

Challenges and Opportunities for Integrated Environmental Assessment

Proceedings of the First Workshop of the European Forum on
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Hasse Goosen, Richard S.J. Tol and Pier Vellinga

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IVM

Institute for Environmental Studies
Vrije Universiteit
De Boelelaan 1115
1081 HV Amsterdam
The Netherlands

Tel. ++31-20-4449 555

Fax. ++31-20-4449 553

E-mail: secr@ivm.vu.nl

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Preface

The first workshop of the European Forum on Integrated Environmental Assessment (EFIEA) took place in Amsterdam on 12-14 March 1998. Integrated Environmental Assessment is loosely defined as policy-relevant, multi-disciplinary research into complex environmental issues. The EFIEA aims to improve the scientific quality of IEA (in its Methodology Programme) and to improve the interactions with and usefulness for policy makers (in its Policy Programme). This first workshop formed the start of both programmes. This workshop also formed the official start of the EFIEA, although the idea was launched at an EU-sponsored workshop in Toulouse, October 1996. The workshop provided an opportunity for EFIEA members to get acquainted with one another and one another's work, and to discuss the goals and challenges in the field of Integrated Environmental Assessment for the next five years.

The meeting was hosted by the Institute for Environmental Studies (IVM) of the Vrije Universiteit in Amsterdam. IVM is the co-ordinator of the concerted action through which the EFIEA is financed by the Environment and Climate Programme of the European Commission, Directorate-General XII. IVM is the chair and secretariat of the EFIEA. Over 45 members of the EFIEA participated in the workshop and all contributed to the discussions and planning activities. Participants included researchers from the natural and social sciences as well as policy makers, DG's and EEA representatives. These various contributions provided the basis of the workshop report. The keynote speeches of the workshop will be published in a special issue of the journal *Environmental Modelling and Assessment* (EMA). They are briefly summarised here. This report cannot present a comprehensive and detailed overview of all contributions and discussions. This would hardly be feasible given the overwhelming input provided. The reports of the various discussions, are to be considered as an overview of the discussions aimed at reflecting the general findings and major conclusions. The organisers wish to thank all participants for their generous input that has contributed to what we believe was a constructive and open minded debate.

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1. Challenges and Opportunities for Integrated Assessment Methodology

Thursday 12 March 1998

1.2 Keynote 1. The European Forum on Integrated Assessment

Pier Vellinga, IVM

This first workshop is aimed at setting a course for the future activities of the EFIEA. Through the establishment of a platform for peer-review and quality control, the EFIEA aims:

1. to improve the scientific quality of integrated environmental assessment (IEA);
2. to strengthen the interaction between environmental science and policy-making.

The methodology programme will deal with a variety of topics such as uncertainty, model analysis and comparison, scales, structural change and combining qualitative and quantitative analysis. The policy programme will first address climate change policy in the European context. Other future topics could be water and transport.

The challenges and opportunities for this first EFIEA workshop are to achieve a list of both relevant methodological and policy topics to be addressed in the future.

1.3 A welcome to the EFIEA

Andrew Sors - EU DG XII

The EFIEA is launched in a time of growing need for Integrated Environmental Assessment. Classical policy has shown its shortcomings and it is increasingly realised that integration should be a key element in policy. DG XII, which has funded the Concerted Action, has high expectations and beliefs in the achievements of the EFIEA. An increased gap between rhetoric and practise of sustainable development and the recognition that science is still failing to support policy making has led to the feeling that the main challenges for the EFIEA are to identify key issues which have major sustainable development implications.

Although the opportunities for IEA promise a bright future for EFIEA, managing the EFIEA successfully will be far from easy. The broad scope of the EFIEA asks for an unavoidably large and diverse group of people which will need to be motivated. Visibility mainly through publishing information will be a key element in achieving the goals. Finally, EFIEA needs to balance methodological issues and policy relevance.

2. Challenges and opportunities for IEA methodology

2.1 Keynote 2: Challenges and Opportunities for IEA: a survey

Ferenc Toth, PIK

Ferenc Toth placed IEA in its historical context. Environmental problems have grown more complex over the years, and evolved from isolated threats to comprehensive issues. At the same time, increasing analytical skills, computing power and data availability allowed for research into complex environmental problems spanning many scientific disciplines. Integrated assessment is not applicable to all stages of the identification and solution of environmental risks. IA is particularly useful in assessing responses, and formulating goals and strategies, but less so for monitoring, risk assessment, implementation and evaluation.

