



“Monitoring of road traffic related effects in the Alpine space and common measures”

## WP6

### Data and indicators

### Past and actual state in Monitraf Regions

### Practical criteria for selection



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## **0/ Introduction**

This report describes the work done under Work Package 6 (WP6), of which the Région Rhône-Alpes in France was in charge, its objectives, methodology, tasks and results.

Choosing a set of indicators is always a very difficult task, especially for transport policy, and when it comes to have an international agreement on such a set it is even more difficult.

After the Monitraf experience, as we will try to show in this report, we can say that in such a case it is of utmost importance for success to fulfil two main conditions:

- 1/ Have a very clear objective for the use of the set of indicators
- 2/ Have limited ambitions to start the process, and allocate appropriate resources to it.

The natural idea which is to use existing indicators instead of creating new ones might not be as good as expected, particularly in this case when different countries have very different cultures and organisations.

## **I/ WP6 terms of reference**

The work included in the WP6 was very much linked with the WP7 and 8,

**The main objectives of Monitraf, regarding indicators, were to:**

- (i) elaborate a comprehensive system of indicators shared by all the partners,
- (ii) in relation with proposed coordinated measures of traffic regulation,
- (iii) with the objective of reducing the negative effects and to improve quality of life, and
- (iv) in order to help politicians make decisions, and monitor their effects.

**The objectives of these WPs, according to the application form were:**

### **WP 6:**

Description of past and actual state of every Region referring to the items and subjects defined in the previous WP.

A synthesis which allows an analysis of the existing database

Preparation of the definition of harmonized indicators

### **WP 7:**

Definition of indicators on the basis of previous investigations

Establishing a common system of indicators

### **WP 8:**

Collecting, calculating, modelling past and actual values of the indicators

Analysis of available scenarios

Interregional interpretation of actual and future state

scenario business as usual - consequences

Due to the late start of these packages, they had to be managed in parallel. This parallel work was finally a rather efficient and logical organisation because the three WP needed many feedbacks from one another.

## **II/ Methodology**

According to the above mentioned objectives, the work of WP 6, in close relation with WP7 and WP8, was mainly focussed on the selection of a limited list of indicators in the fields analysed in WP5, according to criteria regarding mainly the availability and comparability of data.

The fields considered at the beginning were:

- Traffic
- Air pollution
- Noise
- Economy
- Tourism
- Health
- Population
- Weather
- Incidents

### **First analysis of possible data/indicators to be collected:**

The work done under WP7 was a scientific study about what is an indicator, how it can be used in the policy cycle, and how to select the right indicators for Monitraf. It also described some existing systems of indicators relevant to the field covered by Monitraf, and concluded (in cooperation with other partners) with a first selection of about 40 indicators or groups of indicators (refer to WP7 final report).

The objectives of WP6 were, on the other hand, to check existing data in the Monitraf Regions, and to evaluate the possible practical use of what already exists.

The main questions considered and discussed about existing indicators were:

- What are the bodies that measure indicators, what are their status and aims?
- What kind of indicators do they collect: definition, mode of collection?
- What are they used for?
- Do these indicators have a legal value (legal limit to be respected)
- Are similar indicators collected at another level: local, national or European?
- Is collection expensive, reliable?
- Are there some changes forecasted in the near future?

At first the final selection of indicators was supposed to be also directly related to the envisaged traffic regulation measures, but this additional consideration seemed too complicated, technically and politically, to take into account, and finally the selection of indicators was mainly based on availability of data (within the set of indicators submitted to the partners).

### III/ Selection of indicators

Due to time constraints and methodology difficulties, the work went on the following way :

Based on the work done by WP7 a first selection of 45 indicators was made in cooperation with WP8, covering all the fields mentioned above. These are listed below:

