



Appraisal project

Air Pollution Policies
for Assessment
of Integrated Strategies
At regional and Local scales
www.appraisal-fp7.eu



The IAM Decision Framework

As resulting from APPRAISAL
Project

Giorgio Guariso

DEIB – Politecnico di Milano

Brussels, 19 November 2013



KNOWLEDGE SHARING AND DEVELOPMENTS EEA Integrated Assessment Portal

LEARN SEARCH PROJECTS SHARE

EW > Home > Knowledge Base > Frameworks > The DPSIR framework used by the EEA

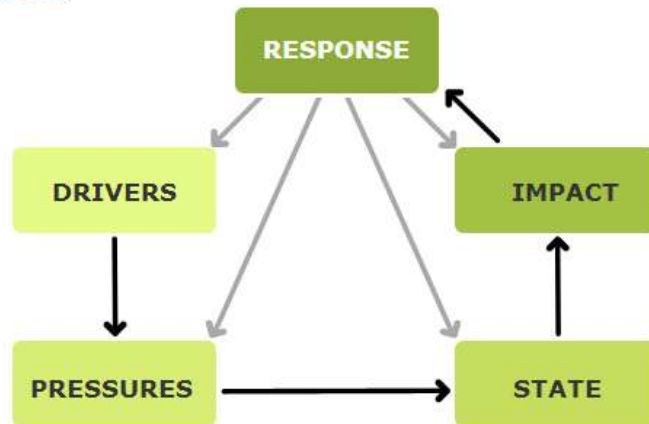
The DPSIR framework used by the EEA

Within the DPSIR framework used by the EEA, it is useful to focus on the links.

Release date 27/07/2007

Contributor Gabriel Agu

[more information](#)



To structure thinking about the interplay between the environment and socio-economic activities the European Environment Agency (EEA) uses the "DPSIR" framework, a slightly extended version of the well-known "PSR" (pressure –state –response) model used by e.g. the OECD.

DPSIR stands for: Driving forces - Pressures - State - Impact - Responses. This approach can encourage and support decision-making, by pointing to clear steps in the causal chain where the chain can be broken by policy action.

The DPSIR represents a systems analysis view:- social and economic developments exert pressure on the environment and, as a consequence, the state of the environment changes. This leads to impacts on e.g. human health, ecosystems and materials that may elicit a societal response that feeds back on the driving forces, on the pressures or on the state or impacts directly, through adaptation or curative action.

European Environment Agency, Kongens Nytorv 6, 1050 Copenhagen K, Denmark - Phone: +45 3336 7100
© Copyright 1993-2006

[Contact us](#) [Accessibility statement](#) [Disclaimer](#)

To structure thinking about the interplay between the environment and socio-economic activities the European Environment Agency (EEA) uses the "DPSIR" **FRAMEWORK**, a slightly extended version of the well-known "PSR" (pressure –state –response) model used by e.g. the OECD.



KNOWLEDGE SHARING AND DEVELOPMENTS EEA Integrated Assessment Portal

LEARN SEARCH PROJECTS SHARE

EW > Home > Knowledge Base > Frameworks > The DPSIR framework used by the EEA

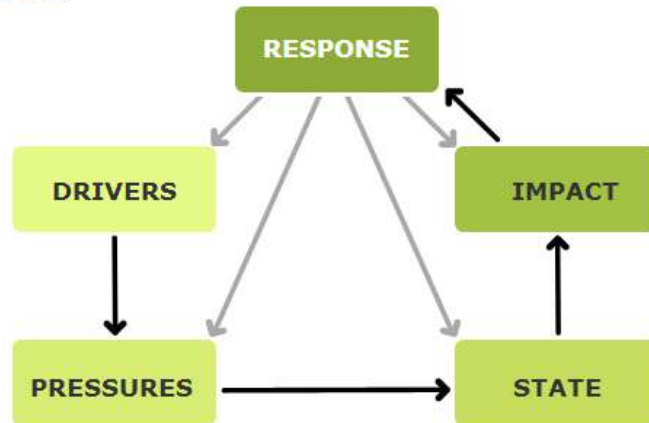
The DPSIR framework used by the EEA

Within the DPSIR framework used by the EEA, it is useful to focus on the links.

