9-11-2017

# Open space provision and environmental preservation strategies: A case study in Brazil

Monica A. Haddad
*Iowa State University*, haddad@iastate.edu

# Open space provision and environmental preservation strategies: A case study in Brazil


## Abstract

A majority of cities across the globe are confronting threats to their natural environment because of worrying trends in indicators such as urban population, PM2.5 air pollution, and CO2 emissions (World Bank 2016). Consequently, several strategies are being used in urban areas to minimise the negative impact of urbanisation on the natural environment. Examples of such strategies are increasing provision of open space and preserving areas that are characterised by high environmental importance. These issues may be less of a problem in public sector practice in the Global North compared to the Global South, because its public institutions generally have more human capital, information and resources to deal with them. For instance, public employees in the Global North have better access to accurate and timely data (Musakwa and van Niekerk 2015; Arsanjani et al. 2016), which produces more effective policies.



## Disciplines

Environmental Design | Environmental Indicators and Impact Assessment | Physical and Environmental Geography | Urban, Community and Regional Planning

## Comments

This accepted book chapter is published as Haddad, M. (2018). Open space provision and environmental preservation strategies: A case study in Brazil. In G. Bhan, S. Srinivas, & V. Watson (Eds.) Routledge Companion to Planning in the Global South (pp. 192-203).London. Routledge. Chapter 15(12 pages) doi:10.4324/9781317392842. Posted with permission.

**Open space provision and environmental preservation strategies:**

**A case study in Brazil**

Mônica A. Haddad

*Book Chapter to be included in the following 2017 book: Bhan, G., Srinivas, S. and Watson, V. (forthcoming)* ***Routledge Companion to Planning in the Global South****. London: Routledge.*

## Introduction[1]

A majority of cities across the globe are confronting threats to their natural environment because of worrying trends in indicators such as urban population, PM2.5 air pollution, and CO2 emissions (World Bank 2016). Consequently, several strategies are being used in urban areas to minimise the negative impact of urbanisation on the natural environment. Examples of such strategies are increasing provision of open space and preserving areas that are characterised by high environmental importance. These issues may be less of a problem in public sector practice in the Global North compared to the Global South, because its public institutions generally have more human capital, information and resources to deal with them. For instance, public employees in the Global North have better access to accurate and timely data (Musakwa and van Niekerk 2015; Arsanjani et al. 2016), which produces more effective policies.

Few studies indirectly address differences in public sector practice between the Global North and the Global South. The first difference, pointed out by Yazdani and Dola (2013), concerns sustainability. They advocate that sustainability should be addressed in ways that are relevant to the context of the Global South, as the concept and practices used in the Global North do not necessarily fit the southern reality. Information pertaining to sustainable practices are widespread in the Global North and lacking in the Global South (Yazdani and Dola 2013: 39). The second difference, pointed out by Miraftab (2009), is about relationships between citizens and governments. She argues that in the North, neoliberalism has a negative effect on civil liberties and the public sphere, but the effect of neoliberalism is more damaging in the South. Citizens'

rights in the South have expanded, but their ability to participate in the public sector has decreased (Miraftab 2009).

In this chapter I present a case study of a region, located in the Global South, to investigate the performance of the public sector regarding open space provision and environmental preservation issues. I am specifically interested in understanding public sector practice, by analysing the spatial relationship between urban growth and environment-related planning tools. This chapter has two main objectives: 1) to describe the spatial patterns of urbanisation in a region of Brazil from 2000 to 2015; and 2) to examine the current use of two urban planning tools related to open space provision and environmental preservation in this region.

Based on my results, I argue that the private and public sectors in Brazil are equipped with a variety of urban planning tools, but there is an urgent need to improve their implementation. Towards that end, the most important issue that needs to be addressed is the role of political influence in public sector practices. Traditional politics seep into the process of implementation. Municipal politicians begin re-interpreting urban legislation, bribing fiscal supervisors, and ignoring the rights of groups with low representation. As a consequence, the implementation of urban planning tools is affected adversely.

**Urban planning tools**

When compared to other Latin American countries, Brazil should be ahead of the game of promoting urban planning practices because of its recognised success of enacting the 2001 urban planning law, Estatuto da Cidade (henceforth City Statute). This law, internationally acclaimed, has its basis on the 1988 Federal Constitution, and includes many urban planning tools to help shape urban areas. In theory, with this law, municipalities would have more power over the urbanisation process and would be able to manage land use more effectively (Rolnik and Klink 2011: 104). Additionally, based on the law, municipalities would promote public participation during urban planning processes. Participatory budgeting, even though not mandatory in the law,

is an example of public participation being used by many Brazilian municipalities interested in making the democratic process stronger.

