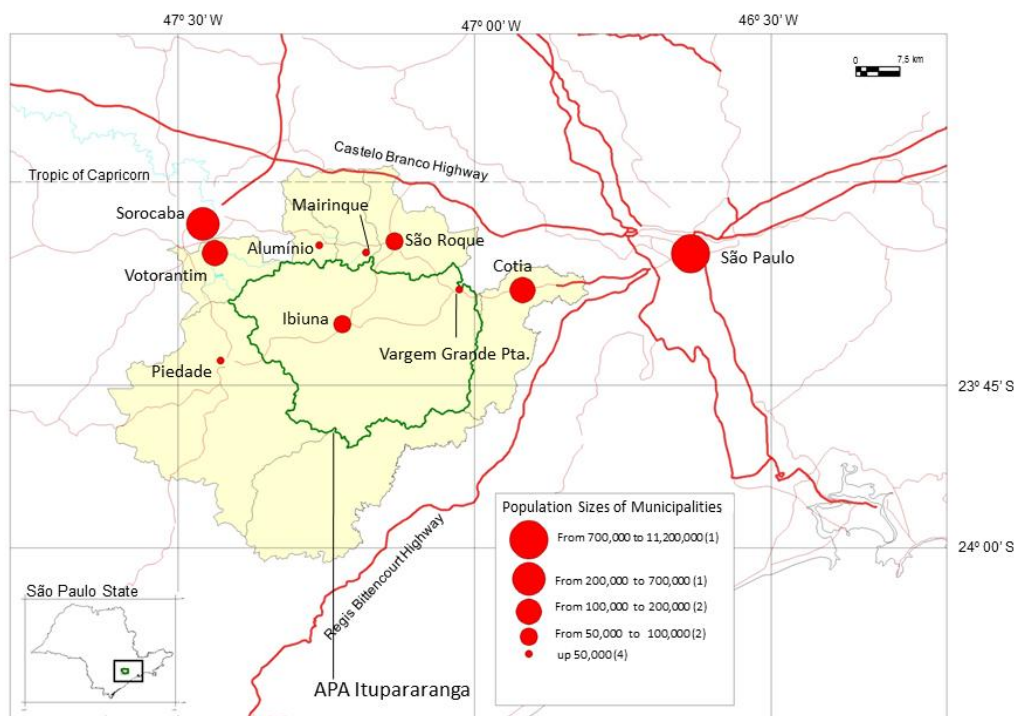
standards to perform content analysis (CHIZZOTTI, 2006). The standard used was whether the APA territory and the protection mechanisms were mentioned.

All the area MMPs were approved in 2006 as required by the City Statute. The MP was discussed and approved in 2010. Public administrators and NGOs, representing all the

municipalities within the APA, participated in this discussion.

Although the municipality of Alumínio is located in the basin, it was not included in the analysis because, at the time of the study, it had less than 20,000 inhabitants. This is the threshold above which municipalities are required to have a MMP.

**Figure 1-** Location of APA Itupararanga in the State of São Paulo with the location of the main urban centers and access roads indicated.



Source: Bernardi, 2011.

## Results and Discussion

The conflict between Management Plans and Municipal Master Plans arises because of differences in economic models. In municipalities, the influence of real estate speculation and economic activities is much more prominent and exerts more pressure than in the management bodies of the APA.

This conflict between economic activities, where the entrepreneur's profit is the ultimate goal, and conservation of the environment, whose goal is the common good and the preservation of diffuse rights, is the basis of most environmental problems arising from the use and occupation of land in rural and urban areas.

The objective of the environmental zoning included in the MP of the Itupararanga APA is to define spaces with restrictions of use or with appropriate profiles to certain environmental conditions. Five zones were defined:

- a) Biodiversity Conservation Zone: forests and other forms of native primary or secondary vegetation in the early or advanced early stages of regeneration of Atlantic forest;
- b) Area of Water Resources Conservation: areas especially important in the conservation of the main attribute of the APA, the Itupararanga Reservoir.
- c) Area of Diversified Occupation: part of the APA territory in the process of urbanization, where the occupation must be planned and controlled;
- d) Rural Occupation Zone;
- e) Zone of Consolidated Occupation: urban spots already established where guidelines for

use and occupation compatible with the protection of the APA must be defined.

