

TOWARDS A SUSTAINABLE MOBILITY DEVELOPMENT IN ROMANIAN CITIES. A COMPARATIVE ANALYSIS OF THE SUSTAINABLE URBAN MOBILITY PLANS AT THE NATIONAL LEVEL

Liliana ANDREI

Technical University of Civil Engineering Bucharest
liliana.capra@phd.utcb.ro

Oana LUCA

Technical University of Civil Engineering Bucharest
oana.luca@utcb.ro

Abstract

In Romania, the sustainable urban mobility plan (SUMP) is required to fund projects through the Regional Operational Program 2014-2020 (Urban Mobility Investment) and the Large Infrastructure Operational Program 2014-2020. In addition, SUMP is mandatory, as mentioned in the Law no. 350 / 2001 (with its subsequent amendments and completions), on territorial planning and urbanism, which states that a General Urban Plan must include, inter alia, an urban mobility plan. Since 2015, cities in Romania started to develop SUMPs in line with their own economic development requirements, ensuring the transition to a sustainable transport system that meet citizens' mobility needs and improving the quality of their lives. SUMPs have already started to be implemented, but currently there is not sufficient information on the state of implementation, although monitoring information should also be provided. Consequently, an assessment is needed to confirm whether these plans achieve their objectives and whether the impact of the adopted measures is the expected one. The main objective of this paper is to compare SUMPs from 30 cities in Romania, classified according to the number of inhabitants, and to propose an improved monitoring and evaluation methodology, allowing thus to intervene and review them in due time. The aim of the research is to avoid introducing measures that do not have the expected effect, to improve them, or introduce other complementary measures.

Keywords: implementation, monitoring and evaluation, sustainable urban mobility plan

1. INTRODUCTION

The global population has tripled in the last 100 years, being today above 7,5 million people are living on the planet and the number is continuously growing. The forecast for 2050 is suggesting a population around 9,7 million (Nations, n.d.). Moreover, it is foreseen that more and more people will live in the urban areas (66%), reversing thus the rural-urban population distribution.

At the European level, the urban regions provided a home to 74,5,0% of the EU-27 population in 2018, the employment to 41,1% of the EU's workforce, and generated 47% of its domestic products (GDP) (*The EU in the World - Population - Statistics Explained*, n.d.),(European Commission & Eurostat, 2016).

Under these circumstances, urban mobility represents a key enabler for social and economic development. However, the mobility has become dominated by private automobile and less sustainable. Consequently, the urban areas have experienced a fast growth in transport related challenges, such as congestion, pollution, accidents, public transportation decline, less urban space, low accessibility for the less developed suburbs, generally the decrease of life quality.

To tackle this issue, several policies have been adopted by the European Commission and European Parliament (Union, 2007),(Union, 2006),(Union, 2008),(Union, 2009),(Union, 2011b), (Union, 2013). These are complemented by other documents of the EU Member States (European Ministers for Urban Development and

Regional Planning, 2007),(New Leipzig Charter, 2020),(Toledo Informal Ministerial Meeting on Urban Development Declaration, 2010) which establish urban policy and urban integration regeneration. These are supplemented by ELTIS Guidelines (Wefering et al., 2014) and Poly-SUMP Methodology (Kocak et al., 2014), which provide indications for preparing the SUMPs.

Nowadays several European states require the implementation of Sustainable Urban Mobility Plans (May, 2015) on a legal basis, providing national guidance as well (England, France, Italy, Netherland, Norway, Denmark, etc.).

It is assumed that the provisions of the framework documents impose the obligation of Romania to implement and align with the EU recommendations: 1) to ensure an integrated approach to urban planning, developing public transport according to the needs of citizens - through a balanced coordination of land use and an integrated approach to urban mobility, 2) to give more attention to environmental components and adopt efficient measures to limit the effects of climate change, 3) to increase the level of accessibility to public transport services, 4) to develop and implement new and sustainable fuels and new propulsion systems, optimizing the performance of multimodal logistics chains, and increasing efficiency.

Thus, the implementation of sustainable urban mobility plans (SUMP) becomes mandatory by the adoption of legislation (LEGE 350 06/07/2001, 2001),(ORDIN 233 26/02/2016, 2016). By this regulation, a SUMP is defined as a tool for the territorial strategic planning, correlating the spatial development of the suburban / metropolitan areas, the mobility and transport of people and goods. One uniform methodology for development of SUMPs is advised.