In this chapter, I examine the current use of two City Statute tools related to open space provision and environmental preservation: the right to preferential purchase (direito de preempção) and land use and zoning regulations. The right to preferential purchase (RPP) gives priority to municipal governments to buy properties that are in the real estate market, being sold by private owners. According to the City Statute, RPP should be included in municipal comprehensive plans, where RPP's uses and its period of validity should be determined. There is, however, a dichotomy in the literature concerning the public financial health of Brazilian municipalities, which directly relates to the ability to use RPP. Hübner et al. (2006) argue that there is a lack of RPP implementation in cities, which may be related to weak public financial health. On the other hand, Fernandes and Maldonado Copello (2009: 18) state that some municipalities are generating "impressive financial resources as a result of urban operations [derived from the City Statute]," which should allow municipalities to use RPP with these funds. Because of this dichotomy, and the lack of comprehensive studies in the literature focusing on RPP, in this chapter I carefully examine the use of this tool.

The City Statute lists several urban uses for which the public sector should have priority to buy private properties, in case there is a need for land acquisition for a public cause such as historical preservation (Presidência da República do Brasil 2001). Other listed uses of RPP are related to the natural environment. As Prieto (2006) points out, RPP could become a powerful tool to improve the quality of the environment for all citizens. This chapter focuses on three types of RPP's uses, included in the City Statute: land for development of open space, land for development of conservation areas that have high environmental importance, and land for installing environmental conservation units.

The second urban planning tool is land use and zoning regulations. Even though land use and zoning regulations are commonly used in urban planning practices in countries from the Global

North, it only started to be more present in Brazilian practices after 2001, with the enactment of the City Statute. In fact, the time lag is quite shocking as the 1915–1930 period was characterised as "the technical age of zoning ordinances" for cities in the Global North, according to Silver (2014: 104).

With the enactment of the City Statute, comprehensive plans became mandatory to all municipalities with 20,000 inhabitants or more. According to IBGE (2016) in 2005, 14.5 per cent of all municipalities with 20,000 inhabitants or more had comprehensive plans, and in 2015, this percentage increased to 89.2. Concerning land use and zoning regulations, in 2009, 38.3 per cent of municipalities had zoning regulations (IBGE 2010), and in 2015, this amount increased to 58.6 per cent (IBGE 2016). These statistics are all welcome news for urban planning practices, especially given the short time frame, but there is still much progress to be made concerning implementation.

**The study area**

The study area, depicted in Figure 1, is a sub-region of the Belo Horizonte Metropolitan Region (BHMR), located in the State of Minas Gerais, in Brazil; its total area is 1,405 $km^2$. BHMR is composed of 34 municipalities, and its core is the municipality of Belo Horizonte (BH). The sub-region is composed of eight municipalities (BH, Confins, Lagoa Santa, Pedro Leopoldo, São Jose da Lapa, Ribeirão das Neves, Santa Luzia, and Vespasiano) that are part of the regional 'North' urban expansion axis. The study area encompasses 64 per cent of the 2010 total regional population, which was 4.8 million inhabitants. Of the top seven BHMR densest municipalities in 2010, four were in the study area.