2.2 Panel discussion

Chris Hope: Uncertainty is an essential element of IEA. An example from estimating optimal levels of carbon dioxide emissions shows how important the communication of uncertainty is and how this can be dealt with: uncertainty should be explained and not denied.

Peter Bailey: Public participation can help to improve the quality of assumptions. Experts from different sectors are often excluded while they can provide useful information for integrated assessments.

Rik Leemans: Integrated assessment is a series of skills needed to solve a problem. Often there is more than one problem. It is important to put the problem at the centre and to leave out irrelevant things. An important aspect of uncertainty in IA models (IAMs) is how to communicate this uncertainty to the policy community. There is a growing need for information for IAMs, especially using GIS/Remote Sensing data

2.3 General Discussion

Integrated Assessment under its present name, was first established in the field of climate change, although the first attempts for integrated assessment approaches are reported from the field of acid rain and water management . Before the term Integrated Environmental Assessment was coined, similar methods were then referred to as 'environmental management'.

Although the majority of EFIEA members are somehow related to climate change, the scope of the EFIEA should include other environmental issues as well. An important question raised is to what extent the IEA methodologies are transferable from one issue to another. Problems addressed by IA are often large scale and of a generic nature. Specially for these generic and larger scale problems, IA methods seem particularly applicable. In detailed problems, disciplinary knowledge becomes predominant. Therefore a prominent criterion for selecting topics could be its scale and scope. Scale and scope could be included in the definitions of integrated assessment.

Water could be an interesting topic to be addressed by EFIEA, although the EFIEA would need to expand and include prominent institutes in the field of water. The involvement of EurAqua, the European network of water institutes, needs to be considered.

3. Towards a Research Agenda for IEA Methodologies

3.1 Keynote 3. Challenges and Opportunities for IEA methodology

Jan Rotmans, ICIS

Jan Rotmans surveyed current status and future prospects of IEA as a scientific methodology. Rotmans finds a trends towards even more complicated models, an emergence of complex models, and a stronger position of participatory approaches. Main challenges include aggregation versus disaggregation, treatment of uncertainty, and blending of qualitative and quantitative knowledge. Models would need to gain scientific and political credibility, and balance between disciplinary components. Concrete recommendations for the EFIEA are:

1. to establish a quality control task force
2. to compare demand-driven and supply-driven IAs
3. to include regional case studies on IA
4. to improve transparency of IA
5. to increase complexity of IA
6. to expand the scope of IA to other issues

3.2 Panel discussion

Klaus Hasselmann: There are different ways to approach Integrated Assessment. The community needs to develop a wide spectrum of approaches. It is important to strive for comparability and compatibility of models. Finally, the interaction between modellers and social sciences should be given more attention.

David Maddison: IEA encounters a number of problems. There is a large number of models available and the reason for this is, that there is no generic model: every problem needs a new model to solve it. This makes the field of IA intransparent. Validation and classification can help enhance clarity and reduce the number of credible models. Furthermore, integrated modelling suffers from a bad reputation having caused disbelief within the policy community. Communicating uncertainty and incorporating it, is an important point of attention.

Joe Alcamo: The practice of IEA is only in its beginning stages, and we do not yet have enough experience or evidence to say definitively that one method or model is better than another. Therefore, experimentation with different methods should be encouraged at this phase in IEA's development. This also means that the sharp critics of one IEA method or another should save their arrows for the trees in their own backyard.

Clair Gough: IEA is a process in which integration should go beyond disciplines and knowledge should go beyond the disciplinary knowledge by including lay knowledge. A major challenge for the EFIEA is to establish the infrastructure for using the models and the knowledge.

Mac Callaway: In the process of IEA, it is important to involve policy makers and stakeholders from the start. Especially information about how to make trade-offs and about how to regard uncertainty and risk can be extremely relevant to the process.

Tom Downing: IEA is 'decision' research. Policy makers, apart from the results, have interests in the methodological part of the IEA process. Policy makers want to be involved in the process and help picking the tools. IEA should be oriented towards the policy/stakeholder community and include them in the method-formulating process.