<b>1</b>	Amount of vehicule EURO 1	<b>402</b>	Transport prices
<b>2</b>	Amount of vehicule EURO 2	<b>403</b>	Fuel prices and taxes
<b>3</b>	Amount of vehicule EURO 3	<b>411</b>	Average rail tariff, Freight (€/ton-Km)
<b>4</b>	Amount of vehicule EURO 4	<b>501</b>	EURO 4 (and following) vehicles/Total vehicle fleet
<b>101</b>	Air concentration of NO2	<b>503</b>	Emissions of CO2 by passenger-km and by tonnekm
<b>106</b>	Transport emissions of greenhouse gases by mode	<b>509</b>	Load factors for freight transport
<b>107</b>	Transport emissions of NOx by mode	<b>516</b>	Cars/inhabitants
<b>108</b>	Transport emissions of VOC by mode	<b>601</b>	Integrated transport and environment strategies
<b>109</b>	Transport emissions of PM10 by mode	<b>603</b>	National transport and environment monitoring systems
<b>110</b>	Transport emissions of C6H6 by mode	<b>701</b>	GDP per inhabitant
<b>201</b>	Land take by transport infrastructure and settlement area	<b>708</b>	Activity rate
<b>205</b>	Modal split, passenger traffic	<b>716</b>	Road expenditure as share of GDP, per year
<b>206</b>	Modal split, freight traffic	<b>724</b>	Transport sector persons in employment
<b>210</b>	Transalpine total tonnage, per year	<b>725</b>	Transport complementary sector persons in employment
<b>232</b>	In/out tonnage by railroad, by total modes	<b>801</b>	Residents per square meter
<b>234</b>	In/out tonnage by road, by total modes	<b>805</b>	Excess of births over deaths
<b>301</b>	Cumulative infrastructure length built every year	<b>806</b>	Migration balance
<b>303</b>	Investments in transport infrastructure, per capita and by mode	<b>810</b>	Unemployment rate
<b>306</b>	Road density in terms of population	<b>901</b>	Bed places in open and closed hotels and resorts per inhabitant
<b>307</b>	Road density in terms of land area	<b>903</b>	Overnight stays per inhabitant
<b>308</b>	Rail lines density in terms of population	<b>2</b>	Transport accident fatalities
<b>309</b>	Rail lines density in terms of land area	<b>8</b>	LDEN
<b>401</b>	Heavy weight traffic taxes per kilometre		

A questionnaire on these indicators was then sent to the partners.

The main questions, listed below, were in link with actual possible use of data for an international database.

### **Data Gathering**

Data sources	Institutions that produce the data and processes the data series used to calculate the indicator
Gathering costs	cost requested by the institution to provide the data
Methodology	Description of methodology used for the data handling with indication of algorithm and reasons for the scale used and for the indexes chosen
Spatial Data Coverage	Geographic coverage level of data used with reference to the Monitraf domain (point of mesure, area availability)
Temporal Data coverage	Time gap from the first reference year
Geographical details	NUTS 2,3 , town council, local monitoring station, ...
Update frequency	Yearly, monthly, daily, hourly ? For the indicator
Technical disponibility	In which form can the data be provided (ex : Excel, word, paper map only, ...)
Confidential disponibility	Is the data available for the project ? (does the institution accepts to give us data. If it refuses, why ?)

### **Use**

Actual use	why is this indicator mesured ?
Problematic aspects	Limitation of the indicator due to significance of data, or to problems in its interpretation
Comparability (within the Region)	differences of data manipulation between two data series (Ex : 2 societies use different algorithms for the same indicator or the sensors do not measure under the same conditions
Normative targets	information level, legal limit, ...
Associated rules	rules associated to normative targets : speed limit, ...

(see attachment 1 for the full questionnaire itself and attachment 1-x for geographical coverage).

One example of answers (from ARPA Valle d'Aosta) is included in this attachment 1; other answers are gathered in attachment 2.

The answers from all the partners were then analyzed on the main criteria regarding availability of data, methodology of measurement, frequency of collection, availability of past measures, spatial covering.

## **A few general remarks can be made from this process:**

### **Problems of definition:**

Definition of some indicators didn't seem precise enough, and were interpreted differently by the partners, or different definitions exist in different Regions, leading to difficulties in gathering consistent data.

For some indicators, not available in a specific Region, an alternative could be proposed

### **Main reasons of proposed exclusion of some indicators**

- Bad availability of data:
  - Transport emission of C6H6
  - Average rail tariff, Freight (€/ton-Km)
  - Emissions of CO2 by passenger\*km and by ton\*km
  - Load factors for freight transport
  - Integrated transport and environment strategies
  - LDEN
- Different definitions :
  - Investments in transport infrastructure per capita and by mode
  - LDEN
  - Heavy weight traffic taxes per kilometer
  - Transport prices
  - National transport and environment monitoring systems
  - Activity rate

### **Solutions were proposed for specific indicators**

- Because of missing data, it was proposed to aggregate:
  - Transport sector persons in employment and
  - Transport complementary sector persons in employment
- Noise indicator is uncommon :

The possibility was discussed to creating a “map of noise zones” like in France, taking into account a scale of noise effects, based for example on calculations using models, but no precise measured values.