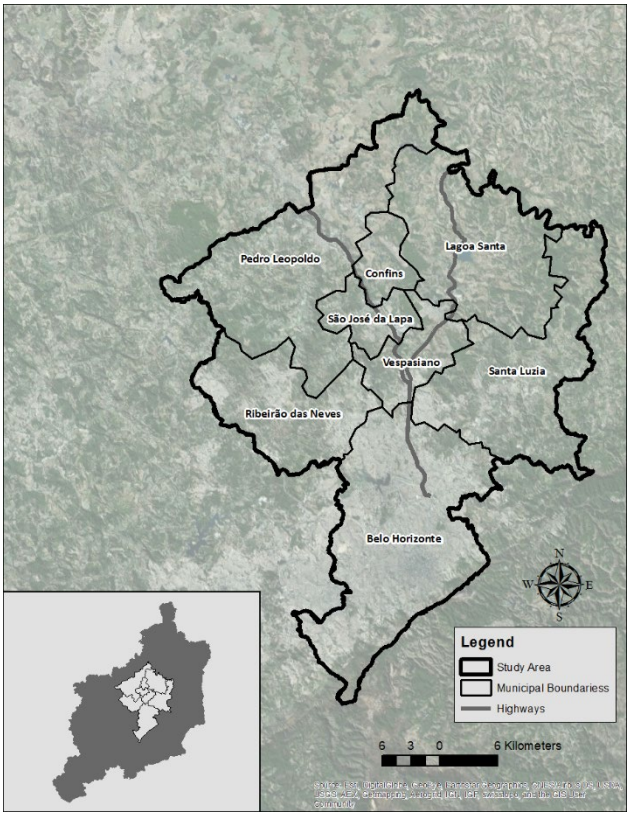


**Figure 1: Study area - Sub-region of the Belo Horizonte Metropolitan Region**

This sub-region was selected because of its urban history and its continuous urban growth. Interestingly, the 'North' urban expansion axis started in the 1970s as bedroom communities for low-income people who were working in BH but could not afford housing there (de Andrade and de Medonça 2010: 170). Nowadays, as Costa and Magalhães (2011) describe, there are several state initiatives located in the 'North' axis, all contributing to BHMR urban expansion. Additionally, the presence of two state highways (i.e., MG 010 and MG 424) in the sub-region explain its attractiveness for growth.

**Spatial analysis**

In order to examine spatial patterns of urbanisation in the study area, land cover maps for 2000 and 2015 were created based on remotely sensed data. Two main sets of analysis were carried

out: Land Use Land Cover (LULC) change and Normalised Difference Vegetation Index (NDVI). For LULC, first I detected the area under 'urban' and 'non-urban' land cover classes for 2000 and 2015. I identified areas where 'new development' occurred between 2000 and 2015, and results of LULC are shown in Figure 2: (A) represents the 2000 classified land cover, (B) represents the 2015 classified land cover, and (C) represents the 'new development' that occurred between 2000 and 2015. The total urbanised area was approximately 100 $km^2$, showing an increase of 7.2 per cent of urbanised area when compared to the whole study area, and a 23 per cent increase when compared to the existing urbanised area. Figure 2 also shows that BH is the most urbanised municipality in both years, having only a few vacant areas, most of which are located in the mountains that surround its southwest border. These mountains are preserved from any construction, designated under the environmental preservation category in the municipal zoning regulation.

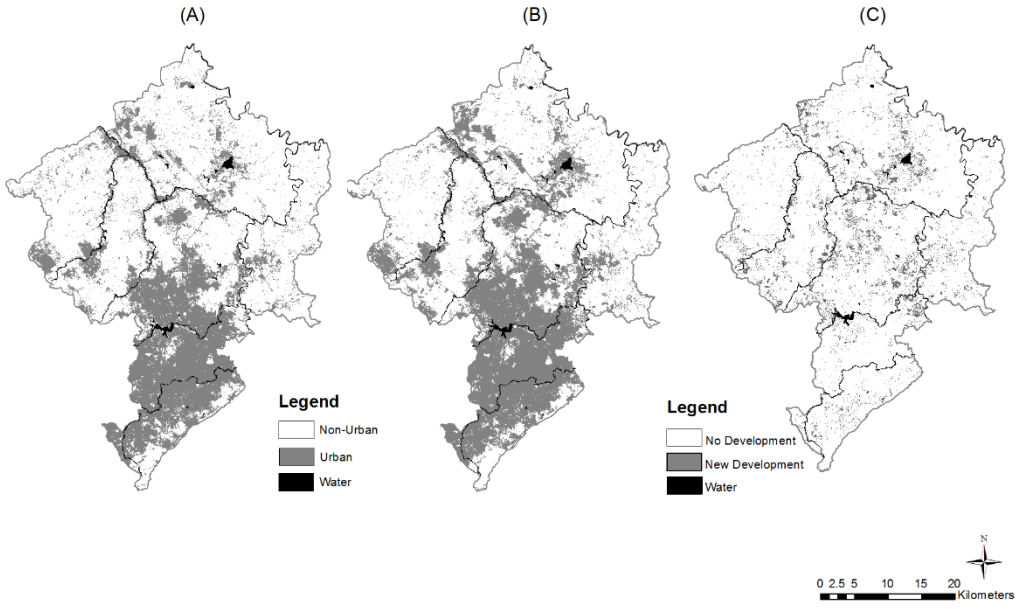


**Figure 2: Results of Spatial Analysis**

Table 1 summarises how 'new development' happened in each of the eight municipalities. In absolute terms, from the total 100 $km^2$, BH had the largest area of 'new development' (18.74 $km^2$). BH also experienced the highest level of urbanisation, in relative terms: around 25 per cent of its total vacant land in 2000 was urbanised by 2015. In addition to 'new development,' it is

important to highlight that BH was also experiencing redevelopment in the form of verticalisation, even though the spatial analysis presented here does not capture that. By demolishing old houses and/or three-floor apartment buildings, developers were constructing high-rise buildings in BH. The municipality of Ribeirão das Neves also witnessed high urban growth, about 15 per cent of its total vacant land in 2000 was urbanised by 2015.

