



Appraisal project

Air Pollution Policies
foR Assessment
of Integrated Strategies
At regional and Local scales

Grant Agreement number 303895

WP2: Review and gaps identification in AQ and HA methodologies at regional and local scale

University of Aveiro

D2.1 First version of the database structure

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Summary

This is the deliverable concerning the APPRAISAL database structure. The database allows collecting, in a common format, information on different assessment methodologies used by the European Member States to assess the effects of emission abatement policy options and measures on the reduction of atmospheric pollutants concentrations and on human health. It will be the basis to identify the strengths and weaknesses in current practices.

This document describes the process of developing the database structure and presents the first version of this database structure.

Version History

Version	Status	Date	Author(s)
0.1	First Draft	23/10/2012	A. Miranda, C. Gama, H. Martins, H. Relvas, M. Lopes, C. Borrego (UAVR)
0.2	Second Draft	05/11/2012	Ana Isabel Miranda, UAVR

Summary of Changes

Version	Section(s)	Synopsis of Change
0.1	All	None – first draft
0.2	All	Mainly language and editing review

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1 Introduction

The APPRAISAL Project is a FP7-ENVIRONMENT Coordination Action funded by the European Commission within the call FP7-ENV-2012-one-stage, Grant Agreement number 303895. The project started officially on June 1st 2012 and initial activities started shortly after.

One of the main purposes of APPRAISAL is to perform an overall review of the methodologies, from simple (e.g. scenario approach) to more comprehensive ones (e.g. full cost-benefit analysis), used in different countries to address and assess the impact of local and regional air quality plans and their health implications. As part of the review particular attention will be given to identify which relevant research activities on air pollution and its health implications, especially EU funded, have been utilized. It will include:

- an analysis of the emission abatement policies and measures planned at regional and local scales,
- their synergies/trade-offs with the measures implemented at the national scales,
- a review of the modelling methodologies in place across member states to identify sources and to assess the effectiveness of emission reduction measures at all scales
- a review of the methodologies to assess the effects of local and regional emission abatement measures on human health,
- a review of monitoring data and complementary methodologies, e.g. source apportionment, to identify their potential synergies in a general integrated assessment frame,
- a review of the techniques used to assess the robustness and uncertainties of the assessment.

WP2 - Review and gaps identification in Air Quality and Health Assessment methodologies at regional and local scale - activities were established aiming to address this particular reviewing objective. WP2 work was broken down into five subjects which are included in the database structure: (i) synergies among national, regional and local approaches, including emission abatement policies; (ii) air quality assessment, including modelling and measurements; (iii) health impact assessment approaches; (iv) source apportionment; and (v) uncertainty and robustness, including Quality Assurance / Quality Control (QA/QC).

In a first phase the review process will be restricted to the consortium partners and will mainly consist of defining a common and structured format (database design: keywords, tables and fields) in which strengths and weaknesses of the different methodologies will be classified and organised around the five previously identified main areas.

The present deliverable concerns the first version of the APPRAISAL database development and structure. This database will be a tool to compile in a harmonised way information that will be the basis of the structured review to be carried out under WP2.

2 Database development

The structure and format of the database was first approached in APPRAISAL's kick-off meeting in Brescia on June 28th 2012 where participants were divided into 3 working groups discussing and defining the database key topics. This work benefited from the partner's expertise and involvement in related projects such as FAIRMODE, APHEIS, AIR4EU or OPERA. This first approach was presented to the NIAM's community (in Brescia on June 29th) and first comments and contributions were provided. As a result of these meetings and posterior contributions by the project's partners via e-mail a first tentative version of the database was put in place.

A WP2 brainstorming meeting was then organized in Aveiro on 27-28th September to analyse and improve the first tentative version of the database. Besides APPRAISAL's partners, stakeholders also provided valuable input to improve the database structure. The first version of the database reached a stable form (in terms of structure, format, key words), ready to be tested by the project's partners.

3 Database structure

The design of APPRAISAL’s database structure has to reflect its main purposes: (i) bring together all major activities on air quality and health assessment; (ii) consolidate and assess existing capabilities and modelling tools used in the EU Member States; (iii) identification of relevant research activities on air pollution and its health implications; (iv) analysis of the limitations of the currently available assessment methods, as well as identification of key areas to be addressed. The database was structured taking these objectives into consideration and considering that it should provide information to the WP2 deliverables and to the Review Report. Therefore, the database structure was designed around topics that are directly related to the five WP2 subjects. The general structure of the database is shown in Figure 1.

