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SUMÁRIO

PRÓXIMA

CONSIDERATION OF ENVIRONMENTAL ISSUES IN TRANSPORT POLICIES, PLANS AND PROGRAMMES IN BRAZIL

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Abstract: Transport services and infrastructures are vital for a country's economy, and of great social importance, influencing mobility and quality of life. From the environmental perspective, transport activities are is also an important issue, especially because they are often related to negative environmental externalities. In Brazil, according to the Federal Constitution, both society and government share the responsibility to protect and preserve the environment, which should be done in every level of decision making. With the purpose to identify the extent to which environmental issues have been considered in transport planning in Brazil, in this paper 12 transport Policies, Plans and Programmes (PPPs) were analysed. The results show that often the environment was considered only through the lens of gas emissions and was considered as less important than economic aspects. Thus, it evidences that despite the constitutional duties environmental issues are generally not adequately considered in transport PPPs.
Key-words: Transport; Environmental issues; Planning.

Resumo: Serviços e infraestruturas de transporte são vitais para a economia de um país, bem como são de grande importância do ponto de vista social, influenciando e.g. mobilidade e qualidade de vida. Do ponto de vista ambiental as atividades de transporte também são importantes, sobretudo por estarem frequentemente relacionados a externalidades ambientais negativas. No Brasil, de acordo com a Constituição Federal, a sociedade e o Estado compartilham o dever de defender e proteger o meio ambiente, o que deveria ser feito em todos os níveis de tomada de decisão. A fim de identificar o quanto questões ambientais tem sido consideradas no planejamento de transportes no Brasil, nesta pesquisa analisou-se 12 Políticas, Planos e Programas (PPPs) do setor. Os resultados mostram que com frequência o meio ambiente foi considerado apenas por meio do parâmetro emissão de gás e considerado como menos importante que questões econômicas. Evidencia-se, então, que apesar dos deveres constitucionais, em geral questões ambientais não são adequadamente consideradas nos PPPs de transporte.
Palavras-chave: Transporte; Aspectos ambientais; Planejamento.

INTRODUCTION

Transport is a fundamental service for a country's economy, allowing people's mobility and freights distribution (HEADICAR, 2009; WORLD BANK, 2010). These services, though, imply the consumption of many resources (e.g. energy, money, land, time) (VASCONCELLOS, 2005), as well as the production of effects on economy, society and environment (STOEGLEHNER, 2013), which often include negative externalities, such as accidents, air pollution, traffic congestions (VASCONCELLOS, 2005). Thus, to consider environmental and social issues within the planning process of the transport sector is crucial to avoid those negative externalities.

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However, as in sectorial planning the main goals are usually economic and conflict with environmental objectives, to integrate environmental issues in sectorial planning and decision making is still a challenge (STOEGLEHNER, 2013). To overcome this challenge, impact assessment instruments have been used worldwide with the purpose to support the consideration of environmental issues in policy, plan and programme making, especially the Strategic Environmental Assessment (SEA) and Sustainability Assessment (SA).

In Brazil, transport services and infrastructure still need to be improved duo to its poor, inefficient and costly transport network in the country as a whole (BARBERO, 2010), as well as the poor passengers mobility in cities (SILVA; COSTA; MACEDO, 2008). Nowadays, investments in the sector are highly concentrated on the road mode (MINISTÉRIO DOS TRANSPORTES, 2012; SECRETARIA DOS TRANSPORTES; DERSA, 2000) and on the regions that have been already leading the country economy (BRAGA; CASTILLO, 2006; MEDEIROS, 2014; MINISTÉRIO DOS TRANSPORTES, 2012). Regarding environmental issues, some authors indicate that they are not properly considered (BRAGA; CASTILLO, 2006; SÁNCHEZ; SILVA-SÁNCHEZ, 2008), and that the notion of sustainability in the sector is not consolidated, varying significantly among regions and planners (SILVA; COSTA; MACEDO, 2008).