Richard Tol: Quality control of IEA is hampered by the lack of understanding of the methods and models. The role of participatory approaches in IEA is limited. Independent, academic research on IEA is needed to ensure quality and policy-relevance.

3.3 General discussion

The role of stakeholder participation is debated. If the goal of an IEA is to serve the policy community, then participation should be an essential element of the assessment. Participatory approaches should only be used if the objectives of the study necessitate this. Incorporating participation asks for further integration of fields such as social sciences and decision theory into IAs. Truly integrating social sciences is difficult; natural and social science are often regarded incompatible.

Another important methodological issue is quality control. Models and participatory methods need to be tested. Different models and methods are available for different purposes with different goals and characteristics. Models and methods need to be classified (on the basis of scales and goals) and validated. There is a growing need for IA models and methods and a transparent 'market' for IA is essential. Innovation, validation and classification of IAMs is therefore essential and a challenge for the EFIEA.

4. Challenges and opportunities for IEA, science-policy interactions

Friday 13 March 1998

4.2 Keynote 4: Challenges and opportunities for interacting with policy from a scientific perspective

Jill Jäger, IIASA

Science and policy do not take place in largely distinct realms. It is unlikely that there will be any kind of linear or sequential linkage between the two. Assessment could be an important bridge between science and policy. The most common methods – IAMs and expert panels – have strengths and weaknesses, but alternatives exist and should be applied. IAMs may hide crucial values or assumptions. Participatory methods may be needed to strengthen IAMs. Checklists for developing and evaluation IAMs exist. The efficacy of the IPCC – the largest IEA to date – can be questioned. Interdisciplinarity, executive summaries, impact assessment, and inclusion of policy options are not necessary conditions for success in the policy arena.

4.3 Round table panel discussion

Jeroen van der Sluijs, Leen Hordijk, Claudia Pahl-Wostl, Nick Eyre, Jeljer Hoekstra, Carlo Jaeger

The discussion led to the identification of a number of possible benchmarks for judging the success of integrated assessments:

- Scientific credibility
- Understanding by the disciplinary scientific community
- Avoid disciplinary error
- Legitimate process of peer review including peer review of non-academics
- Publications in disciplinary literature
- Review meetings
- Run each others models
- Briefing documents about models for non-model experts
- Acceptance by disciplinary experts from interdisciplinary perspective
- Good examples
- Quality of data
- Scientific acceptance: number of references (measurable)
- Effect on the research agenda: impact in the science community
- New scientific insights
- Political legitimacy
- Is the developed model being used and how would the users judge the model
- Influence: does the IEA influence the policy making process

- Requests for additional assessments: how often do policy makers ask for a new assessment
- Does the IEA succeed in clarifying the problem
- Does the IEA identify needed actions
- Effectiveness of communicating information
- Effect on the policy agenda: impact in the policy community
- Plurality
- Contribution to consensus
- Indirect effect on the public and media
- Assumed effect on policy if integrated assessment had not taken place.

It is noted that the application of these criteria should depend on the purpose of the assessment. Not all benchmarks are suitable indicators for the quality and success of each assessment. Different assessments serve different purposes. This supports the need of developing a handbook including a method taxonomy, taking into account these possible benchmarks.

4.4 Keynote 5: Challenges and opportunities for interacting with policy from a policy perspective

Nigel Haigh, IEEP

Nigel Haigh stressed the dichotomy between ‘objective’ ‘well-informed’ and ‘rational’ policy advice based on scientific research, such as IEA, and the reality of decision-making. Agenda-setting and decisions often depend on coincidence and are thus unpredictable. IEA is most useful in policy formulation. However, IEA needs to be aware of political realities to be really effective.

Round table panel discussion

Jean-Charles Hourcade, Rob Swart, Sylvie Facheux, Hans Luiten, John Murlis, Bert Metz, Matthijs Hisschemoller, Nigel Haigh.