### **Other remarks**

- Some indicators have different elaboration methods (simulations, census, sample, ...) comparability must be checked,
- Time data coverage is different from one Region to the other for most indicators: past data will be very difficult to use.
- Concentration of NO2 is not specific of transport activities, nor is concentration of PM10, making their use for traffic management measures difficult.
- But the indicators to monitor pollution are the most common, and thus the easiest to collect.

Conclusions were then driven on two main synthetic criteria: availability and comparability of data, and a proposal made for a selection of indicators.

COD WP7	Label	Availability	Comparability of data
1	Amount of vehicle EURO 1	Good	Difficult to collect or compare
2	Amount of vehicle EURO 2	Good	Difficult to collect or compare
3	Amount of vehicle EURO 3	Good	Difficult to collect or compare
4	Amount of vehicle EURO 4	Good	Difficult to collect or compare
101	Air concentration of NO2	Good	Good
106	Transport emissions of greenhouse gases by mode	Good	Difficult to collect or compare
107	Transport emissions of NOx by mode	Good	Difficult to collect or compare
108	Transport emissions of VOC by mode	Good	Difficult to collect or compare
109	Transport emissions of PM10 by mode	Good	Difficult to collect or compare
110	Transport emissions of C6H6 by mode	Bad	Difficult to collect or compare
201	Land take by transport infrastructure and settlement area	Good	Good
205	Modal split, passenger traffic	Good	Difficult to collect or compare
206	Modal split, freight traffic	Good	Difficult to collect or compare
210	Transalpine total tonnage, per year	Good	Good
212	vehicle frequencies(Cars and trucks monitored by automatic stations of the alpine arc)	Good	Difficult to collect or compare
232	In/out tonnage by railroad, by total modes	Good	Difficult to collect or compare
234	In/out tonnage by road, by total modes	Good	Difficult to collect or compare
301	Cumulative infrastructure length built every year	Good	Good
303	Investments in transport infrastructure, per capita and by mode	Good	Bad
306	Road density in terms of population	Good	Good
307	Road density in terms of land area	Good	Good
308	Rail lines density in terms of population	Good	Good
309	Rail lines density in terms of land area	Good	Good
401	Heavy weight traffic taxes per kilometre	Good	Bad
402	Transport prices	Good	Difficult to collect or compare
403	Fuel prices and taxes	Good	Good
411	Average rail tariff, Freight (€/ton-Km)	Bad	Good
501	EURO 4 (and following) vehicles/Total vehicle fleet	Good	Good
503	Emissions of CO2 by passenger-km and by tonnekm	Bad	Good
509	Load factors for freight transport	Bad	Good
516	Cars/inhabitants	Good	Good
601	Integrated transport and environment strategies	Bad	Good
603	National transport and environment monitoring systems	Good	Bad
701	GDP per inhabitant	Good	Good
708	Activity rate	Good	Bad
716	Road expenditure as share of GDP, per year	Good	Good
724	Transport sector persons in employment	Good	Good
725	Transport complementary sector persons in employment	Good	Good
801	Residents per square meter	Good	Good
805	Excess of births over deaths	Good	Good
806	Migration balance	Good	Good
810	Unemployment rate	Good	Good
901	Bed places in open and closed hotels and resorts per inhabitant	Good	Good
903	Overnight stays per inhabitant	Good	Good
2	Transport accident fatalities	Good	Good
8	LDEN	Bad	Good

  

	Good
	Difficult to collect or compare
	Bad

Criteria used for proposal of selection
<u>Availability :</u> If the indicator is unavailable in two Regions or more it is eliminated
<u>Remarks :</u> The distinction between 724 and 725 doesn't seem usefull There is some redundancy between concentration of NO2 and emission of NO2

One has to be carefull about :

- distinctions between measurements and results of models
- geographic coverage of measurements, not always specific to alpine Regions

(for more details, see attachment 2 : Synthesis of the answers).