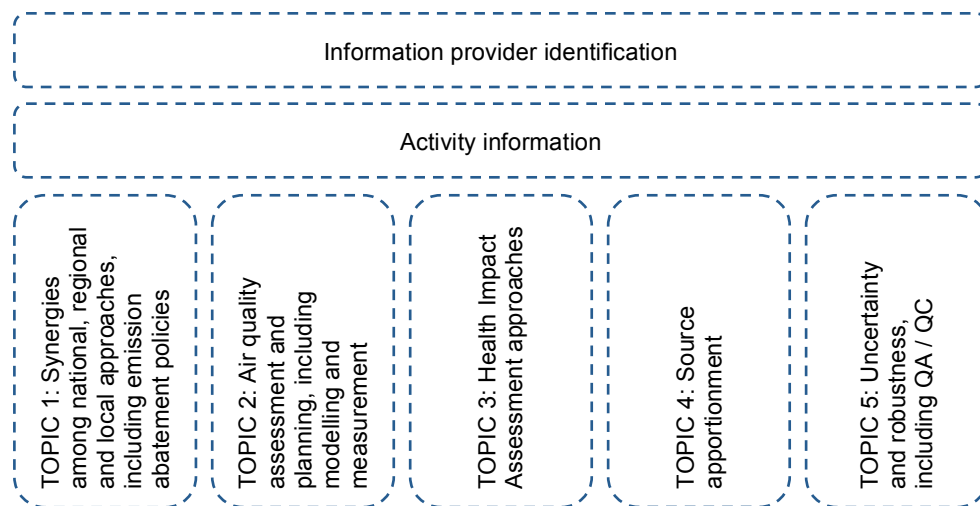


Figure 1 - General structure of the database.

Inherent to the database concept is that this both simplifies data entry and facilitates the analysis of the results afterwards because it structures the information obtained from users. As a too rigid database structure with only multiple choice answers might not capture all information required, some open questions were added to each topic allowing the user to express his/her experience. It is important to note that guidance and instructions on the different topics and questions in the database document will be given. Specific contents of each block or section of the database are discussed in the next sections of this document.

3.1 Information provider identification

This section of the database holds common information about the person/institution who is providing the information to the database. A single user will be able to insert information about one or more activities.

Institution
 Type
 Web site
 Country
 Contact person(s)
 Experience with Integrated Assessment
 Which of the following aspects in an IA study have you been involved in?
 Which of the following phases of the IA were calculated?
 Why are you (not) using IA?
 How important do you consider Integrated Assessment studies?

3.2 Activity information

In this section of the database information regarding the activity which is being submitted is recorded. This section is the one which will provide the necessary data to assess methodologies and to identify the strengths and weaknesses in current practices in the European Member States. It starts with the general description of the activity, such as its title, its main objective, the target pollutants or the study area. The user will also select, from the five available topics, the ones addressed by the activity.

Activity title, type and commitment
 Project / Air Quality Plan activity date
 Project/activity Main objective
 Project/activity abstract
 Contact person
 Study area
 Temporal horizon
 Target Pollutants
 Topics addressed
 References

the answer given to this topic will determine which subgroups the user needs to answer

The answers given in this first part of the query will determine which subgroups (from topic 1 to topic 5) the user needs to answer.

3.2.1 TOPIC 1: Synergies among national, regional and local approaches, including emission abatement policies

This topic aims at identifying/characterizing how emission abatement strategies at the national (Member State) level are considered/integrated in the definition of Regional (zone) and/or Local (agglomeration) Plans and Programmes (RLPPs) to improve the air quality, and vice-versa. This part of the database structure should facilitate:

- the identification of synergies and trade-offs between the two scales (national and regional/local) at which AQ policies are made,
- the assessment of the consistency of approaches among nation wide and

- regional/local scales,
- spotting potential improvements to be made.