**Table 1: Summary of new development among municipalities**

| Municipality | New development ($Km^2$) 2000-2015 | Municipal total area ($Km^2$) | Vacant land (Km2) 2000 | Percentage of vacant land that was urbanized from 2000 - 2015 |
|---|---|---|---|---|
| Belo Horizonte | 18.74 | 330.93 | 73.76 | 25.41 |
| Confins | 4.04 | 42.22 | 34.78 | 11.62 |
| Lagoa Santa | 15.78 | 230.58 | 199.19 | 7.92 |
| Pedro Leopoldo | 14.77 | 291.49 | 251.33 | 5.88 |
| Ribeirão das Neves | 15.9 | 154.58 | 105.31 | 15.10 |
| Santa Luzia | 14.27 | 233.63 | 193.66 | 7.37 |
| São José da Lapa | 6.51 | 48.62 | 36.22 | 17.97 |
| Vespasiano | 9.66 | 69.78 | 50.65 | 19.07 |

Finally, to better understand the urbanisation process, I evaluated changes in the vegetation health from 2000–2015. I used the most common vegetation index – the Normalised Difference Vegetation Index (NDVI) – which is calculated from red and near-IR reflectance data. NDVI values can range from +1 to -1, with healthy green vegetation having values closer to +1 and unhealthy vegetation and non-vegetated features having values nearer -1.

Using Holben's (1986) study as a reference for NDVI classification categories, NDVI values ranging from -1 to 0.1 were included in the non-vegetated category, NVDI values ranging from 0.1 to 0.3 were included in the moderate vegetation category, and NDVI values above 0.3 were included in the high vegetation category. Table 2 compares the results of these three categories. One can observe that there was a decrease in 'high vegetation' of around 36 per cent, and the non-vegetated category increased by approximately 27 per cent. Both statistics indicate that the vegetation health was getting worse during the study period.

**Table 2: Summary of NDVI classification categories**

| NDVI Categories | NDVI value | 2000 Area Km2 | 2015 Area Km2 | Percentage Change |
|---|---|---|---|---|
| Non-vegetated | 0.1 or less | 403 | 514 | 27.54 |
| Moderate Vegetation | 0.1 - 0.3 | 567 | 615 | 8.47 |
| High Vegetation | 0.3 or high | 435 | 276 | -36.55 |

**Examining urban planning tools**

*Right of Preferential Purchase*

A content analysis of municipal comprehensive plans was conducted to understand how RPP was being used by the municipal governments that encompass the study area. This research process took place between August and September 2016. I was looking for answers for the following questions: is RPP included in the comprehensive plan?; is there a broad list of RPP's uses present in the plan?; are RPP's uses copied verbatim from the City Statute?; are RPP's procedures copied verbatim from the City Statute?; is there a specific list of RPP's uses present in the plan?; is the City Statute included as the primary regulatory law?; and is there any additional specific law for RPP mentioned in the plan?. Table 3 summarises the findings of the content analysis.

Seven out of the eight comprehensive plans included RPP in their scope.[2] Only the municipality of São José da Lapa did not mention RPP in its comprehensive plan. Lagoa Santa included RPP in its comprehensive plan, but did not mention the City Statute as a regulatory law for the tool, nor did it describe the broad list of RPP's uses. On one hand, Belo Horizonte and Vespasiano included RPP in their plans and referred to the City Statute as the primary and only law that could regulate the tool. On the other hand, although Confins, Pedro Leopoldo, Ribeirão das Neves and Santa Luzia refer to the City Statute as the primary law that could regulate the plan, they all require that the RPP be the object of a specific municipal law. In the Ribeirão das Neves comprehensive plan, despite the fact that the RPP text had close resemblance to the original City Statute text, nowhere the comprehensive plan was the 2001 law mentioned. Finally, BH and Confins were the only municipalities to detail RPP uses.