Starting with 2015, the Romanian cities started to elaborate the SUMPs in accordance with their own economic development needs and the transition to a less polluting urban transport system. Most of them are now in the process of implementation, but there is not sufficient information on the effectiveness of the measures already adopted, on the achievement of their objectives and on the impact of the measures taken.

This paper aims to explore the alignment of several SUMPs in Romania with the national regulation in force, to assess their features related to the provisions of the spatial planning and sectorial documents, the measures included into the action plan and the evaluation and monitoring process. This will help the determination of the missing elements, providing recommendation for monitoring, evaluation and revision the plans.

In addition, the present research comes under the circumstances of preparation of the new Cohesion policy for 2021-2030 (*Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL Laying down Common Provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, and the European Maritime and Fisheries Fund and Financial Rules for Those and for the Asylum and Migration Fund, the Internal Security Fund and the Border Management and Visa Instrument*, 2018) and following the release of SUMP 2.0 in October 2019 (Rupprecht et al., 2019).

2. METHODOLOGY

This study is based on an investigation of 30 SUMPs, selected from a personal database of over 100 mobility plans in Romania. The mobility plans database was built on the information found from the local authorities and the County Environmental Protection Agencies webpages.

The investigation was carried out in 3 stages: 1. an analysis related to the correlation of SUMPs with the specific documents, 2. an analysis concerning the packages of measures included in the SUMPs and their orientation towards sustainable transport, such as encouraging non-motorized and public transport, increasing accessibility, ITS, etc. 3. In the last stage, the proposed procedures for monitoring and evaluation, including the indicators used and the planned timeframe for the review were analysed. The analysis followed the structure of the above-mentioned national legislation.

2.1. Selection of cities

As recommended by (JASPERS, 2015), cities are classified in three categories, according to population, complexity, and nature of the transport system (see table 1). The cities included in this study were randomly selected from the three categories indicated but ensuring representativeness for the Romanian Development Regions (see Table 2).

TABLE 1 - LEVELS OF TOWNS/CITIES FOR FUNCTIONAL REGIONAL ANALYSES

Level 1	Level 2	Level 3
Population		
>100,000 inhabitants	40,000 - 100,000 inhabitants	<40,000 inhabitants
Public transport		
Complex network with intersecting routes and multiple modes (tram, bus, trolleybus, maxi-taxi)	Moderate network of public transport services that may include multiple modes and some interchange opportunities	Very few public transport routes, or no services
Road network		
Dense road network with a large urban area, numerous routing options for many trips, with traffic congestion appearing during periods of the typical day.	Compact urban centre fed by a number of defined approach roads, and with different routing options for traffic travelling into/through the urban area.	Simple road network comprising a small number of main roads passing through the area, and with limited opportunities for choosing different routes

TABLE 2 - THE CITIES SELECTED FOR ANALYSIS

	City/Town	Population (INS, 2016)	Region
Level 1	Bucuresti	2106144	Bucuresti-Ilfov
	Iasi	362142	North-East
	Timisoara	332983	West
	Cluj-Napoca	321687	North-West
	Constanta	317832	South-East
	Craiova	305689	South-West
	Oradea	222736	North-West
	Braila	210602	South-East
	Arad	179045	West
	Tirgu Mures	150191	Centre
Level 2	Vaslui	97067	North-East
	Tirgu Jiu	96852	South-West
	Focsani	94408	South-East
	Tirgoviste	93563	South
	Bistrita	93336	North-West
	Tulcea	89696	South-East
	Resita	88533	West
	Slatina	84546	South-West
	Calarasi	77576	South
	Alba Iulia	74233	Centre
Level 3	Dej	38970	North-West
	Campina	37553	South
	Campulung	36944	South
	Rosiori de Vede	32582	South
	Husi	30484	South-East
	Moinesti	24684	North-East
	Viseu de Sus	18159	North-West
	Gura Humorului	17047	North-East
	Flamanzi	11931	North-East
	Cristuru Secuiesc	10796	Centre

2.2. Data analysis

The first stage addressed to the compliance of the examined SUMP into the spatial planning and sectoral documents. The evaluation criteria were based on the requirements related to elaboration of the strategic stage of mobility plans: correlation with the provisions of the land-use planning documents and the provisions of the sectoral strategic documents. For the sectoral documents, the strategies related with transportation, environment and socio-economic development were considered. Each criterion also considered the assessment of the national and European related papers (see Table 3).