Release date 27/07/2007

Contributor Gabriel Agu

[more information](#)



To structure thinking about the interplay between the environment and socio-economic activities the European Environment Agency (EEA) uses the "DPSIR" framework, a slightly extended version of the well-known "PSR" (pressure –state –response) model used by e.g. the OECD.

DPSIR stands for: Driving forces - Pressures - State - Impact - Responses. This approach can encourage and support decision-making, by pointing to clear steps in the causal chain where the chain can be broken by policy action.

The DPSIR represents a systems analysis view:- social and economic developments exert pressure on the environment and, as a consequence, the state of the environment changes. This leads to impacts on e.g. human health, ecosystems and materials that may elicit a societal response that feeds back on the driving forces, on the pressures or on the state or impacts directly, through adaptation or curative action.

European Environment Agency, Kongens Nytorv 6, 1050 Copenhagen K, Denmark - Phone: +45 3336 7100
© Copyright 1993-2006

[Contact us](#) [Accessibility statement](#) [Disclaimer](#)

The DPSIR represents a systems analysis view:- social and economic developments (**DRIVERS**) exert **PRESSURE** on the environment and, as a consequence, the **STATE** of the environment changes. This leads to **IMPACTS** on e.g. human health, ecosystems and materials that may elicit a societal **RESPONSE** that feeds back on the driving forces, on the pressures or on the state or impacts directly, through adaptation or curative action.



From DPSIR to AQ IAMs



DRIVERS
Changes in population, economy, traffic, urbanization, climate,...



PRESSURES
Pollutant and precursor emissions (point, linear, areal sources)



STATE
Air Quality (concentration, peaks, integral → indicator(s))



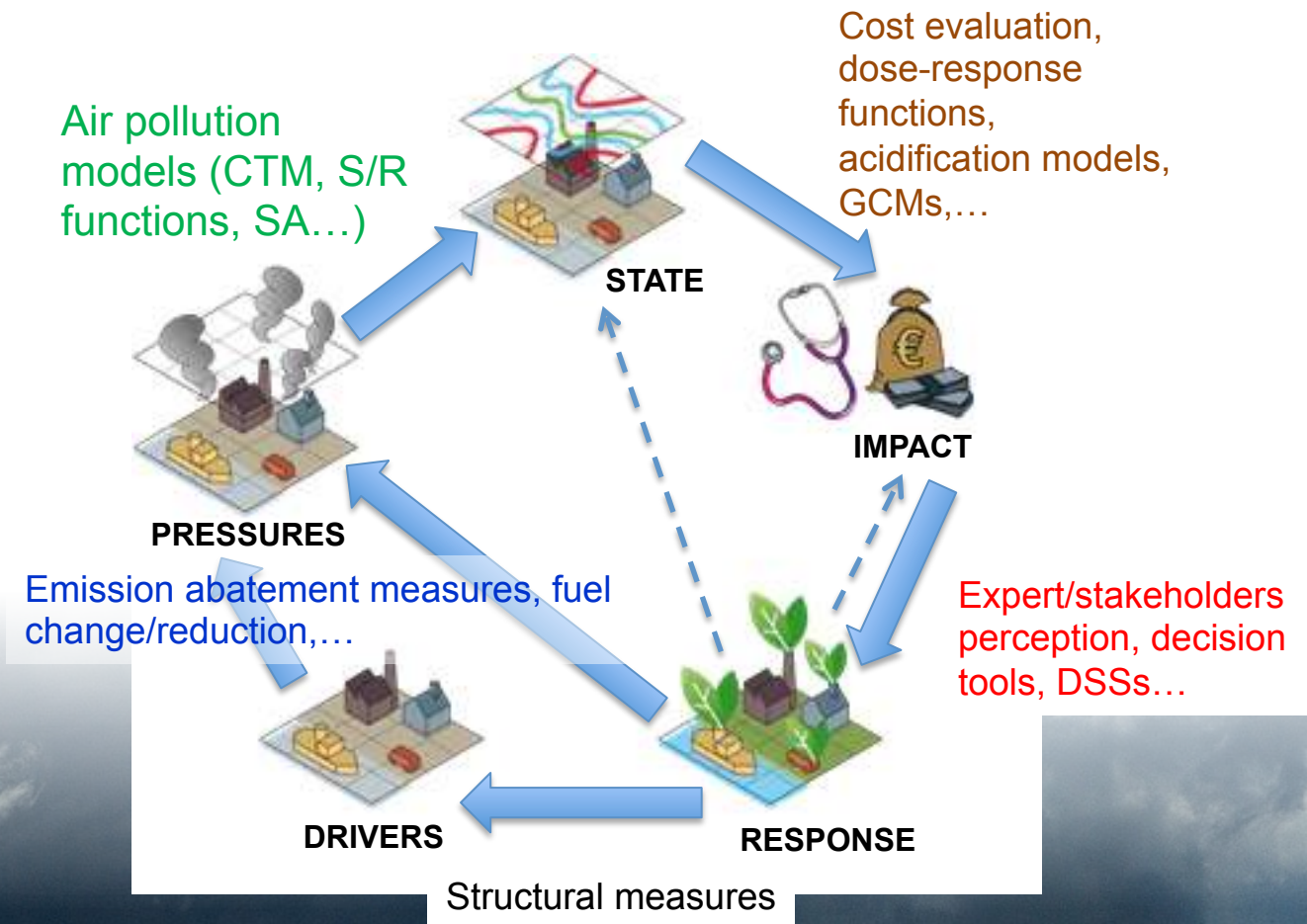
IMPACT
Human and ecosystem health, implementation and external costs, effects on climate → indicator(s)