**Table 3: Summary of content analysis for RPP in the municipal comprehensive plans**

| Municipality | RPP included | Broad list of RPP's | RPP's uses copied verbatim | RPP's procedures copied | Specific list of RPP's | City Statute as the primary | Additional specific law |
|---|---|---|---|---|---|---|---|

| | | uses present | from City Statute | verbatim from City Statute | uses presented | regulatory law | for RPP mentioned |
|---|---|---|---|---|---|---|---|
| Belo Horizonte | Yes | Yes | Yes (copied from) | No | Yes | Yes | No |
| Confins | Yes | Yes | No | No | Yes | Yes | Yes |
| Lagoa Santa | Yes | No | NA | NA | No | No | No |
| Pedro Leopoldo | Yes | Yes | No | No | Yes | Yes | Yes |
| Ribeirão das Neves | Yes | Yes | No | No | No | Yes | Yes |
| Santa Luzia | Yes | Yes | Yes | No | No | Yes | Yes |
| São José da Lapa | No | NA | NA | NA | NA | NA | NA |
| Vespasiano | Yes | Yes | Yes | No | No | Yes | No |

In summary, even though RPP was included in seven municipal comprehensive plans, the implementation of such tool was not found in any municipality. This finding reinforces what Santos Júnior and Montandon (2011) explained about RPP: it is one of the City Statute tools most often included in municipal comprehensive plans, but it is almost never regulated, making its implementation unlikely to happen. Even with this knowledge, I found it surprising that BH was not implementing RPP during the time of this study. BH residents have a very small amount of open space per capita, and yearly issues with flooding are part of residents' reality. Having such a tool remain only on paper is an example of what Klink and Denaldi (2016: 404) describe as "disappointing progress" in the effort toward Brazilian urban reform.

*Land use and zoning*

When examining land use and zoning regulations, I only selected zoning categories related to provision of open space and environmental preservation. I was able to gather zoning regulations of seven out of the eight municipalities, having adoption dates ranging from 2006 to 2012. Only the municipality of São José da Lapa did not have zoning regulations, or did not make them available to the public, at that time. Using a GIS software, I overlaid 'new development' with

selected zoning categories related to the provision of open space and/or environmental preservation.

For this analysis, I only selected the areas of 'new development' that were equal or greater than the mean patch size (i.e. 4,318 $m^2$). This decision was based on the fact that my zoning analyses required robust 'new development' data, and by not considering the smaller areas, I made 'new development' more robust. Out of the 100 $km^2$ of total 'new development,' this examination includes 74 $km^2$, corresponding to 74 per cent of the total urbanisation that occurred between 2000 and 2015.

Table 4 displays the summary of the overlay between 'new development' and the zoning categories. Based on the description of all these zoning categories, development should not have been occurring in these zones, which are all related to open space and/or environmental preservation. Five municipalities had two types of zoning scales, macro-zoning and zoning. I made sure to include both categories when analysing these municipalities. When observing Table 4, the two most unexpected results are: 14 per cent of new development took place in areas where it should not have happened, and 43 per cent of new development in BH took place in areas with environment-related zoning categories. The municipality of Santa Luzia also had a similar result to BH, with 35 per cent of its new development taking place in areas within environment-related zoning categories. The situation in São José da Lapa was unclear because of unavailable zoning regulations.

**Table 4: Summary of the overlay of 'new development' and environmental-related zoning categories**

| Municipality | New development with areas => 4,318 m2 (in km2) | New development coincide environmental-related zoning (in km2) | % areas coincide in relation total area new development | Macro-zoning regulation | Zoning regulation/ year |
|---|---|---|---|---|---|
| Belo Horizonte | 11.63 | 5.01 | 43.04 | no | yes/2010 |
| Confins | 2.96 | 0.31 | 10.48 | no | yes/2009 |
| Lagoa Santa | 12.34 | 0.78 | 6.36 | yes | yes/2006 |
| Pedro Leopoldo | 10.12 | 0.00 | 0.02 | yes | yes/2006 |
| Ribeirão das Neves | 11.79 | 0.74 | 6.25 | yes | yes/2012 |
| Santa Luzia | 9.83 | 3.49 | 35.49 | yes | yes/2008 |
| São José da Lapa | 6.93 | NA | NA | no | no |
| Vespasiano | 8.57 | 0.04 | 0.50 | yes | yes/2006 |
| **New development** | **74.18** | **10.37** | | | |

These regulations were dated between 2006 and 2012. This is an important piece of information because my analysis covers 2000-2015, and one may argue that the results presented here may be biased. In other words, municipalities may have zoned these areas after development took place there. While this is possible, the high likelihood is that these areas that were characterised by high environmental importance were already present in these zones. For instance, an existing neighbourhood may be adjacent to a forest, and new housing units may have been built there in 2003. After some evaluation, the city decided to preserve the rest of the remaining forest, and a new zoning for preservation may have been enacted in 2006. Situations like this may affect the magnitude of the percentage of new development that coincided with environment-related zoning categories presented in Table 4, i.e., the numbers may have been smaller. To illustrate, instead of having 43 per cent of new development in areas with environment-related zoning categories, BH may have a smaller percentage. Its zoning regulations are from 2010, and part of the 11.63 $km^2$ of 'new development' may have taken place before that. Therefore, I cannot make my conclusion with a very high level of certainty.