In case the user has selected *Synergies among national, regional and local approaches, including emission abatement policies*, as one of the topics addressed by the activity being reported, he/she will then have to answer to questions related to the following subjects:

- Contribution to decision level
- Strategies included in the activity
- Emission sectors addressed with the measures
- Type of measures (technical or non-technical) considered

European, national, regional and local strategies with potential impacts on the national, regional and/or the local air quality are listed. In addition, open questions will be asked regarding (i) the importance of synergies among policies at different scales; (ii) the existence of conflicts or inconsistencies among scales; (iii) the methodology to combine results at different scales; and (iv) remaining issues.

3.2.2 TOPIC 2: Air quality assessment and planning, including modelling and measurement

Member states have developed air quality assessment and planning capabilities. This database topic will contribute to the review of these capabilities by compiling information on:

- modelling techniques used to assess air pollutant concentrations and the impacts of air quality improvement strategies (e.g. type of model and modeling setup);
- the needed input data (e.g. emissions, meteorology and air quality monitoring data);
- the methodologies used to downscale results to the very local scale (i.e. street level) where most occurrences of non-compliance occur.

Hence, in case the user has selected *Air quality assessment and planning, including modelling and measurement*, as one of the topics addressed in the activity being reported, information about the following subjects will have to be provided:

- Modelling purpose
- IA methodology
- Source-receptor relationships
- Number of models which were used
 - For each of these models:
 - AQ Modelling tool
 - Modelling setup
 - AQ Modelling input data
 - Combined use of model and measurements
- Measurements
- IA indicators

In addition, open questions will be asked regarding (i) main weaknesses identified in the implemented approach; and (ii) to what extent or not (and why) cost-effective measures to reduce air pollutants concentrations were obtained.

3.2.3 TOPIC 3: Health Impact Assessment approaches

Selecting the topic *Health Impact Assessment* approaches implies providing information about the applied methods and tools used to estimate the mortality and morbidity caused by different air pollutants.

- HIA approach used
- Focus of the HIA
- Health impact functions used
- Population data on which the health impact functions are based
- Air pollutants for which the health effects were considered
- In case exposure was assessed:
 - Overall population of the study area
 - Focus on particular sub-groups
 - Calculation of exposure indicators
 - Methodology to combine concentration and population data
 - Temporal resolution of the used concentration data
- Health indicators used
- Monetization of health effects and external cost methodology

Open questions will also be asked regarding (i) the use of state-of-art tools, methods and knowledge to assess the impact of air pollution on human health; (ii) future research needs; and (iii) uncertainties in Health Impact Assessment.

3.2.4 TOPIC 4: Source apportionment

This topic has been specifically added to the database structure because nowadays source apportionment methodologies are used more frequently and it is important to understand how these are applied and what their added-value to integrated assessment is.

Therefore, in case the user has selected *Source apportionment* as one of the topics addressed in the activity, questions related to the following subjects will have to answered:

- Purpose of the source apportionment study
- Methodology
- Source categories considered
- Pollutants considered
- Study area
- Types of input data used
- Sampling design

This topic's open question will cover issues such as: (i) the achievement of the source apportionment study objectives and the limitations of the used methodology; (ii) the source apportionment capacities in the institutions of the associated country/region/city; and (iii) the

appropriateness of the data collected in the associated country/region/city for source identification.

3.2.5 TOPIC 5: Uncertainty and robustness, including QA / QC

Models and their application in support of the Air Quality Directive should be reliable and trustworthy, thus model quality assurance and control is a crucial element that needs to be tailored to match the policy application. Moreover, uncertainties and quality objectives when model results and measurements are used together should also be properly addressed.

Information will have to be provided about the method used to evaluate the activity, including estimated quality indicators:

Type of evaluation methodology / uncertainty quantification applied
Assessment of model uncertainty in its different components
Use of already available software for the evaluation performed
Performance/quality indicators used

When filling in this topic of the database partners should take into account the several activities dealing with this issue and aiming to settle a modeling evaluation framework, e.g. COST732 (for local scale models), COST728 (for mesoscale models), AQMEII (continental scale), or FAIRMODE (specifically oriented towards the AQD).

This topic will finish with some open questions about (i) the application of the used methodology to evaluate the quality of a model for air quality planning and/or air quality assessment; (ii) the main deficiencies in the model/study; and (iii) the methodology to combine the different uncertainties of Integrated Assessment Modelling.