RESPONSE
Decisions about pollution abatement, energy efficiency, land use,...

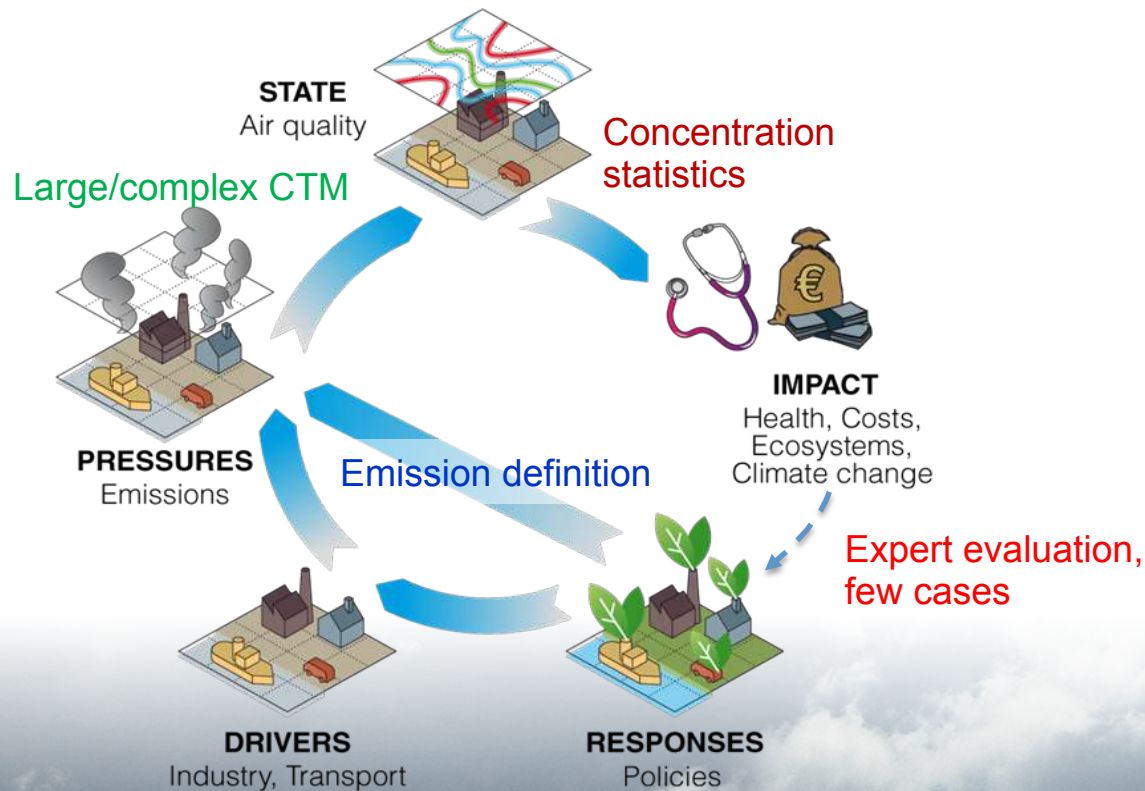


From DPSIR to AQ IAMs: connections



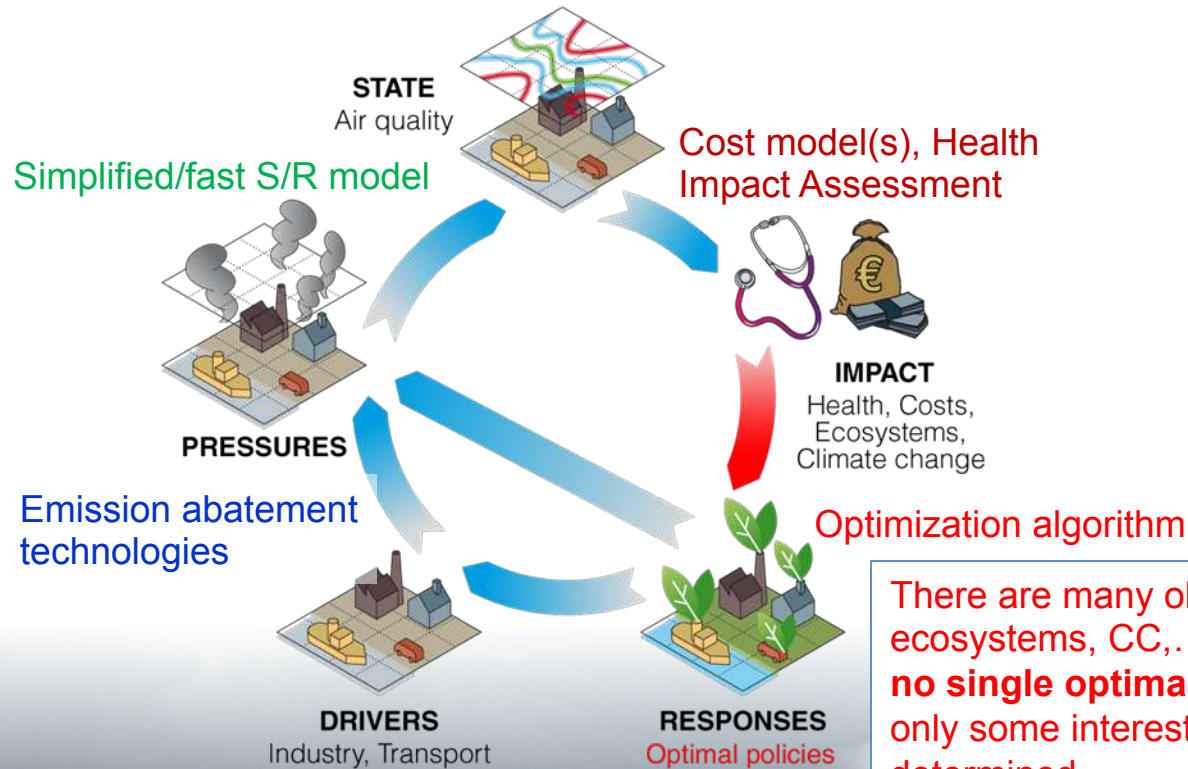


From DPSIR to AQ IAMs: scenario analysis





From DPSIR to AQ IAMs: efficient policies



There are many objectives (health, ecosystems, CC,...) ⇒
no single optimal solution exists, only some interesting ones can be determined



IAM blocks

Whatever approach is taken, each block can be considered with different levels of detail

**Example 1:
PRESSURES
(emissions)**

LEVEL 1 : Emissions are estimated for **rough sectors on a coarse grid**, using per default the top-down methodology.

LEVEL 2 : A combination of **bottom-up and top-down methodology** is used to calculate the emissions with the SNAP – NAPFUE classifications at level 2 or 3. Emissions factors and activity data representative of the area of study are used.