On the other hand, in spite of the fact that in Brazil there is no mandatory impact assessment for policies, plans and programmes, the application of the Strategic Environmental Assessment to transport sector has already been suggested in some transport plans (MINISTÉRIO DOS TRANSPORTES; ARCADIS LOGOS, 2013; MINISTÉRIO DOS TRANSPORTES, 2012; SECRETARIA DOS TRANSPORTES; DERSA, 2000), indicating some concern with the theme. In addition to that, environmental values and the obligation of the government and society to protect and preserve the environment are stablished in the Brazilian Federal Constitution, and to promote sustainability is presented as a purpose of some transport institutions, showing that environmental issues should be considered in planning and decision making.

In this context, in order to support the better consideration of the environment in the transport sector in Brazil, it is first necessary to analyse if and to what extent environmental issues have been already considered in the actual plan framework, allowing the identification and discussion of gaps and opportunities in the sector. The analysis carried in this paper is based on 12 transport policies, plans and programmes reports from the national, state and local levels in Brazil, and indicates the environmental issues mentioned in those documents, as well as the importance gave to them in the decision-making.

METHODOLOGY

In order to evaluate to what extent environmental issues have been considered in transport sector, the empirical research consisted in the analysis of a sample of transports policies, plans and programmes (PPPs) prepared at the national level (Brazil), state level (state of Sao Paulo) and municipal level (city of Sao Paulo). Sao Paulo State and Sao Paulo city were chosen as case studies in this research because of their uniqueness regarding transport, as both the transport infrastructure and services are concentrated in these regions (BRAGA; CASTILLO, 2006; MEDEIROS, 2014; MINISTÉRIO DOS TRANSPORTES, 2012).

For each administrative level, the documents analysed were chosen based on two criteria: the document should be available and the PPP should be currently in use. To identify and access these PPPs an exploratory search was done in websites of transport institutions. The accessed documents were first analysed with regards to their legal nature (statutory and mandatory nature), inter-modality (one mode, multimodal or intermodal), scope (e.g. transport management, infrastructure, urban mobility, climate change) and strategic orientation (policy

oriented, plan oriented, programme oriented or a mix). Following, the content of the reports was analysed in order to identify what environmental issues were presented and how.

RESULTS AND DISCUSSION

A total of 33 PPPs were identified for the national, state and municipal levels through an exploratory search in transport institutions websites. From these 33 PPPs it was possible to access the planning reports of 12, which compose the sample analysed (Table 1). The analysed documents are indicated in Figure 1, as well as their characteristics regarding the administrative level they refer to, legal nature, inter-modality, scope, strategic orientation and the institution responsible for each PPP. These characteristics indicate the variety of PPPs included in the sample.

Table 1 –Documents analysed.

Administrative level	Year	Initials	Name
National	2010	PNTH	Guidelines for Nacional policy for water transport
	2012	PNLT	National Plan of Transport and Logistics
	2012	NPUM	National policy of urban mobility (Law 12.587/2012)
	2013	PNIH	National Plan for Waterway Integration
	2013	PHE	Waterway Strategic Plan
	2013	PSTM	Sectorial Plan of Transport and Urban Mobility for Climate Change Mitigation and Adaptation
State (Whole state)	2000	PDDT	Master Plan of Transport Development
	2011	PCPV	Plan of Vehicular Pollution Control
	2013	PTS	Sustainable Transport plan
State (Metropolitan region)	2006	PITU	Integrated Plan of urban transports
	2010	RRC	Regional Rail Connection: Preliminary Consideration and Guidelines
Municipal	2014	PDE	Urban Development Policy and Municipal Master Plan of Sao Paulo

From the characteristics analysed, it is important to highlight the classification of the PPPs according to their scope and strategic orientation, which consisted in seven categories based on the generic transport PPP framework presented by Fischer (2002) (Figure 1). This classification is important in order to clarify the role of each document in the planning framework, avoiding mistakes based on documents names (as in Brazil there is not an regulatory framework that distinguishes the concepts and differences between Policy, Plan and Programme) and permitting the identify cases that deal with issues regarding more than one strategic level (e.g. Guidelines for the Nacional policy for water transport, which is about general guidelines for water transport, but also about project level decisions).