4 Future work

A pilot experiment was set up to test the current version of the database structure (see Annex A for the currently available complete version). Six partners and 3 APPRAISAL's stakeholders are filling in the proposed database to identify improvements that still have to be done. Guidance needs should also be identified to be included in the final WiKi version.

After this pilot experiment, and until the end of October, a final version will be disseminated among APPRAISAL partners and stakeholders. This final version will then be populated by project partners and stakeholders between November 2012 and February 2013.

A collaborative multiple users tool will be implemented to sustain this final database: the Wiki-APPRAISAL website. This will allow the various partners and stakeholders to create and edit structured interlinked web pages via a web browser. Different levels of access will be defined: final acceptance rights (SG) and, editing rights (SG, partners and in the final open phase of the project registered editors). In this way an interactive database will be implemented and constantly updated.

In a later stage an open call to fill in this structured database will be launched at the beginning of March 2013 allowing other Member States to extend the compiled information on used methodologies and systems.

Annex A

The complete version of the database structure

IDENTIFICATION

1. Institution:

2. Type: (select one)

- Administration
- Research/Higher Education
 - Applied research
 - Fundamental/basic/pure research
- Private company
 - SME
 - Large
- Government Agency/Institution
- NGO
- Other (please specify)

3. Web site:

4. Country:

5. Contact person(s):

- (name)
- (e-mail)
- (address)
- (telephone)
- (fax)

6. Experience with Integrated Assessment

- I have ordered an IA study
- I have used information from an IA study
- I contributed to IA studies with data
- I contributed to IA studies with guidance
- I review IA studies
- I do IA studies
- None

7. Which of the following aspects in an IA study have you been involved in?

- Concept: decision on what should (not) be considered in the IA study
- Data collection
- Air quality
- Decision modelling
- Economic analysis (internal, external)
- Impact (health/environment/other)
- Others (please, specify below)

8. Which of the following phases of the IA were calculated?

- Sources to concentration
- Sources to health
- Concentration-to-exposure
- Concentration to health
- Exposure-to-health

- Health-to-money

9. Why are you not using IA?

- Not-applicable
- Don't believe that we need this (explain why)
- Lack of in house experience
- Lack of finances and/or time
- Lack of required input data
- Lack of incentive (legal, politic)
- Not-applicable

10. How important do you consider Integrated Assessment studies? Scale 1 -5 (not – essential)

ACTIVITY

1. Activity title:**2. Activity type**

- Air quality planning
- Research project/activity
- Other (please specify)

3. Activity commitment (select one):

- Institutional Member State activity
- R&D EU Project
- R&D National Project
- Regional/local project
- Other (please, specify)

4. Project / AQP activity date (year)

- Beginning
- Ending

5. Main objective (select one):

- Air quality planning
- AQ assessment
- Health assessment
- Other (please specify)

6. Project/activity abstract (max 100 words):**7. Contact person:**

- (name)
- (e-mail)
- (address)

8. Study area: (if an AQP, please provide the EC code of your study area) on-line list of codes

- Country
- Region
- Zone within a country or a region
- Agglomeration

- Municipality
 - Zone within a city
 - Other (please, specify)
- 9. Temporal horizon:**
- Reference year
 - Target year(s)
 - Specific episodes
- 10. Target Pollutants:**
- Nitrogen dioxide
 - Ozone
 - Sulphur dioxide
 - Benzene
 - PM10
 - PM2.5
 - Lead
 - Arsenic
 - Cadmium
 - Nickel
 - Polycyclic Aromatic Hydrocarbons
 - Other (please specify)
- 11. Topics addressed:** (go to the appropriate page, one or more possible)
- [Synergies among national, regional and local approaches, including emission abatement strategies](#)
- [Air quality assessment and planning, including modelling and measurement](#)
- [Health impact assessment approaches](#)
- [Source apportionment](#)
- [Uncertainty and robustness, including QA/QC](#)
- 12. References:**

1. Synergies among national, regional and local approaches, including emission abatement policies

1. Contribution to decision level:

Not applicable

National

Regional (e.g. province)

Local (e.g. city)

Other (please, specify below)

2. What strategies are included in your activity (please, specify if possible)

▪ EU (select one)

- Road exhaust emissions of new vehicles sold in EU member states (emission standards as defined in a series of directives staging the progressive introduction of increasingly stringent standards)