A detailed description of the objectives permitted and non-permitted activities, as defined by the MP, are summarized in Tables 1, 2 and 3, respectively. These zones, defined in a participatory process, were analyzed and compared with the areas of occupation foreseen in the municipal MMPs.

Most of the conflicts observed are related to the more restrictive use limitations foreseen in the Management Plan when compared to the Executive Plans, although in some cases the opposite occurred and the Master Plan is more restrictive than the Management Plan. In these cases the conflict was named as a "divergence" in Table 4 in order to highlight them.

**Table 1.** Objectives of each zone established by the Itupararanga APA Management Plan.

| Zones                             | Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biodiversity Conservation Areas   | To conserve and maintain wildlife and biodiversity in order to guarantee the maintenance of vegetation in the initial, middle and advanced stages of regeneration and the main headwaters of the watercourses forming the basin of the Itupararanga dam.                                                                                                                                                                                                                    |
| Water Resources Conservation Zone | To preserve the quantity and quality of the water of the basin of the Itupararanga reservoir, to conserve the headwaters of the watercourses that form the hydrographic network of the sub-basin, to guarantee the maintenance of vegetation in the areas of permanent preservation of the reservoir and its main river, guaranteeing soil fixation and maintenance of the micro-climate in its surroundings, maintaining soil permeability and recovering the floodplains. |
| Diversified Occupation Zone       | Maintain the remnant forest, discipline and guide the new real estate development projects, neighborhoods and boat marinas with the guarantee of sustainability of the environment, promote economic and environmental sustainability of agriculture, forestry and pastoral activities, adapt to potential tourism activities for the sustainable development of APA and promote or adapt to tourism activities with a focus on rural tourism and ecotourism.               |
| Zone of Rural Occupation          | Promote rural land use in a disciplined and appropriate manner to support the conservation of natural resources, promote the environmental and economic sustainability of rural properties, promote sustainable rural activities and alternative agriculture, adapt urban activities, allowing their installation only for uses compatible with sustainability of the APA, and mandating development of environmental sanitation infrastructure.                            |
| Consolidated Occupancy Zone       | Discipline urban sprawl, implement new land lots, trade, service and industry uses, promote the installation of environmental sanitation infrastructure, encourage the adoption of housing programs for the resettlement of the population living in areas of risk and / or illegals, promote the recovery of Permanent Preservation Areas and promote environmental recovery of degraded areas.                                                                            |

Org. Authors, 2018.



**Table 2.** Permitted Uses of each zone established by the Itupararanga APA Management Plan.

| Zones                             | Permitted Uses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biodiversity Conservation Areas   | a) Management for the maintenance of genetic and population diversity of biota; b) Ecotourism activities; c) Sustainable rural activities; (d) the manufacture of handicraft food products; e) Plant replenishment with native species; f) Activities of contemplative visitation; g) Other rural uses that do not promote the suppression of native vegetation at any stage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Water Resources Conservation Zone | a) Agricultural activities focusing on soil conservation and water resources, with the rational use of agrochemicals; b) Leisure activities; c) Low impact fishing activities; d) Leisure and tourism activities of low density and impact; e) Ecotourism activities; f) Forest restoration with native species; g) Agricultural activity, provided that it does not promote modification in the existing natural environment, and respecting the support capacity of the same; h) Activities of contemplative visitation; i) Aquaculture practice; j) Land parceling for urban purposes of non-densified human occupation, through the mandatory installation and operation of environmental sanitation infrastructure, and training and maintenance of large landscaped and green areas with native species and ensuring soil permeability rates with a minimum of 50% of the gross área. |
| Diversified Occupation Zone       | a) Plant replenishment with native species; b) Agro-silvo-pastoral activities of small size and of low environmental impact, mainly in relation to the use of pesticides and fertilizers; c) Mining activities; d) Leisure activities; e) Fishing activities, provided that they are practiced in a sustainable way; f) Aquaculture; g) Ecotourism activities; h) Creation of municipal parks; i) Small and low environmental impact trade and service activities; j) Low-impact tourism ventures; l) Industrial activities of low environmental impact; m) Controlled urban expansion; n) Housing and various buildings, provided that under licensing; o) Existing constructions for single-family use.                                                                                                                                                                                   |
| Zone of Rural Occupation          | a) Agrosilvopastoral activities controlled and of low environmental impact, mainly in relation to the use of agrochemicals and exotic invasive species; b) Permanent crops (fruit); c) Family and organic agriculture, prioritizing agroecological practices; d) Sustainable fishing activities; e) Aquaculture; (f) systematically controlled mining activities; g) Small and low environmental impact trade and service activities; h) Permanence of existing constructions for isolated single-family use; i) Activity of low environmental impact.                                                                                                                                                                                                                                                                                                                                      |
| Consolidated Occupancy Zone       | a) Urban expansion conditioned to the adequacy of basic infrastructure; b) Activities of commerce, service and industry under the control of the municipal legislation of use and occupation of the soil submitted to the environmental licensing by the competent organs; c) Fishing activities; d) Recovery of degraded areas with predominant use of native species; e) Agricultural activities, as long as they are compatible with the proximity of the urban environment.                                                                                                                                                                                                                                                                                                                                                                                                             |