The discussion focused on the role of Integrated Assessments. An essential question is whether its main purpose is to serve the policy by trying to answer policy relevant questions and by mapping problems. Alternatively, IA may also play a role in igniting interest in an issue. One role of the EFIEA could be an ignition one, for instance for assessments of relatively new or unstructured problems. Apart from igniting, the EFIEA should focus on clarifying conflicts and defining sectoral and cross-sectoral problems. The role of the EFIEA will depend on the stage of the problem in the ‘problem-cycle’.

The policy success and credibility of integrated assessment will be determined by various elements. These elements are often unpredictable. We should realise that, in policy, ignition is seldom caused by scientific facts or findings. The policy community can be strongly influenced or driven by a certain event. EFIEA could, however, aim to push items higher on the political agenda. If the aim is to influence the policy community, we would have to engage the relevant people and they should be involved from the start.

The success of an integrated assessment will, to some extent, depend on how well the results fit into the policy makers agenda. Independent peer review is therefore essential. EFIEA should realise that policy makers use scientific result to achieve certain goals in negotiations. Often there is a time lag between the policy community wanting answers and the science community being able to provide them.

4.5 General discussion

From the demand side, fairness is a problem in growing need of IA. It is regarded a scientific challenge to clarify the issue by demonstrating the consequences of certain choices. Judging what is or is not fair, however, is not in the domain of science.

The success of integrated assessments in policy depends on many uncertain factors and this is one of the reasons to strive for stakeholder and policy involvement. The policy process is not orderly, but reactive. Actors will not be facts-driven but value-driven. Actors will use scientific information in a strategic way. If the goal of the assessment is to be policy relevant, then timing of results is extremely important. If the EFIEA wants to be policy relevant in an early (ignition) stage we would need to establish a mechanism to be kept up to date with the EU agenda. Participatory work is extremely valuable in this. Science and policy do not share the same language. Sometimes science therefore does not answer the right question. We need mutual respect and dialogue to bridge this.

5. Challenges and opportunities for EFIEA

Saturday 14 March 1998

5.2 Short-list for the methodology programme: Pier Vellinga

The general EFIEA paper presents a list of possible topics to be addressed within the methodology programme such as uncertainty, model analysis and comparison, scales, structural change and combining qualitative and quantitative analysis. Two initiatives have arisen from the various discussions of this workshop:

1. A proposal for clustering of workshops by organising summerschool-type workshops.
2. The establishment of a European Task Force to improve IEA quality by writing a comprehensive handbook clarifying taxonomy, goals, policy interactions and uncertainty.

The idea of clustering methodology workshops is taken further by putting methodological issues in the context of a policy issue. In this way, a matrix of methodology and policy issues can be the basis of each cluster workshop. Such a matrix workshop should provide a creative environment to stimulate interaction and share personal experiences.

5.3 General Discussion Methodology programme

The need is felt to start doing more practical things, especially in a summer school context. Training sessions, model testing and sharing practical experiences should be key activities. Transferability of IEA methods is an important benchmark for the overall success and impact of the EFIEA. One way to find out about transferability is to learn-by-doing. Summer schools could offer good opportunities for model testing and comparison, although this can be regarded as a task for either modelling specialists or project assistants. The organisation of a summer school may prove difficult, given the time implications in holiday periods.

With regard to setting up a handbook for IEA practises, a matrix workshop setting could ideally provide the information to fill in the gaps in knowledge. Writing a handbook together with a large group of people could prove extremely difficult. Internet-facilities could support the development of a handbook and this option will need to be investigated. We should start preparing the handbook now, and aim at finishing it in 2 years time.

The EFIEA will need to learn from others. Specially integrated assessments on a local level could prove to be a rich source of information which is relatively unexplored. These communities could be included in active learning processes and gaming situations. The EFIEA should digest this experience from the local level, and the local level IA community can benefit on methodological side.

5.4 General Discussion Policy programme

With regard to the policy programme, the first topic to be addressed at a workshop in January 1999 will be Climate Change policy in the European context. This workshop will be hosted by FEEM/Carlo Carraro. The aim is to organise an interim workshop in September, on the

same topic but placed in a context of the Buenos Aires meeting¹. The workshop will take three days and the organising committee will identify a selection of issues to address, from a larger menu which includes international equity/fairness (intrasectoral, intergenerational and within and outside the EU), timing and uncertainty, mutual benefits and interactions, technical opportunities and policies and public participation in climate policies.