- . MARPOL pollutants emissions from ships
 - . energy efficiency directive
 - . industrial emissions directive
 - . ecodesign directive
 - . climate change programmes
 - . received from another entity
 - . Promotion of low emission vehicles
 - . Other (please, specify below)
 - National (select one)
 - . National Emission Ceilings
 - . National Climate Change Programs
 - . National energy projections
 - . Received from another entity
 - . Promotion of low emission vehicles
 - . Other (please, specify below)
 - Regional (select one)
 - . Air Quality Plans (former Plans and Programmes)
 - . Received from another entity
 - . Other (please, specify below)
 - Local (select one)
 - . Low emission zone
 - . Promotion of low emission vehicles
 - . Restrictions for traffic or domestic combustion in most polluted days
 - . Promotion of public transport / cycling
 - . Domestic combustion information campaigns
 - . Street cleaning and dust suppression measures
 - . Received from another entity
 - . Other (please, specify below)
- 3. What emission sector are you addressing with your measures? (SNAP activities)**
- . SNAP 1 - combustion in energy and transformation industries
 - . SNAP 2 - non-industrial combustion plants
 - . SNAP 3 - combustion in manufacturing industry
 - . SNAP 4 - production processes
 - . SNAP 5 - extraction and distribution of fossil fuels and geothermal energy
 - . SNAP 6 - solvent and other product use
 - . SNAP 7 - road transport
 - . SNAP 8 - other mobile sources and machinery
 - . SNAP 9 - waste treatment and disposal
 - . SNAP 10 - agriculture
 - . SNAP 11 - other sources and sinks
- 4. What type of measures did you consider? (provide some examples) (for each SNAP, included in the previous question)**
- . Technical

. Non-technical

OPEN QUESTIONS

- . Were synergies among policies at different scales important in your assessment?
- . Did you identify conflicts or inconsistencies among scales? If yes can you list them in order of priority (from more to less crucial aspects)?
- . How did you combine the results at different scales?
- . What do you see as remaining issues?

2. Air quality assessment and planning, including modelling and measurement

1. Modelling purpose:

[§ Air quality assessment \(go to 4\)](#)

§ Mitigation and planning

2. IA methodology (select one):

- Scenario analysis
- Cost assessment
- Cost-benefit
- Cost-effectiveness
- Multi-objective approach
- Other (please specify)

3. Source-receptor relationships (select one):

- Not applicable
- Functions
- Matrixes
- Models
- Other (please specify)

4. How many models? (points 5, 6, 7 and 8 will be repeated for each model)

5. AQ Modelling tool:

- model name
- included in a model documentation system (e.g. EEA Model Documentation System (MDS) (http://acm.eionet.europa.eu/databases/MDS/index_html)?)
- model classification
 - . Eulerian chemical transport model
 - . Lagrangian chemical model
 - . Lagrangian particle model
 - . Obstacle resolving fluid dynamical model
 - . Gaussian plume
 - . Gaussian puff
 - . Hybrid methods
 - . Street canyon models

- . Semi-empirical models
- . Other
- main features included
 - . Transport
 - . Chemistry
 - . Turbulence
 - . Deposition
 - . Specific parametrisations (e.g. urban/street increments)
- range of scales
 - . regional (10 to 50 km)
 - . urban (1 to 5 km)
 - . local (up to 1 km)
 - . street level (e.g. street canyon)

6. Modelling setup

- spatial resolution
 - km x km x ----- km (if the vertical spacing is not uniform specify the grid spacing for the 1st vertical layer)
 - . Not applicable
- temporal resolution (select one)
 - . Hourly
 - . Daily
 - . Yearly
- Are you using special methodologies to downscale results to very local scale (i.e. street level) ?

7. AQ Modelling input data:

A. Emissions

- emission inventory
 - . EU (EMEP)
 - . National emission official report
 - . Regional (or local) official inventory
 - . Project specific
 - . Other (please specify)
- emission inventory approach
 - . Top-down
 - . Bottom-up
 - . Combined
- emission disaggregation categories (based on EMEP/EEA categories, to be listed online)
 - . Main groups (e.g combustion in energy and transformation industry)
 - . Sub-groups (e.g. public power)
 - . Sub-activity (e.g. combustion plants >= 300 MW (boilers))
 - . Fuels
 - . Other (please specify)