These indicators, together with the conclusions of the answers where then discussed by the partners during a workshop in Lugano in September 2006 with the aim of agreeing on a short list of 10 to 15 indicators

#### IV/ Results

Although the objective at the Lugano meeting was to reduce the number of indicators, some new ones where introduced that seemed useful to measure effects of traffic management decisions. At the end of the process 27 indicators where considered for final collection of data

1	Traffic	-	Total number of vehicules (cars and light duty veic. < 3,5 tonn)
2	Traffic	-	Total number of long vehicules
3	Traffic	-	Percentage vehicules euro 4 and higher
4	Traffic	206	Modal split, freight traffic (rail and road only)
5	Traffic	210	Transalpine total tonnage, per year
6	Traffic	-	Tunnel capacity
7	Traffic	-	Rail Transport efficiency
8	Environment	101	Air concentration of NO2 (hour)
8	Environment	101	Air concentration of NO2 (day)
8	Environment	101	Air concentration of NO2 (year)
9	Environment	109	Air concentration of PM10 (year)
9	Environment	109	Air concentration of PM10 (day)
10	Environment	-	noise indicator
11	Environment	-	Cardiovascular and respiratory morbidity
12	Infrastructure	-	Investments in environment infrastructure, per year and by mode
13	Infrastructure	303	Investments in transport infrastructure, per year and by mode
16	Cost	-	Toll prices / km motorway
17	Cost	403	Fuel prices and taxes
18	Economy	701	GDP per inhabitant
19	Economy	-	population
20	Economy	810	unemployment rate
21	Economy	725	Number of employees in transport sector
22	Economy	901	Bed places in open and closed hotels and resorts
23	Economy	903	Overnight stays
24	Economy	-	Migration Balance
25	Economy	-	Birth balance

(see attachment 3 x for details).

Data collection was then launched on these indicators, to be analysed and used by the following work packages. Further difficulties appeared during this collection, some are mentioned here under.

#### **V/ Some remarks from this experience of WP6:**

##### **- Political importance of such data base!**

For political use, these data are of utmost importance : this was strongly set forward in the political meeting in Innsbruck in April 2007: to share the analysis of problems and fix common goals at all levels, Regions, States, Europe, we badly need a set of data on which we all agree, and which can be used to decide common traffic management measures. The importance of this set of data might justify specific definitions and specific network of measurement stations.

##### **- Methodology for choice of indicators :**

What we tried to do in Monitraf was to start by a scientific and general process, first discussing the effects of traffic in the Alps, and trying to find indicators to measure as many effects as possible. The idea was then to propose precise targets for these effects, and to imagine traffic management measures to reach these targets. In fact this objective appeared much too broad, and we were soon limited by the difficulty to link directly traffic to its effects, the availability of consistent data over all Regions, or the difficulties to collect these data.

We tried then a more practical process, focussing more on the existing, or envisaged traffic management measures, and trying to find which were the most appropriate indicators for political use: what do we need to decide and communicate on envisaged measures.

At the end, the actual process of choosing indicators in Monitraf, was a mix of a scientific general approach, a political, or traffic management approach, finally taking into account the real availability of data.

For political use, i.e. decisions on traffic management measures, control of their effects and communication, the type of rather general existing data considered in Monitraf might be sufficient. In case specific measures are taken for specific goals, it might be necessary to create a new, specific type of data with a shared protocol for data collection.

##### **- data collection**

beside the difficulty of having a common definition of measurements, the collection of data itself encountered many difficulties :

- the only data rather simple to collect in a consistent way in the different Regions are those regarding traffic and air pollution. For all others there are many problems that make their scientific use impossible or questionable.

- only some of the Monitraf partners had their own data collection organisation, for others we had to go through special bodies that were not directly involved in Monitraf, and that either had very little time or even no will to give out data. If we want to set a permanent data base, it will probably have to be done through contracts with bodies collecting the basic data, and maybe also through payments, to ensure regularity and reliability of these data.

A contracting system would also allow for precise definitions of specific types of data.

Starting from existing data collection in each Region seems at first glance attractive: “we are not going to create new data, but simply use existing ones”. In fact it appeared very difficult, and would probably not be efficient for a permanent data base.

## **VI/ General conclusions:**

The work undertaken by the partners during two years showed clearly the necessity, but also the great difficulty, to create a database with a set of indicators common to all the alpine Regions.

This database should help to discuss, both at political and at technical level, traffic management measures, to decide such measures, to explain the decisions to the stakeholders and to monitor the effects of these measures.

These objectives should be made very clear before the work on construction of the database starts.

It doesn't seem realistic to think that such a data base will be free, just gathering existing data: these data do not necessarily exist in a similar format in all Regions and collecting bodies do not necessarily agree on giving out the data. That is why this database should be supported by an official, permanent and international body, able to allocate every year resources to this task.