Org. Authors, 2018

**Table 3.** Restrictions of use of each zone established by the Itupararanga APA Management Plan.

| Zones                             | Restrictions of use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biodiversity Conservation Areas   | a) Industrial activities that generate polluting effluents, such as: petroleum refineries, steel mills, industries where there are ore reduction processes, cellulose industries, flat glass industries, sugar and alcohol plants, cement industries, industrial incinerators, automobile industries, fertilizer industries that process phosphate rock, chemical or petrochemical complexes, among others, as established in Decree 4.544 / 02; (b) Installations for cemetery; c) Installations for the treatment and disposal of solid waste of any kind; d) Residential subdivisions and condominiums that imply the suppression of vegetation in the early, middle or advanced stages of regeneration; e) Predatory fishing practice and aquaculture. |
| Water Resources Conservation Zone | a) Industrial activities that generate polluting effluents, such as: petroleum refineries, steel mills, industries where there are ore reduction processes, cellulose industries, flat glass industries, sugar and alcohol plants, cement industries, industrial incinerators, automobile industries, fertilizer industries that process phosphate rock, chemical or petrochemical complexes, transshipment, among others; b) Disposal of solid waste of any nature.                                                                                                                                                                                                                                                                                       |
| Diversified Occupation Zone       | It does not define uses that are not allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Zone of Rural Occupation          | It does not define uses that are not allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Consolidated Occupancy Zone       | It does not define uses that are not allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Org. Authors, 2018

**Table 4.** Relation of the present conflicts between zoning presented in the Master Plans of the municipalities of the areas belonging to the Itupararanga APA and the environmental zoning of these same areas in the APA Management Plan, enumerated according to their appearance in the Map of Conflicts (Figure 2).