B. Meteorology

- **Type of meteorological driver**
 - meteorological model
 - . Diagnostic (name)
 - . Prognostic (name)
 - . Other (please specify)
 - meteorological measurements (data source)
- **Time resolution**
- **Spatial resolution**
- C. Initial and boundary conditions**
 - from a larger scale model (specify)
 - from measured data (specify)
- 8. Combined use of model and measurements?**
 - Yes
 - . For model calibration (please specify)
 - . For model validation/evaluation (relation to topic 5. Uncertainty and robustness including QA/QC)
 - . For boundary conditions
 - . For post-processing
 - . For data assimilation
 - No
- 9. Measurements**
 - Methods
 - . Continuous data from air quality monitoring stations
 - . Data from field campaigns
 - . Indicative (examples)
 - . Other (please specify)
- 10. IA indicators:**
 - Compliance achievement (online list to be provided with the AQD thresholds)
 - . Annual mean PM10
 - . Nr. of daily exceedances to PM10 LV
 - . Annual mean NO2
 - . Nr. of hourly exceedances to NO2 LV
 - . AOT40
 - . Nr. of hourly exceedances to SO2 LV
 - . Nr. of daily exceedances to SO2 LV
 - . Annual mean benzene
 - . Other (please specify)
 - GHGs indexes (please specify)
 - Population exposure to...
 - Ecosystems exposure to...
 - Internal costs
 - External costs
 - Other (please specify)

OPEN QUESTIONS

- . *What have you identified as main weakness in your current approach (e.g. lack of data for validation, parametrisation of certain processes, emission factors)?*
- . *Were you able to identify cost-effective measures to reduce air pollutants concentrations? If not, why?*

3. Health impact assessment approaches

1. What HIA approach did you use?

- Retrospective
- Predictive
 - . Towards reference values
 - . Iterative decrease of exposure (e.g. by $5\mu\text{g}/\text{m}^3$)
- Counterfactual
- Others (please specify)

2. Your HIA was focused on:

- Long-term effects
- Short-term effects
- Both

3. What health impact functions did you use (please give a reference):

- reference values associated to the relative risks
 - . With threshold
 - . Without threshold
- odds ratio
 - . With threshold
 - . Without threshold
- dose response functions
 - . With threshold
 - . Without threshold

4. Your health impact functions are based on what type of population data?

- A cohort
- A panel study
- A questionnaire/survey

5. What air pollutants did you consider to estimate health effects?

- . ozone
- . PM10
- . PM2.5
- . PM1
- . SO2
- . NOx
- . Black carbon (anthropogenic carbon)
- . Multi-exposure

6. In case you assessed exposure (concentration with population):

- What is the overall population of the study area?
- Did you focus on a particular sub-group? If yes, based on:
 - . Age
 - . Sex
 - . Socio-economic status
 - . Professional activity
 - . Other (please specify)
- The exposure indicators were calculated based on:
 - . Intake fraction (based on emissions)
 - . Air quality (interpolated) monitored data. If yes indicate the type of monitoring station:
 - . Traffic
 - . Industrial
 - . Urban background
 - . Suburban background
 - . Rural background
 - . Air quality modeled data (see topic Air Quality Assessment and Planning)
 - . Individual exposure data (human biomonitoring)
- How were concentration and population combined?
 - . same resolution in which air pollution concentrations were predicted
 - . less detailed resolution size (e.g. city, province, country level)
 - . more detailed exposure analysis sub-model (please specify the level)
- What was the temporal resolution of the used concentration data?
 - . hourly
 - . daily
 - . weekly
 - . monthly
 - . seasonal
 - . annual
 - . multi-year

7. What health indicators were used (several options could be selected):

- Premature mortality, additional mortality, death postponed, etc. (number of different terms are used in literature)
- Morbidity (e.g. pneumonia cases, cardiovascular diseases, respiratory diseases, ...)
- Health perception (and well-being)
- Life expectancy (year/month)
- Years of life lost (YOLL)
- Disability-adjusted life-years (DALY)
- Quality-adjusted life-years (QALY)
- Years in health life (WHO 2012)
- Other (please, specify)

8. Were health effects monetized? If yes, what was the external costs methodology?

- ExternE
- CAFÉ

- National data
- Other

OPEN QUESTIONS

. Are you using the state-of-art tools, methods and knowledge to assess the impact of air pollution

on human health?