TABLE 3 - CONSIDERATION OF STRATEGIC DOCUMENTS WHEN DEVELOPING SUMPS

	Framing in the provisions of the sectoral documents										Framing in the provisions of the land-use planning documents										
	Socio-economic development					Environment					Transportation					EU					
	Local	Regional	National	EU	Local	Regional	National	EU	Local	Regional	National	EU	Local	Regional	National	EU	Local	Regional	National	EU	
Bucuresti																					
Cluj-Napoca																					
Timisoara																					
Iasi																					
Constanta																					
Cratova																					
Brasov																					
Oradea																					
Braila																					
Tirgu Mures																					
Tirgu Jiu																					
Targoviste																					
Focsani																					
Bistrita																					
Tulcea																					
Resita																					
Slatina																					
Calarasi																					
Alba-Iulia																					
Vaslui																					
Reghin																					
Campina																					
Husi																					
Dej																					
Rostori de Vede																					
Moinesti																					
Viseu de Sus																					
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Cristuru Secuiesc																					

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In the second stage the measures included in the Action Plan were examined; they were evaluated following the criteria in the Table 4. This is corresponding to the operational level stage into the national regulation.

TABLE 4 - MEASURES INCLUDED IN SUMPS

	Bucuresti	Cluj-Napoca	Timisoara	Iasi	Constanta	Craiova	Brasov	Oradea	Braila	Tirgu Mures	Tirgu Jiu	Targoviste	Focsani	Bistrita	Tulcea	Resita	Slatina	Calarasi	Alba-Lulia	Vaslui	Reghin	Campina	Husi	Dej	Rosiori de Vede	Moinesri	Viseu de Sus	Gura Humorului	Flamanzi	Cristuru Secuiesc
Major infrastructure interventions	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Public transport	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Freight transport	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Alternative transport																														
cycling	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
walking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
reduced mobility	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Traffic management																														
parking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
safety	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ITS	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
signage	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
High complexity areas																														
central protected area	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
occasionally traffic generator/attraction points	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
intermodal areas	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Intermodal structure and necessary urban operations	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Institutional aspects	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

In the last stage the proposed monitoring and evaluation strategy was investigated, with specific focus on the procedures for measures implementation assessment and the actors involved in the SUMP's monitoring process (see table 5). In addition, it was explored whether the indicators for measuring the implementation are provided.

TABLE 5 - MONITORING AND EVALUATION

	Bucuresti	Cluj-Napoca	Timisoara	Iasi	Constanta	Craiova	Brasov	Oradea	Braila	Tirgu Mures	Tirgu Jiu	Targoviste	Focsani	Bistrita	Tulcea	Resita	Slatina	Calarasi	Alba-Lulia	Vaslui	Reghin	Campina	Husi	Dej	Rosiori de Vede	Moinesri	Viseu de Sus	Gura Humorului	Flamanzi	Cristuru Secuiesc
Procedure for implementation assessment	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Indicators for monitoring and evaluation of investment results	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Actions and indicators for SUMP implementation	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Actors responsible for SUMP's monitoring	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

3. RESULTS AND DISCUSSIONS

3.1. Framing SUMP's in the provision of strategic documents

Generally, in the SUMP's analysed, the documents related to local, regional, and national land-use planning, such as General Urban Plans, County Land Use Plan (ORDIN 233 26/02/2016, 2016), National Land Use Plan (LEGE 71 12/07/1996, 1996) and Romania's Territorial Development Strategy (Ministerul Dezvoltării, Lucrarilor

Publice si Administratiei, 2016) were well considered. However, in most cases, the General Urban Plans are obsolete (around 2000-2010) or are in process to be updated.

Regarding the spatial planning documents, it could be noted that the spatial programming documents at European level are not always considered for Level 1 and Level 3 cities. For Level 2 cities, several European strategies (European Commission & Directorate-General for Regional and Urban Policy, 2000),(European Conference of Ministers responsible for Regional Planning, 2000) are properly considered.

In terms of the sectorial documents, the SUMP analysed were well correlated with the transportation strategies, appropriately considering the EU policies (Union, 2007),(Union, 2006),(Union, 2008),(Union, 2009),(Union, 2011a),(Union, 2011b) and national, regional, and local policies, including Romania Transport Masterplan (Ministerul Transporturilor, n.d.), Regional and Local Development Strategies.

Even if the environmental component is included in the sectorial documents considered, it should be noted the lack of correlation with the environmental studies at local, county, and regional level. The same was observed in relation to the socio-economic development strategies and sustainable energy local action plans.

In several cases sectorial documents are improperly considered as land-use planning documents.

3.2. Measures included in SUMP Action Plan

The results of the investigation of the measures included in the SUMP are presented in table 4.