Following the classification of the PPPs, they were analysed regarding the environmental issues presented on their reports, resulting in the identification of environmental references in: PPP objectives, when presenting baseline information, when assessing the PPP impacts, when proposing monitoring actions and in the presentation of the final decision. References made were classified into eight categories: sustainability, environment (in general), soil, water, fauna and flora, air, land use, and social (Table 2). Figure 2 presents the number of PPPs that mentioned environmental issues related to each category, showing that the most mentioned categories are air, land use and social.

Regarding air, the most mentioned issue is gas emissions, specifically CO_2 emissions (Table 2), which is also the central issue of the three climate change PPPs for the transport sector,

included in the analysis (Figure 1). It is important to mention that the elaboration of climate change plans and programmes is mandatory for some sectors, including the transport sector, because of the national and state Climate Change Policies, which establish targets for the reduction of CO_2 emissions.

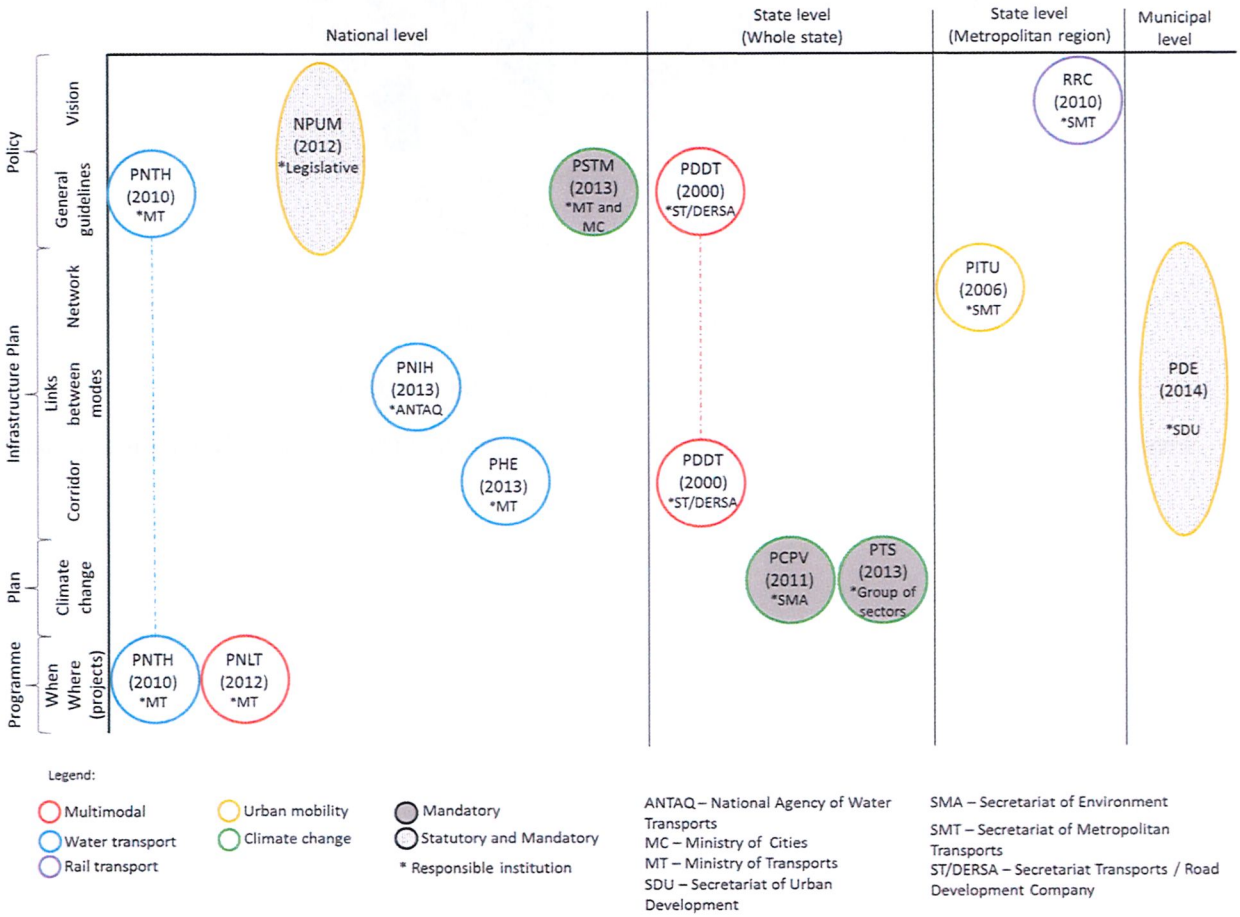

Figure 1 - Planning framework of transport in Brazil (national level), Sao Paulo State (state level), Metropolitan region of Sao Paulo (regional level) and Municipality of Sao Paulo (local level).

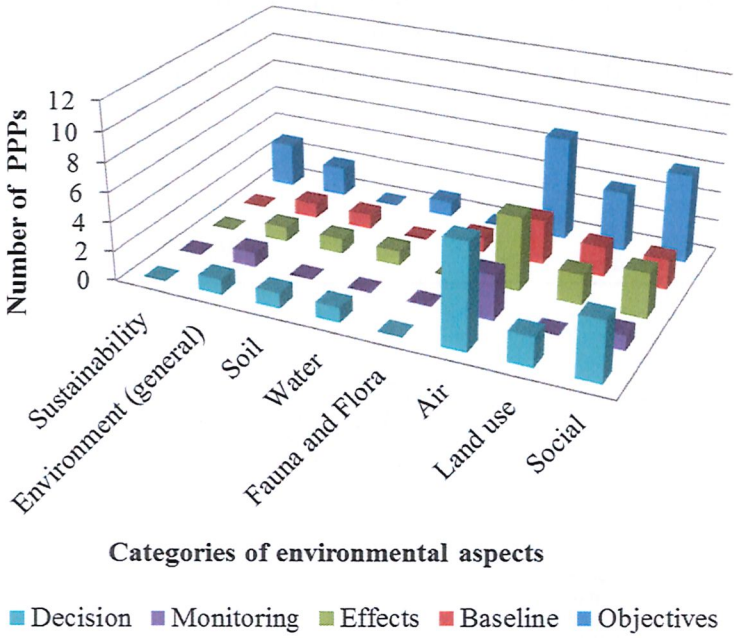

Figure 2 – The frequency with which environmental issues were mentioned in the policies, plans and programmes analysed.