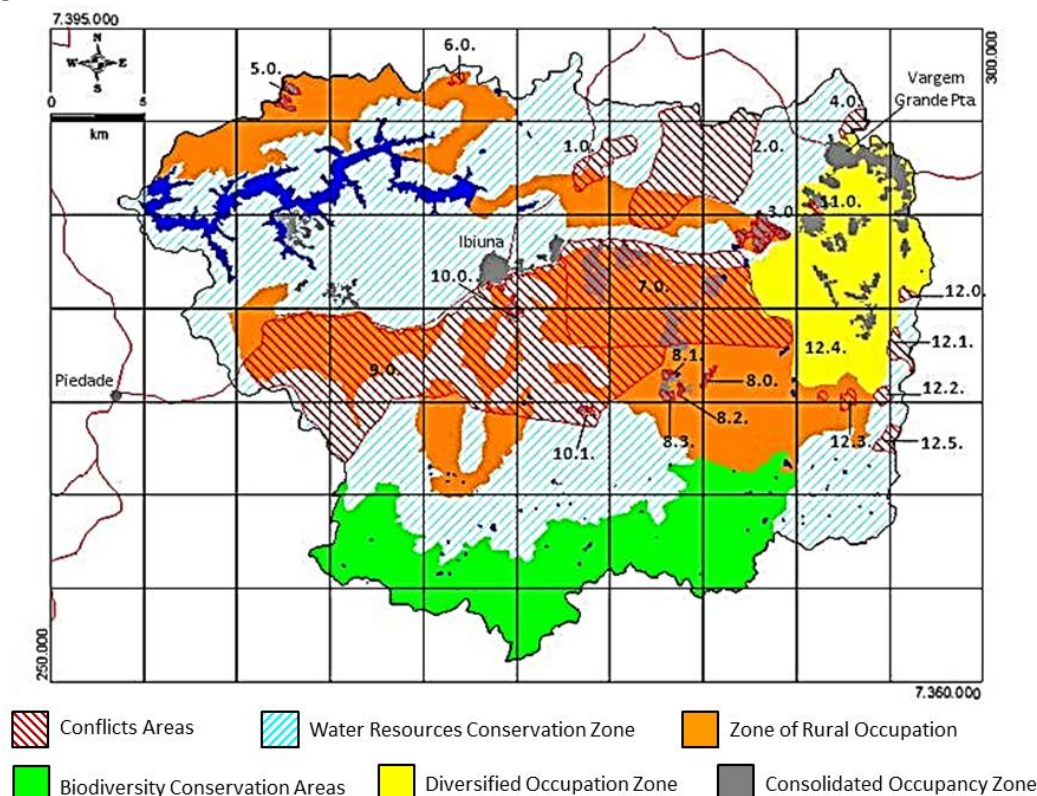
| Counties               | Zones of the Counties                                                                                                                                                                                                                                                                                        | Zones APA            | Conflicts  | Area aprox. | Map area       |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|-------------|----------------|
| Piedade                | Zone of Disciplined Use (Rural Macrozona); Permanent Preservation Zone.                                                                                                                                                                                                                                      | WCZ; BCZ .           | No         |             | -              |
| São Roque              | Areas with Severe Occupational Restrictions; Area Suitable for urban occupation with measures of protection to Manancial; Manacial Protection; Urban area.                                                                                                                                                   | OZO; ROZ; WCZ.       | Yes        | 3.400 ha    | 1, 2, 3        |
| Vargem Grande Paulista | Areas of Environmental Preservation I and II; Industrial Development Areas; Areas of Urban Recovery; Predominantly Industrial Areas; Residential area with corridors.                                                                                                                                        | OZO; DOZ; WCZ.       | Yes        | 150 ha      | 4              |
| Votorantim             | Tourist and Recreation Area 1.                                                                                                                                                                                                                                                                               | OZO; ROZ; WCZ.       | Divergence | 90 ha       | 5              |
| Mairinque              | Environmental Conservation Zone; Countryside; Farm area 3.                                                                                                                                                                                                                                                   | OZO; ROZ; WCZ.       | Divergence | 33 ha       | 6              |
| Ibiúna                 | Environmental Interest; Industrial Destination; Current Urban Perimeter.                                                                                                                                                                                                                                     | OZO; ROZ; WCZ; BCZ . | Yes        | 16.700 ha   | 7, 8, 9, 10, * |
| Cotia                  | Zone of Containment to Urban Expansion I, II, III; Predominantly Residential Area; Strictly Residential Zone; Industry, Commerce and Service Zone; Environmental Preservation Zone; Social Interest Zone; Area of Historical-Cultural Interest; Mixed Use Zone; Zone of Tourist Interest; Zone of Rural Use. | OZO; ROZ; WCZ; DOZ.  | Yes        | 490 ha      | 11, 12,*       |

Where (\*) indicates that the zone present in the municipality may be in accordance with the zone stipulated by the APA, provided that requirements are fulfilled, and the acronyms: WCZ (Water Conservation Zone), BCZ (Biodiversity Conservation Zone) DOZ (Diversified Occupation Zone), ROZ (Rural Occupancy Zone) and OZO (Occupied Zone of Occupation).

Of all the municipalities analyzed, only the municipality of Piedade does not present any type of zoning conflict. In all others, there is at least one area of conflict, and about 20% of the APA Itupararanga area has regions with

conflicts of use. The summary of the observed conflicts is summarized in Table 4. The areas of conflict delimited in the APA map are presented in Figure 2.

**Figure 2.** Overlap of Conflict Areas between the Municipal Master Plans and Zoning of the APA. The numbers on the map represent the areas of conflict



Org. Authors, 2018

These conflicts or disagreements can make it difficult to manage the territory as it may create an environment of juridical insecurity. Although the MP was endorsed by the State Government and therefore has its own legislation, the definition of land use and occupation is a constitutional prerogative of the municipality. Since municipal powers were represented in the development of both the MP and the MMP, the question arises as to how these management tools were approved without effective consideration of the interrelations between them.