Most of the analysed SUMP are focusing on major infrastructure interventions, referring to modernization and upgrading of different street categories and construction of new ones.

Regarding public transportation, the proposed measures are aimed to improve the infrastructure: dedicated lanes, tram infrastructure modernization, stops/stations modernization, increasing the accessibility. In addition, several actions are planned to reorganize and extend the routes, and to purchase clean vehicles (electric buses, trolleybuses, and trams). It is also proposed to set up public transport services in the localities where it does not exist (in some Level 3 cities).

Also, some measures for providing alternative means of transportation are presented in all the studied plans. They are addressing the construction of dedicated infrastructure for bicycles, providing bike-sharing services and improvement of walking conditions. Moreover, some cities proposed e-mobility measures regarding the development of a charging infrastructure for electric vehicles, and parking facilities. Generally, the measures for people with reduced mobility are not specifically mentioned, but they could be considered included in other measures, for instance procurement of public transport vehicles with low floor, upgrading the sidewalks, increase the accessibility of stops/stations.

Freight transportation is, with some exception, poorly addressed in SUMP, and sometimes is missing. The measures proposed are limited to the construction of cities ring road, parking for good distribution around main markets and construction of logistic points. In some SUMP, the development of a Sustainable Urban Logistic Plan (SULP) is proposed.

As concerning traffic management, the proposed measures are focusing on re-organisation of intersections, and parking related aspects: construction of new parking areas and development of different parking policies. Development of ITS is also considered by introduction or improving of the existent traffic management system, dynamic information systems and payment of different transport services.

Almost all the analysed SUMP included measures of reorganization of the areas of high complexity. These include reorganization of central or protected areas into pedestrian areas, and revitalization of some areas of cities.

There is a wide range of measures concerning the intermodality. Starting from reorganizing the public transport interchange points, including the railway stations, Park & Ride initiatives and, where the case, improving the city connection with the airport, these actions are very well represented.

Institutional aspects are approached in all SUMP's under various aspects: communication campaigns related to the sustainable mobility and setting up of a department responsible with the SUMP's implementation and evaluation. Moreover, in many cases it is proposed to sign the contracts for public service, or the updating of the existing ones, in accordance with (Regulation (EC) No 1370/2007 of the European Parliament and of the Council of 23 October 2007 on Public Passenger Transport Services by Rail and by Road and Repealing Council Regulations (EEC) Nos 1191/69 and 1107/70, 2007).

3.2. Monitoring and evaluation of SUMP's

Consideration of monitoring and evaluation aspect in the examined SUMP's is presented in Table 4. Except for one case, all the SUMP's analysed provide procedures for evaluating the implementation and propose Monitoring Committees. It is also proposed to create a department to deal with the implementation and evaluation of SUMP, generally, under the organizational structure of the local authority or of the transport authority.

The evaluation procedure is accompanied by two types of indicators, one for monitoring and evaluation of measures and the other for SUMP implementation. As monitoring intervals for measures is proposed quarterly, semi-annual, or annual measurement, and for the entire plan a revision is proposed every 3 to 5 years.

Some plans foresee implementation indicators, but a time horizon for evaluation and monitoring is not precisely specified.

In other few cases, the evaluation and monitoring process remains just at a statement level, no concrete actions or indicators being proposed.

In some cases, the Monitoring Committee is proposed, with a broad participation of representatives of local, regional, and national authorities, transport operators, the educational environment, the Police, the Inspectorate for Emergency Situations, civil society. However, the complexity of this Committee is questioning the effectiveness of monitoring and evaluation process.

4. CONCLUSIONS

The present paper outlines a comparison between the national legislation and several urban mobility plans elaborated in cities of Romania. The conclusion is that the analysed SUMP's have largely complied with the legal provisions. The aspect that should be considered in their future updating is a better correlation with the European development policies, which provide useful information about the future programs of the grant. Similarly, a better correlation of SUMP's with the strategic documents of local, regional, or national development from the point of view of socio-economic development and sustainable energy and climate local action plans is necessary. Additionally, the recent approved Romania's Sustainable Development Strategy 2030 (Hotarare 877 09/11/2018, 2018), (Luca et al., 2021) could provide valuable inputs for revision of mobility plans, at the same time with the initial preparation for the automated vehicles integration (Andrei et al., 2022).

The positive aspect is the orientation towards clean public transport, the development of charging networks for electric vehicles and the promotion of walking and cycling.

At the opposite side is the aspect related to urban freight, which was considered only in very few cases. Sustainable urban logistics plans should be an integral part of SUMP's. They should contain, for example, issues related to the optimization of goods distribution policies, encouraging the use of electric vehicles, access regulations, set-up the logistic infrastructure measures, etc.