Table 2 – Environmental issues mentioned in PPPs analysed and the number of documents in which they were mentioned (indicated in brackets), organized according to the report part where they were mentioned (objective, baseline, assessment and monitoring) and according to the category they are related to.

Categories	Objectives	Baseline	Assessment	Monitoring	Decision
Sustainability	-Promote sustainability (3)				
Environment (general)	-Increase environmental quality (2)	-Legal aspects related with environment (1)	-Environmental quality (1)	- Environmental impacts (1) - Transport of dangerous loads (1)	-Environmental quality (1)
Soil		-Erosion vulnerability (1) -Geomorphology (1)	-Erosion (1) -Geomorphology (1)		-Erosion (1)
Water	-Protect water (1)		-Intervention in rivers (1)		-Intervention in rivers (1)
Fauna and Flora		-Vegetation cover (1)			
Air	-Reduce gas emissions (4) -Reduce other pollutant emissions (1) -Increase the use of biofuel (1) -Increase energy efficiency (4) -Avoid noise (1)	-Air quality (1) -Gas emissions (3)	-Gas emissions (4) -Transport network (1) -Fuels used (1)	-Gas emissions (1) -Conditions of vehicular emissions (1)	-Gas emissions (6) -Transport efficiency (1)
Land use	-Respect protected areas (1) -Guarantee urban quality (3)	-Protected areas (2)	-Protected areas (2) -Indigenous and traditional population areas (2) -Urban areas (2)		-Protected areas (2) -Indigenous and traditional population areas (2) -Urban areas (1)
Social	-Guarantee the quality of life (3) -Increase human security (2) - Decrease social inequalities (2) -Promote mobility (4)	-Population characteristics (2)	-Human security (2) -Social inequalities (1) -Transport accessibility (1) -Mobility (1)	-Components of mobility (1)	-Human security (1) -Social inequalities (1) -Transport accessibility (1) -Mobility (1)