. What do you see as future research needs?

. What are the largest uncertainties in HIA?

4. Source apportionment

1. Purpose of the source apportionment study (select one)

- Identify causes of exceedances
- Detract natural sources or road salting and sanding from PM (Dir. 2008/50/EC art. 21)
- Apply for postponement of attainment (Dir. 2008/50/EC art. 22)
- Design air quality plans/ action plans (Dir. 2008/50/EC arts. 23 and 24)
- Identify the contribution from other countries (transboundary pollution - Dir. 2008/50/EC art. 25)
- Identify the contribution from different geographic areas within a country
- Assess remediation measures effectiveness
- Refine emission inventories
- Others

2. Methodology

- receptor modelling (specify the name and select the method)
 - . enrichment factor
 - . tracer method
 - . PCA
 - . CMB
 - . PMF
 - . hybrid models
 - . incremental approach (Lenschow)
 - . Other (please specify)
- dispersion modelling (specify the name and select the method)
 - . eulerian chemical transport model
 - . lagrangian model
 - . gaussian model
 - . Other (please specify)
- inverse modelling
- objective estimation techniques (e.g. statistical models, spatial interpolation of measured data, statistical relationship between emission density/traffic data/meteorology fields and air pollution levels etc.)
- combination of the above methods (Y/N)

- other (please, specify)
- 3. Source categories**
 - Industry including heat and power production (combustion)
 - Industry including heat and power production (other than combustion)
 - traffic exhaust
 - sea salt / road salt
 - biomass / wood burning
 - crustal, mineral dust
 - commercial and residential
 - off road mobile machinery
 - agriculture
 - shipping
 - transboundary
 - natural
 - other (please specify)
- 4. Pollutant**
 - NO₂
 - O₃
 - PM10
 - PM2.5
 - Aerosol physical properties
 - Volatile organic compounds (VOCs)
 - Polycyclic Aromatic Hydrocarbons (PAHs)
 - Persistent Organic Pollutants (POPs)
 - Secondary organics
 - other (please specify)
- 5. Study Area**
 - Local
 - . urban roadside
 - . urban background
 - . regional background
 - . industrial
 - City
 - Region
 - Country
 - other (please specify)
- 6. Types of input data used (depending on type of SA methodology)**
 - Emission inventory
 - Field campaign results
 - Routine ambient air quality measurements (e.g. from monitoring network)
 - source profiles
 - meteorological fields
 - backward trajectories

- other (please specify)
- 7. Sampling design (only for receptor modelling methodology for SA)**
- sampling site number and type
 - number of samples
 - sampling period(s) (to include seasonal variation within a year)
 - sampling analysis (equipment used)
 - sample chemical (or physical) analyses (used technique)

OPEN QUESTIONS

. Explain to what extent it was possible to achieve the objectives of your source apportionment study and what were the limitations of the used methodology?

. Are the source apportionment capacities in institutions of your country/region/city enough to achieve reliable source identification and support air quality management?

. Is data collection in your country/region/city appropriate for source identification?

5.Uncertainty and robustness, including QA / QC

1. Did you explicitly address uncertainty in the current project or is the uncertainty evaluation based on previous work?

- This project
- Previous (please provide a reference)

2. Did you evaluate the uncertainty of:

- Air quality modelling
- Source apportionment
- Health impact assessment
- IA system

3 What type of evaluation methodology / uncertainty quantification was applied

(information about evaluation methodology can be found on

http://ensemble2.jrc.ec.europa.eu/wp-aqmeii/aqmeii_docs/Phase1/doc/dennis_et_al_2010.pdf ; latter guidance will be included)

- Diagnostic
- Operational
- Dynamic
- Probabilistic
- Expert judgment
- other (please, specify)

4 Was model uncertainty assessed in its different components? If yes, what did you study specifically?

- first component
- second component
- third component

- fourth component

5. Did you use already available software for your model evaluation?

- No
- Yes (please, specify)

6. What were the performance/quality indicators (please specify): (expected inputs from FAIRMODE)

OPEN QUESTIONS

- . *How do you judge that your model is good enough for planning?*
- . *How do you judge that your model is good enough for assessment?*
- . *What are the main deficiencies in your model/study?*
- . *How do you combine the different uncertainties of IAM?*