In summary, these conflicts can be related to three non-mutually exclusive aspects: poor participation of public agents and

civil society in the process of drawing up plans; lack of planning culture in the municipal and state spheres; different interests of the actors who participated in the process.

For Cunha and Lopes (2001), the choice of interlocutors is a key point in the mediation of conflicts. It appears there was a lack of dialogue since the MP intensified the conflict instead of reducing it. This deficient consultation process can be related to municipal structure, where the responsibility for environmental issues is isolated and provides little influence on decisions affecting other managerial issues, such as Urban Planning.

If there was a mechanism for efficient processing in the township and any new

activities or plan of expansion of specific areas required the analysis of all sectors involved (environment, planning, works and infrastructure, for example), there could be a reduction in the number of conflicts.

Analyses of the minutes of the meetings held for the development of the Management Plan, demonstrate that although all the municipalities in the APA area of Itupararanga participated at some point in the discussions, representation was mostly from the perspective and personnel of the environmental area. Staff from other areas did not participate or participated sporadically, while the mayors were only presented the Plan when it was close to final approval in CONSEMA (State Council for the Environment).

One of the greatest conflicts observed, both in terms of area and the restrictions of use, was the noninclusion of an extensive area destined for industrial use in the municipality of Ibiúna (conflict area 7, Figure 2). In the MP this area overlaps a zone designated for the Protection of Water Resources and the Area of Rural Occupation.

Bernardi (2011) concluded that most councilors, mayors and civil servants did not consider the importance of the APA and, in some cases, considered it as a development of the municipality.

The deficiency in the participation of managers and representatives with decision-making power could be compensated for by the participation of civil society, which is one of the most important agents in the planning process (SILVA; SATO, 2012). However, in this case,

despite participation in the development of the Management Plan, the observed failure arose from the low participation of organized civil society in the development of the Master Plans.

MMPs should serve to give transparency and to allow democratic participation in the management of urban space (BRAGA, 2001); MMPs developed without the participation of the population would, therefore, be useless.

Bernardi (2011) interviewed NGO representatives who, according to municipal governments, participated in the drafting of the MMPs, and in most cases, participation was confined to the attendance of a public hearing, and most of the suggestions arising in these public meetings were not taken into account.

The lack of participation of city technicians in the development of the Management Plan can be a reflection of the lack of confidence in this management tool, by both management and the directors, or even ignorance of the role of municipalities in the process.

The majority of the MMPs were developed according to the requirement of the Statute of the Cities, as demonstrated by the dates of approval within the period defined by the statute. However, often these plans seem to have been made with the purpose of not being implanted or at least to not serve as a territory management tool. Furthermore, for most municipalities, the MMP is limited to a land-use planning tool represented by zoning, without effective intervention mechanisms (REZENDE; ULTRAMARI, 2007).

Lack of regional planning is one of the reasons for the difficulty of implementation. In none of the MMPs analyzed was the possibility of discussion with other municipalities considered. In the MMPs, each municipality was viewed as an isolated entity. This can lead to further conflicts between the territories. The City Statute contributes to this problem by not including the needs and obligations of regional or metropolitan planning in its guidelines (SILVA; ARAÚJO, 2003).

The lack of explicit statements of about the relationships between the MMPs of neighboring municipalities, and the fact that these should have some degree of regional planning and management, is also perceived in other areas, such as the Metropolitan Region of Campinas (FONSECA; MATIAS, 2013) and the Federal District (LIMA, 2011). In addition, the City Statute does not deal with mechanisms for integrated planning across neighboring municipalities that are not part of metropolitan regions (BRASIL, 2001).

Recently, the metropolitan region of Sorocaba was created (SÃO PAULO, 2014), which brings together 27 cities. It is preparing its Region Director Plan (RDP), which should guide the revision of the Municipal Master Plans and reduce discrepancies between neighboring townships. However, two of the most important municipalities that make up the APA Itupararanga territory, because they contain the sources of the rivers feeding into the dam, Vargem Grande Paulista and Cotia (Caucaia do Alto neighborhood) were not

included in the metropolitan region and therefore will not be considered in the RDP.