LEVEL 3: Emissions are calculated with the **finest space and time resolution available** (bottom-up) method with the SNAP-NAPFUE classifications finest levels. Emission factors and activity data have to correspond to the specific activities of the studied area.



IAM blocks

Whatever approach is taken, each block can be considered with different levels of detail

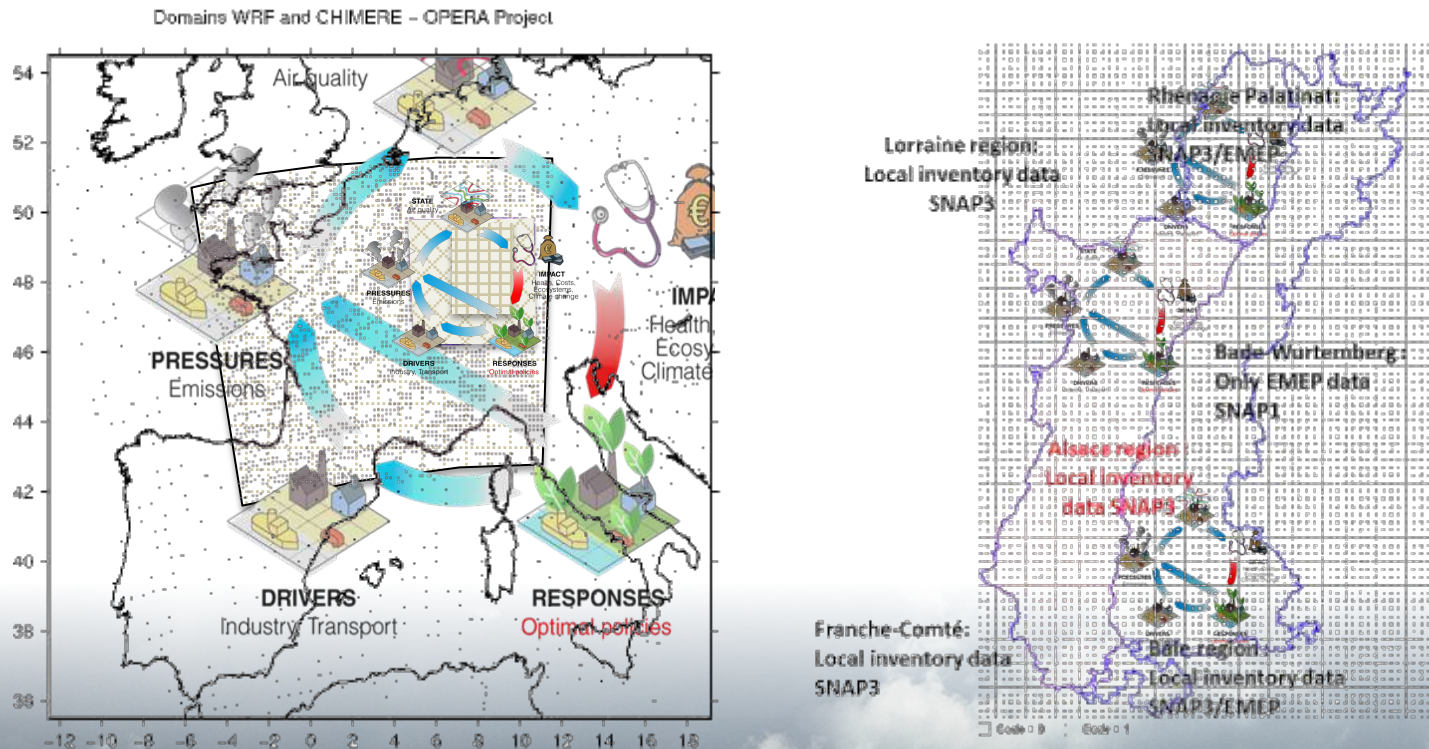
**Example 2:
STATE
(air quality)**

LEVEL 1: AQ state is only characterized by measurements or by **very simple models** (e.g. local concentrations are assumed to be proportional to local emissions)

LEVEL 2: AQ state is computed by a model (e.g. gaussian), adapted to the studied spatial scale, and validated over the area of interest. and should use emissions input data also adapted to this scale. Observed concentrations can be used to improve model results (data assimilation). Boundary concentrations and local meteorology are explicitly considered.