Nonetheless, I argue that it is likely that new development may be happening in areas where it should not have, even after the land use and zoning regulations have been passed. This argument is due to the fact that in Brazil, "plans have not been properly implemented, and many forms of

disrespect for the legal order have been left unquestioned" (Fernandes and Maldonado Copello 2009: 16). The other issue that I cannot be certain about is related to the legality of these new developments. I presume that some of the new developments are legal, while others are illegal. To illustrate my point, a well-known illegal settlement that took place circa 2013 is the Isidoro settlement, located in an area in BH that was supposed to be devoted to environmental preservation.

Regardless of legality and/or illegality, in my opinion, this disrespect towards land use and zoning regulations happens because of three main factors: the fragility of policies supporting urban planning processes in Brazil, the lack of practical experience in implementation of urban planning tools in many municipal governments, and the national political process that facilitates the formation of bureaucratic links between developers' interests and public administration. This systematic disrespect towards land use and zoning regulations is due to these three factors and is not a problem related to lack of information nor technical capacity of public employees.

**Discussion**

My findings point to the fact that there is a lack of implementation for the City Statute tools in the sub-region of BHMR. Friendly (2013) also found this lack of implementation in her case study about the city of Niterói. There are two main reasons that may help us understand my findings for the BHMR sub-region.

The first reason is that in Brazilian cities, political influence drives economic interest for development over social interest for provision of public goods (Rolnik 2011). As she explained, urban planning is tied to corruption in Brazil. Developers have economic interest in furthering their own agendas by influencing politicians. These politicians, in turn, rather than implementing policy that is focused on the public good, support development for profit (Rolnik 2011: 250–253). I believe this type of behaviour may be related to the lack of RPP implementation for environment-related uses because developers are interested in using the land for corporations rather than goods and services for the public.

Marques (2010) had similar insights, when studying urban governance in São Paulo. He concluded that political influence has a profound effect on policy implementation in Brazil. For instance, many mayors and municipal officials have vested interests in their own companies outside of government, and sometimes they change land regulation to suit their own needs rather than the needs of the public (Marques 2010: 11–18). Moreover, my findings echo what Roy (2009) describes about urban governance in India: urban governance operates based on 'unmapping' processes, allowing "considerable territorialised flexibility to alter land use" (Roy 2009: 81) and zoning regulations.

The second reason is related to policy implementation *per se*. Policy implementation may be extremely limited if municipal governmental entities do not have funds, personnel and/or power to enact the changes a policy may demand (Milio 2010). When a policy is implemented, oversight and accountability must be taken into consideration. Ideally, a specific group would be responsible for overseeing the process so that it is implemented as intended, providing accountability during the completion and implementation of the policy (May 2003: 228–230). Additionally, if more than one organisation is involved, inter-organisational cooperation is imperative. Each entity that is involved in the implementation process must understand that they all share a common goal, and must facilitate cooperation to proceed (O'Toole 2003: 235–240).

In Brazil, the way the public sector operates does not generally help policy implementation to be successful. According to Arellano et al. (2013: 583), the Brazilian public sector "has no commitment to effectiveness and efficiency." Moreover, the authors also refer to corruption. The Brazilian public sector has been affected by politicians, who have had the power to place their own allies in positions of power, causing issues in efficacy and accountability. On the other hand, Rhodes et al. (2012) observed that there are systems in place to monitor the public sector performance, allowing opportunities to improve accountability. To illustrate, as they described, the Ministry of Planning has released a guide for analysing performance success, providing program administrators with a method to assess their outcomes.

When facing these two reasons, I believe the most important issue that needs to be addressed is the relationship between political influence and corruption. Traditional politics seep into the process of implementation. Municipal politicians begin re-interpreting urban legislation, bribing fiscal supervisors, and ignoring the rights of groups with low representation. As a consequence, the implementation of urban planning tools is affected adversely. In my opinion, there is no doubt that administrative corruption is the gravest threat to the implementation of urban planning tools in Brazil.

**Recommendations and conclusion**

Some recommendations should be addressed to assure that strategies, such as RPP and environment-related zoning categories, are indeed being implemented. I have three main recommendations: one seeks to broaden the lessons learned here, and two are specifically for the study area. The first recommendation is about the public administrative aspects of planning. I recommend that the public sector makes 'combating administrative corruption' the number one priority in its agenda in order to improve institutional practice. Second, if Brazilian municipalities decide to implement RPP, municipalities should invest in the automation of their land and property database. By having updated and easily accessible land and property registries, planners will be able to have a solid foundation for implementation of RPP, which will likely lead to a successful conclusion, as Braga (2001) asserts.