Analysing the results by each PPP it is possible to notice that in some cases environmental issues are mentioned in the PPPs' objectives, however, not all of them are further explicitly considered during planning process, neither in decision making (Figure 3). It indicates that, in some cases, environmental issues were included in the level of intentions and discourse, but were not really considered through the whole planning process. Figure 3 also shows that usually only one or two categories are considered, except from the Waterway Strategic Plan (PHE) and Master Plan of Transport Development (PDDT), which stands out for being more comprehensive.

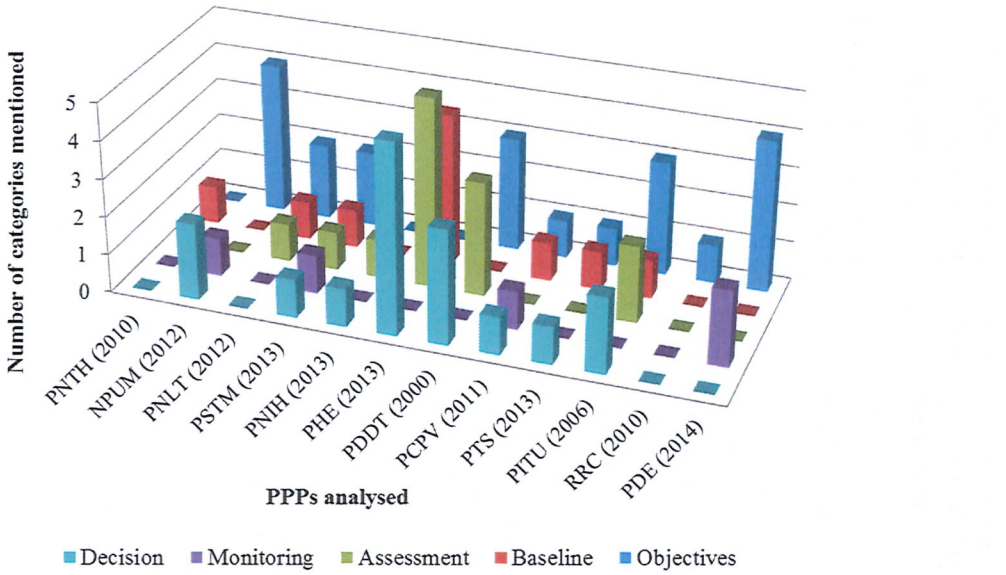

Figure 3 – Number of categories (sustainability, general environment, soil, water, fauna and flora, air, land use, social) mentioned in each PPP in objectives, baseline, assessment, monitoring and decision.

Specifically about decision making, it is important to know not only what issues were considered, but the extent to which these issues influenced the decision made. Through the content analysis of the reports it was possible to identify six different situations:

i. Environmental issues included as guidelines (EA): PPPs that stablished a framework for other plans and programmes and included the consideration of environmental issues as necessary for the further planning process;

ii. Group of issues considered, but with low importance (↓): PPPs that explicitly considered a group of environmental issues in the decision making through multi criteria analysis, however, with low representativeness (especially if compared with the economic criteria);

iii. Gas emissions considered (G): 'Climate change PPPs', which explicitly considered only gas emissions in the decision;

iv. Protected areas considered (P): 'Locational PPP' that explicitly considered only land use compatibility in the decision;

v. Not mentioned (-): PPPs that did not provide enough information on their reports, so it was not possible to evaluate to what extent environmental issues were considered in the decision making;

vi. Not considered (N): PPP that explicitly not considered environmental issues.