Creating a mechanism for monitoring and evaluation at regional/national level to anticipate difficulties in preparing, implementing, and evaluating SUMP is imperative. This should be a support for designing the measures and making the investment costs more efficient.

The respective mechanism might be developed as a joint SUMP's platform, under the direct administration of the Central Authority (e.g. Ministry of Development, Public Works and Administration). This platform shall be

built on a set of common indicators and shall benefit from the contribution of the local authorities responsible for implementing the SUMP. The values of indicators, updated on a regularly bases (eg.: 3-month, 6-month), will allow the efficient monitoring, evaluation, comparison and updating of the SUMP, through the rapid intervention to correct deficiencies.

A functional logic flow for the development, implementation, evaluation and updating of the SUMP is proposed in the Figure 1.

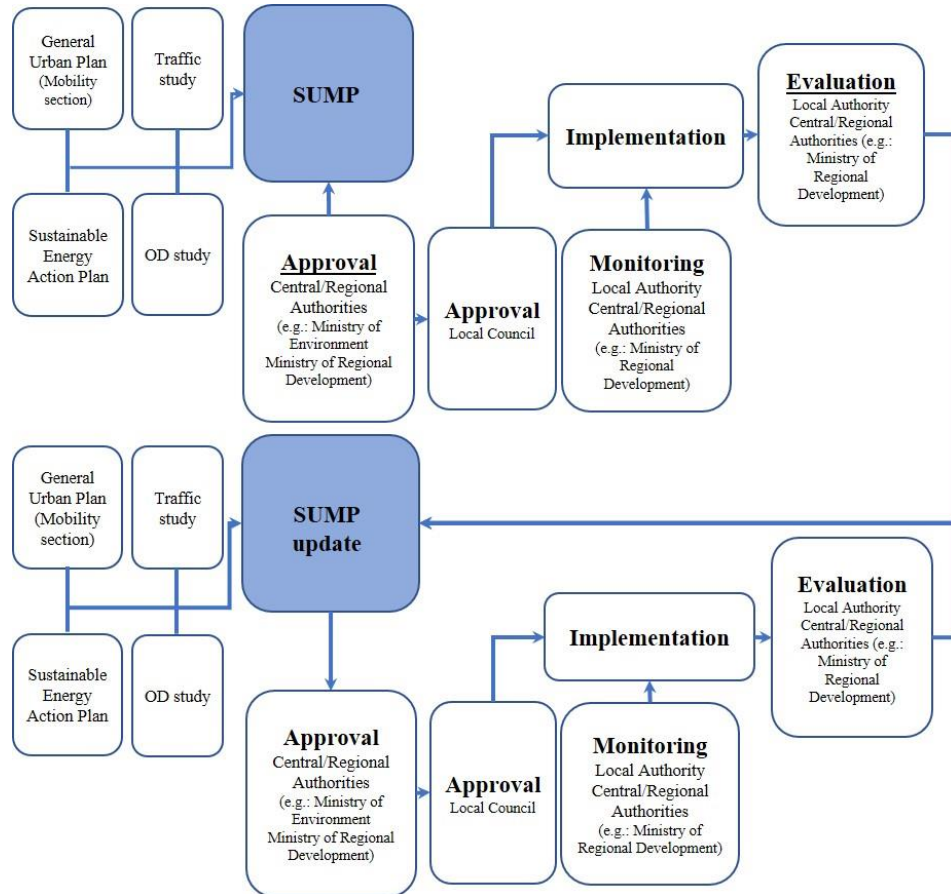


FIGURE 1 - LOGICAL FLOW-CHART FOR THE DEVELOPMENT, IMPLEMENTATION, EVALUATION AND UPDATING OF THE SUMP

The monitoring and evaluation indicators shall cover, but not limited to, the following aspects:

- Population/active population by age structure in the area covered by SUMP;
- The share of GDP in the evaluation area / national GDP;
- Number of jobs;
- Number of commuters daily / weekly;
- Average time to travel to the workplace;
- Level of motorization;
- Modal share;
- No. of ultra low/zero emission vehicles for public transport
- No. of ultra low/zero emission vehicles for goods distribution
- Km. of right way for public transport;

- Km. of bicycle tracks;
- No. of charging station for electric vehicles;
- No. of road accidents, no. of injuries and deaths;
- CO₂ emissions from the transport activity;
- Annual concentration of NO₂, PM₁₀, PM_{2.5};
- External costs of to transport.

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