The final two recommendations are related to public participation, i.e., increase citizens' ability to participate in the public sector. Looking at the history of the City Statute, Friendly (2013: 162) explained that from 1988 to 2001, "an intense negotiation process" took place between many actors, including NGOs, environmental organizations, and private citizens. Nowadays, however, "the renovation of [this] processes" (Fernandes and Maldonado Copello 2009: 19) is one of the central factors needed to improve implementation of the City Statute.

One bright spot regarding public participation is found in the municipality of BH. It has received special attention in the literature because of its successful implementation of participatory budgeting (Wood and Murray 2007). This success provides optimism for the future. However, there is cause for concern. In the 2015/2016 BH participatory budgeting, 7 out of the 116 approved projects were allocated to the environment-related theme, representing only 6 per cent of the total budget.[3] My immediate recommendation would be to educate citizens about sustainable practices and the importance of prioritising topics related to the natural environment. The goal would be for an increase in the percentage of the total budget devoted to this issue.

The final recommendation is about the electronic version of BH's participatory budgeting. As technology is more and more ubiquitous, electronic-participatory budgeting should be expanded: public employees should organise topics for discussion and be active in participating and responding online; political representatives should take part in online forums; and online forum *per se* should be used to evaluate the participatory process (Barros and Sampaio 2016: 295–308).

There are important opportunities for future research on the topic of public sector practice in the Global South. One idea could be to interview public employees to better understand their perspectives on the relationship between political influence and corruption, and on policy implementation *per se*.

**References**

Arellano, E.B., Wakamatsu, A. and Ribas, R. (2013) "Organizational values in the Brazilian public sector: an analysis based on the tri-axial model," *Cross Cultural Management* 20(4): 578–585.

Arsanjani, J.J., Tayyebi, A. and Vaz, E. (2016) "GlobeLand30 as an alternative fine-scale global land cover map: Challenges, possibilities, and implications for developing countries," *Habitat International* 55: 25–31.

Barros, S. A., and Sampaio, R. C. (2016) “Do citizens trust electronic participatory budgeting? Public expression in online forums as an evaluation method in Belo Horizonte,” *Policy and Internet* 8(3): 292–312.

Braga, R. (2001) “Gestão ambiental no Estatuto da Cidade: alguns comentários,” In P.F. Carvalho and R. Braga (org) *Perspectivas de Gestão Ambiental em Cidades Médias*, Rio Claro: LPM-UNESP, pp.95–109.

de Andrade, L.T. and de Mendonça, J.G. (2010) “Explorando as consequências da segregação metropolitana em dois contextos socioespaciais,” *Cadernos Metrópole* 12(23): 169–188.

Costa, G.M. and Magalhães, F.N.C. (2011) “Processos socioespaciais de metrópoles de países de industrialização periférica: Reflexões sobre a produção do espaço metropolitano de Belo Horizonte, Brasil,” *Revista Brasileira de Estudos Urbanos e Regionais* 13(1): 9–25.

Fernandes, E., and Maldonado Copello, M.M. (2009) “Law and land policy in Latin America: Shifting paradigms and possibilities for action,” *Land Lines* 21(3): 14–19.

Friendly, A. (2013) “The right to the city: theory and practice in Brazil,” *Planning Theory and Practice* 14(2): 158–179.

Holben, B.N. (1986) “Characteristics of maximum-value composite images from temporal AVHRR data,” *International Journal of Remote Sensing* 7(11): 1417–1434.

Hübner, C.E, Pinto, J.F. and Oliveira, F.H. (2006) “Cartografia Cadastral urbana e o direito de preempção,” *Anais do Congresso Brasileiro de Cadastro Técnico Multifinalitário* 1(10): 1–7.

Instituto Brasileiro de de Geografia e Estatística (IBGE) (2010) “Pesquisa de Informações Básicas Municipais: Perfil dos Municípios Brasileiros – 2009”, Rio de Janeiro, Available: http://biblioteca.ibge.gov.br/visualizacao/livros/liv44692.pdf [Accessed 13 December 2016]

IBGE (2016) “Pesquisa de Informações Básicas Municipais: Perfil dos Municípios Brasileiros – 2015”, Rio de Janeiro, Available: http://loja.ibge.gov.br/perfil-dos-municipios-brasileiros-2015.html [Accessed 13 December 2016]

Klink, J. and Denaldi, R. (2016) “On urban reform, rights and planning challenges in the Brazilian metropolis,” *Planning Theory* 15(4): 402–417.