After the climate workshop in January 1999, other topics will have to be identified and addressed in the policy programme. At this stage, water and transport are suggested. It is realised that EFIEA would then have to engage other communities. EFIEA should do a scoping of the fields of water and transport before jumping in. Apart from water and transport, biodiversity is mentioned as a possible topic for the future.

An important issue in the discussion is, whether the choice of a topic is really policy driven. It is unclear how choosing the topics is linked to a policy process: what are the decisions we need to focus on. On the other hand, the policy issues should have a long term perspective and the Forum should not be used for short term policy decisions. The forum should however try to be up to date with the EU agenda, for instance by accepting the advice of its 'demand-side' members. Policy workshops will have to be interactive and the policy community must be included in the development of the programme.

¹ This plan was abandoned.

List of workshop participants

Alcamo
Prof J.M.
University of Kassel
Center for Env. Systems Research
Kurt-Wolters-Strasse 3
D-34109 KASSEL
Germany
49-561-8043266
49-561-8047266
alcamo@usf.uni-kassel.de

Asselt
Ms M. van
Univ. van Maastricht
ICIS
P.O.Box 616
6200 MD MAASRTICHT
31-43-3882662
31-43-3210541
M.vanAsselt@ICIS.UNIMAAS.NL

Bail
Dr Ch.
EC/DGXI
Wetstraat 200
1049 BRUSSELS
Belgium
32-2-2954099
32-2-2969557
christoph.bail@dg11.cec.be

Bailey
Dr P.
Univ. of York
Stockholm Environment Institute
Box 373
YO1 5YW YORK
United Kingdom
44-117-9719220
44-1904-432898
pdb8@york.ac.uk

Berk
Dr M.
RIVM
P.O.Box 1
3720 BA BILTHOVEN
31-30-2743723
31-30-2744435
marcel.berk@rivm.nl

Callaway
Mr J.M.
Systems Analysis Department
Risoe National Laboratory
P.O.Box 49
DK-4000 ROSKILDE
Denmark
49-46-775100
49-46-321999
mac.callaway@risoe.dk

Carraro
Prof C.
University of Venice
Department of Economics
San Giobbe, 873
30121 Venezia
Italy
39 41 2574166
39 41 2574176
carraro@feem.it/
ccarraro@unive.it

Dale
Dr N.J.
University of Bath
Department of Eco and International
Development
Claverton Down
BATH BA2 7AY
United Kingdom
44-1225-826954
44-1225-826381
hssanj@bath.ac.uk

Downing
Dr T.E.
University of Oxford
Environmental Change Unit
1a Mansfield Road
OXFORD OX1 3TB
United Kingdom
44-1865-281180
44-1865-281181
tom.downing@ecu.ox.ac.uk

Dresen
Ms H.M.
University of Amsterdam
department of Science Dynamics
Nieuwe Achtergracht 166
1018 WV Amsterdam
dresen@chem.uva.nl

Eyre
Dr N.
Eyre Energy and Environment
7 Abbotsgate
CUMBRIA LA6 2JS
United Kingdom
44-152-4272923
44-152-4272923
nick@eyreenv.demon.co.uk

Faucheux
Prof S.
Universite de Versailles Saint-Quentin-
Yvelines
College Vauban
47 Boulevard Vauban
78047 GUYANCOURT CEDEX
France
33-1-39255375
33-1-39255300
sylvie.faucheux@c3ed.uvsq.fr

Goosen
Mr H.
Institute for Environmental Studies
VU
De Boelelaan 1115
1081 HV AMSTERDAM
31-20-4449566
31-20-4449553
hasse.goosen@ivm.vu.nl

Gough
Dr C.
Institute for Systems, Informatics and Safety
Joint Research Centre
Via Enrico Fermi
I-21020 ISPRA
Italy
39-332-789947
39-332-789923
clair.cough@jrc.it

Haigh
Dr N.
Institute for European Environmental Policy
Dean Bradley House
52 Horseferry Road
London SW1P2AG
United Kingdom
44-171-7992244
44-171-7992600
central@ieeplondon.org.uk

Hasselmann
Prof K.
Max Planck Institute of Meteorology
Bundesstrasse 55
DE 20146 HAMBURG
Germany
49-40-41173236
49-40-41173298
hasselmann@dkrz.de