Table 3 presents each PPP classified according to these six situations.

Table 3 – Consideration of environmental issues in the decision making and justification.

PPP	Classification	Justification
PNTH (2010)	-	Not mentioned.
PNLT (2012)	N	Decision was based only on the economic return of the projects because it would be "too complex to develop a model that considered other criteria in addition to the economic" (Ministry of Transports, 2012, p 195).
NPUM (2012)	EA	The document established guidelines for municipal urban mobility plans, including the necessity monitor and control gas emissions.
PNIH (2013)	P	Viable areas selection clearly considered the localization of environmentally protected areas.
PHE (2013)	↓	Decision was supported by the multi-criteria analysis that included environmental aspect, but it had a small importance on the method used.
PSTM (2013)	G	The main output of the plan was to affirm that the transport projects included in PNLT might contribute for the reduction of gas emissions, which was based on the evaluation of gas emissions.
PDDT (2000)	↓	Environmental issues were considered in an indirect way, through an indicator of sustainability. Thus, it was not clear if environmental issues were really considered and if it influenced the decision.
PCPV (2011)	G	The guidelines for reducing gas emissions were based on the prediction and evaluation of gas emission.
PTS (2013)	G	The main output of the plan was to affirm that the use of biofuel might contribute for the reduction of gas emissions, which was based on the evaluation of gas emissions.
PITU (2006)	↓	Decision was supported by the multi-criteria analysis that included environmental aspect, but it had a small importance on the method used.
RRC (2010)	-	Not mentioned.
PDE (2014)	EA	Among the guidelines presented for the definition of new transport infrastructure it was listed some environmental issues that shall be considered.

G: Gas emissions considered; P: Protected areas considered; EA: Environmental issues included as guidelines; ↓: Group of issues considered, but with low importance; N: Not considered; –: Not mentioned.

In summary, PPP reports content analysis indicates that the consideration of environmental issues in transport policies, plans and programmes is mainly focused on gas emissions; and the cases that considered more environmental issues can be identified as being part of one of two groups: PPPs related to urban mobility, which deal with issues related to accessibility, urban and life quality, transport efficiency, and the PPPs that used multicriteria analysis as a method to assess and compare the alternatives assessed. In the last case, though, despite the fact that more issues were included in the analysis, their influence in final decision was hindered by economic criteria, indicating trade-offs between environmental/social issues and the economic ones.

Thus, it is possible to infer that environmental issues have been poorly considered in the decision-making, evidencing a gap between environmental values presented in the Brazilian Constitution and reaffirmed in principles of the transport institutions and the planning practice.

Though, it is important to be aware that as the analysis resented here relies on the quality and comprehensiveness of PPP reports, any information omitted from the reports was not identified. Despite this limitation, the analysis results are still a strong indicator of gaps in the transport planning framework regarding the consideration of environmental issues.
In this context, questions about what constrains a comprehensive and effective consideration of environmental issues in PPP making and in decision making arise. With the purpose to deep in this issue, the next step of this research comprehends the analysis of how environmental issues are included in planning process in transport sector, which will be done based on data collected through interviews with planners from transport institutions in the national, state and municipal levels.

CONCLUSIONS

With the purpose to understand the extent to which environmental issues have been considered in transport policies, plans and programmes in Brazil, 12 transport PPPs were analysed. The results indicate that the main category considered is air, which is usually mentioned through gas emissions related to transport services and infrastructures. Some PPPs mentioned a more comprehensive group of issues, however, in final decision they were considered as less important than the economic ones, and trade-offs between them where admitted.
These evidences indicate the necessity to study the planning process in the sector in more detail with the purpose to understand what factors hinder a better consideration of environmental issues, as well as to identify opportunities to improve the planning process. This detailed analysis will be carried out in the next step of this PhD research.

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