Marques, E. (2010) “Government, political actors and governance in urban policies in Brazil and São Paulo: Concepts for a future research agenda,” *Brazilian Political Science Review* 7(3): 8–35.

May, P. (2003) “Policy design and implementation,”, in B. Peters and J. Pierre (eds) *Handbook of Public Administration*, Trowbridge: The Cromwell Press Ltd., pp.223–233.

Milio, S. (2010) *From Policy to Implementation in the European Union: The Challenge of a Multi-Level Governance System*, London and New York: Tauris Academic Studies.

Miraftab, F. (2009) ‘Insurgent planning: situating radical planning in the global South’, *Planning Theory* 8(1): 32–50.

Musakwa, W. and Van Niekerk, A. (2015) “Earth observation for sustainable urban planning in developing countries: Needs, trends, and future directions,” *Journal of Planning Literature* 30(2): 149–160.

O’Toole, L.J. Jr (2003) “Interorganizational relations in implementation,” in B.G. Peters and J. Pierre (eds) *Handbook of Public Administration*, Trowbridge: The Cromwell Press Ltd., pp.234–244.

Presidência da República do Brasil (2001) “Lei federal nº 10.257, de 10 de julho de 2001,” Available: http://www.planalto.gov.br/ccivil_03/leis/LEIS_2001/L10257.htm [Accessed 13 August 2016]

Prieto, E.C. (2006) “O estatuto da cidade e o meio ambiente,” *Anais do Congresso Brasileiro de Direito Urbanístico* 4(12): 1–20.

Rhodes, M.L., Biondi, L., Gomes, R., Melo, A.I., Ohemeng, F., Perez-Lopez, G., Rossi, A., and Sutiyono, W. (2012) “Current state of public sector performance management in seven selected countries,” *International Journal of Productivity and Performance Management* 61(3): 235–271.

Rolnik, R. and Klink, J. (2011) “Crescimento economico e desenvolvimento urbano: Por que nossas cidades continuam tão precárias?,” *Novos Estudos-CEBRAP* (89): 89–109.

Rolnik, R. (2011) “Democracy on the edge: Limits and possibilities in the implementation of an urban reform agenda in Brazil,” *International Journal of Urban and Regional Research* 35(2): 239–255.

Roy, A. (2009) “Why India cannot plan its cities: Informality, insurgence and the idiom of urbanization,” *Planning Ttheory* 8(1): 76–87.

Santos Júnior, O.A. and Montandon, D.T. (eds) (2011) *Os Planos Diretores Municipais Pós-estatuto da Cidade: Balanço Crítico e Perspectivas*, Rio de Janeiro: Letras Capital.

Silver, M. (2014) “The role of planning in the twenty-first century and beyond,” *Planning Theory and Practice* 15(1): 103–106.

Wood, T. and Murray, W.E. (2007) “Participatory democracy in Brazil and local geographies: Porto Alegre and Belo Horizonte compared,” *European Review of Latin American and Caribbean Studies* 83: 19–41.

World Bank (2016) “Indicators”, Available: http://data.worldbank.org/indicator [Accessed 13 December 2016]

Yazdani, S. and Dola, K. (2013) “Sustainable city priorities in global North versus global South,” *Journal of Sustainable Development* 6(7): 38–47.

[1] I would like to acknowledge Marina Magalhães de Castro, Devanshi Mehta, and Morgan Bradley for their research assistance, and Jayme Wilken for her editorial suggestions.

[2] List of comprehensive plans, laws and orders follow. São José da Lapa, Plano Diretor, Law 881/2015; Lagoa Santa, Plano Diretor, Law 2.633/2006; Belo Horizonte, Plano Diretor, Law 7.166/1996 Secretaria Municipal de Serviços Urbanos/Secretária Municipal Ajunta de Regulação Urbana; Vespasiano, Plano Diretor, Law 002/2006 and Complementary Law 003/2007; Confins, Plano Diretor, Complementary Law 012/2009; Pedro Leopoldo, Plano Diretor, Law 3.034/2008; Ribeirão das Neves, Plano Diretor, Complementary law 002/2006; Santa Luzia, Plano Diretor, Law 2.699/2010; and Ribeirão das Neves, Plano Diretor, Law 036/2006.

[3] Prefeitura Municipal de Belo Horizonte, Secretaria Municipal de Governo & Secretaria Municipal Adjunta de Gestão Compartilhada 2015, Plano Regional de Empreendimentos: Orçamento Participativo 201/2016 & Orçamento Participativo Digital 2013, Belo Horizonte, Brazil.