LEVEL 3: A full CTM model is used nested into a model chain that starts from a large scale (Europe for example) to regional (country or regions) and local scale (city or street level). As for level 2, it must be adapted to the studied spatial scale, and validated over the area of interest.

Additional dimension: synergies among scales



Decision taken at higher levels constrain those at lower levels, but regional/local decisions may modify the impact of national/EU decisions.



Additional dimension: uncertainty

IAMs cannot be fully tested (no correct solution exists), so only separate blocks/connections can be analyzed.

- *Which is the sensitivity of the solutions to a decision problem to different assumptions on **emission** and **abatement** measures?*
- *How do different sets of **indexes** (for human, ecosystems and materials exposure) impact on policy design?*
- *Which are the most suitable **approaches** for different scales?*
- *How can the **uncertainty** (or robustness) of the proposed solutions be evaluated and be transferred to decision-makers to effectively support their decisions?*



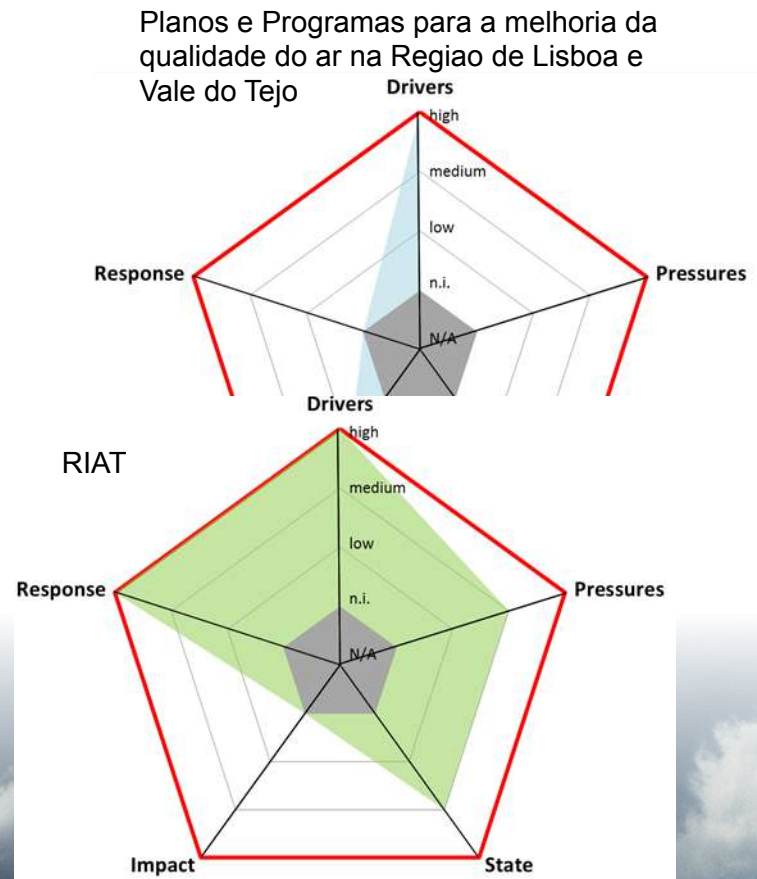
Actual plans and research studies: A classification proposal

All classifications overlook some detail

We can classify all the plans and studies in the DB according to the (perceived) level of detail used to study each block.

A radar graph may help understanding how deeply the plan/study analyzed each block. *More detail does not necessarily mean "better" results.*

The different colors may reflect the detail with which results are provided and the possibility to explore them under different viewpoints (DSSs ≠ paper plans)





Where to find detailed material

www.appraisal-fp7.eu

Appraisal project

- Home
- ▶ Project
- ▼ **Documentation**
 - Deliverables
 - Dissemination
- ▶ Meetings
- Publications
- Related Links
- Contacts
- Private Area

- Calendar
- Upcoming Events
- News
- Become Stakeholder
- Search

 Questionnaire

CA 308395



EU Funding

D3.1 – First version of IAS design

D2.2 – Synergies among regional and local authorities, including emission reduction technologies

D2.3 – Quality assessment and measurement, including modelling and measurement

COMMENTS WELCOME