The large number of zoning categories in occupied areas is an additional example of the difficulties facing implementation. The MMPs were thought of as a "photograph of the current condition", where the main scenario considered is a fatalistic view that urban expansion is the only future of the city, with the municipal power unable to exert more effective actions through planning.

No reflection on the need to change the reality, nor any seeking of alternatives to the current model of development was observed in the master plans. The municipality as a land manager does not use this prerogative, allowing economic forces such as speculation on real estate, to command urban sprawl. Several papers discuss the right of cities to manage their future, and conflicts between the interests of society and capital in modern cities (HARVEY, 2008; BATTAUS; OLIVEIRA, 2016). Most often capital ends up driving the growth of cities by subjugating public to private interest.

Another problem observed is the definition of small zones or even isolated points delimited by geographical coordinates whose only objective seems to have been to leave an existing enterprise in accordance with the MMP. For example, delimiting an industrial area inside a rural area due to a pre-existing enterprise. In most of the MMPs analyzed there are no definitions of actions available to suit projects or occupations that are inconsistent with the defined land-use zoning.

Even when the Master Plans have definitions of actions for implementation, these planning tools lack clear definitions of process monitoring and compliance with the plan (REZENDE; ULTRAMARI, 2007). Often the municipal government itself, which should ultimately ensure the implementation of the plan, is the first to de-legitimize it, proposing timely changes in order to support competing economic interests, such as the development of urban settlements in rural areas, or even disregarding it to facilitate such developments.

The lack of effectiveness of both the Management Plan and Master Plans, also serve economic interests that should not be ignored. For speculators and for some entrepreneurs the lack of control or regulation and the reduction of municipal power in controlling the occupation of land is a more profitable alternative to submission to collective interests.

In order to resolve these conflicts, the best strategies are to change both the Master Plans and the Management Plan and to strengthen the APA's management council to discuss and negotiate the reduction of these conflicts

If the process of changing the Management Plan and Master Plans occurs only in one direction, with the Management Plan incorporating the zoning of municipal land use into the environmental zoning of the APA, this will mean a relaxation of the restrictions of the Management Plan and may lead to non-compliance with the objective of the Conservation Unit, which is the conservation of water resources.

For example, the entire territory of the Vargem Grande Paulista, almost 90% of which is located in the APA, was classified in the MP as a Diversified Occupation Zone, reducing the occurrence of conflicts. However, this zoning may impair the ability to effectively manage this important area. The sources of the rivers forming the Itupararanga reservoir are in this municipality and dumping of untreated sewage into these rivers is one of the main causes of declines in water quality.

Because the objective of this APA is the maintenance of the water quality of the Itupararanga Reservoir, the protection of headwaters should be of utmost importance.

It is apparent that the Management Council should be strengthened and given the power to make effective deliberations, avoiding the legal conflicts relating to the prerogative of the municipalities in the determination of the use of the land. This strengthening involves increasing the participation of townships and civil society, transparency, the dissemination of their activities and the objective conditions of operation. Unfortunately, although the council of APA Itupararanga exists for some time, it has always proven difficult to elect and renew its members every two years, because population and cities lack the interest and because of the limited supporting staff, generally limited to a single manager.

## Final Considerations

APA Management Plans are essential management tools for meeting the goals set for



these areas and should communicate with other local and regional planning mechanisms.

The analysis of the relationships between municipal management plans and the management plan in the Itupararanga APA area demonstrated that the intersection between these land management tools is still an area of conflict.

The absence of regional entities to promote discussion among municipalities, the development of director plans with little popular participation, subject to the pressure of real estate speculation and with disorganized participation of the municipal entities, render these instruments generators of conflicts. These instruments can compromise Management Plans and even make the management of the territory a problem of legal and administrative insecurity. The APA Governing Council, institutionally strengthened, with tools of direct action and with effective operating conditions, can assume the task of promoting the discussion and solution of these conflicts between neighboring cities.

So that management plans can contribute both to the conservation of the desired attributes of APAs as well as the management of municipal territories, it is necessary that public officials effectively incorporate these tools for planning and management and that they are made in a participatory, democratic and integrated way. The incorporation and effectiveness of these tools in municipalities require a change in the administrative culture, with greater

participation and transparency and an understanding that the environmental dimension of municipal management is not ancillary, but central, to the definition of the territory.

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