Hettelingh
Prof J.P.
RIVM
Postbus 1
3720 BA BILTHOVEN
31-30-2743529
Jean-Paul.Hettelingh@rivm.nl

Hisschemöller
Dr M.
Institute for Environmental Studies
VU
De Boelelaan 1115
1081 HV AMSTERDAM
31-20-4449523
31-20-4449553
matthijs.hischemoller@ivm.vu.nl

Hoekstra
Mr J.
KEMA Nederland B.V.
Postbus 9035
6800 BT ARNHEM
31-26-3562383
31-26-3515022
hoekstra@mta6.kema.nl

Hope
Dr C.W.
University of Cambridge
Judge Inst. Of Management Studies
Mill Lane
CAMBRIDGE CB2 1AG
United Kingdom
44-1223-338194
44-1223-339701
ch11@cam.ac.uk

Hordijk
Prof L.
Wageningen Agricultural University
Inst for Env. and Climate Research
P.O.Box 9101
6700 HB WAGENINGEN
The Netherlands
31-317-484919
31-317-484839
leen.hordijk@wimek.cmkw.wau.nl

Hourcade
Dr J.C.
CIRED/CNRS/Centre Int. de l'Environnement
1, Rue du 11 Novembre
92120 MONTROUGE
France
33-1-46121850
33-1-40929317
hourcade@centre-cired.fr

Jaeger
Prof C.
Inst. for Sociology
Techn Univ Darmstadt
Residenzschloss
Marktplatz 15
D-64283 DARMSTADT
Germany
49-6151-163266
49-6151-166035
jaeger@ifs.th-darmstadt.de/jaeger@hermes.emp-eaw.ch

Jäger
Dr J.
International Institute for Applied Systems
Analysis
Schlossplatz 1
2361 LAXENBURG
Austria
43-2236-807
43-2236-71313
jaeger@iiasa.ac.at

Kilian
Dr U.
Max Planck Institute of Meteorology
Bundesstrasse 55
DE 20146 HAMBURG
Germany
49-40-41173405
49-40-41173298
kilian@dkrz.de

Kok
Mr M.
Dutch National Research Programme on
Global Air Pollution and Climate Change
Postbus 1
3720 BA BILTHOVEN
030-2743717
030-2744436
marcel.kok@rivm.nl

Leemans
Dr R.
RIVM
P.O.Box 1
3720 BA BILTHOVEN
31-30-2742639
31-30-2744435
rik.leemans@rivm.nl

Liberatore
Dr A.
EEG/DG XII/D-5 (econ+soc. Aspects of the
Env.)
200, Rue de la Loi
B-1049 BRUSSELS
Belgium
32-2-2952229
32-2-2994462
angela.liberatore@mhs.g.cec.be

Liefferink
Dr D.
Wageningen Agricultural University
Dep. Of Sociology
Hollandseweg 1
+31/317/483990
6706 KN WAGENINGEN
31-317-483571
31-317-483990
Duncan.liefferink@ALG.SWG.WAU.NL

Luiten
Mr H.
European Environment Agency
Kongens Nytorv 6
DK-1050 Copenhagen K
Denmark
45-3336-7100/7133
Hans.Luiten@EEA.EU.INT

Maddison
Dr D.J.
University College London
Centre for Social and Eco Research on the Global
Env
Gower Street
LONDON WC1E 6BT
United Kingdom
44-171-3807874
44-171-9162772
d.maddison@ucl.a.c.uk

Metz
Dr B.
RIVM
Postbus 1
3720 BA BILTHOVEN
31-30-2743990
31-30-2744435
bert.metz@rivm.nl

Murlis
Dr J.
University College London
Jackson Env. Institute
5 Gower Street
LONDON WC1E 6HA
United Kingdom
44-171-8135206
44-171-8135283
jei@ucl.ac.uk

Pahl-Wostl
Dr C.
Department of Environmental Physics
Uberlandstrasse 133
CH-8600 DUBENDORF
Switzerland
41-1-8235040
41-1-8235210
pahl@eawag.ch

Rossi
Dr F.S.
Corso Vittorio Emanuele, 27
I-10125 TORINO
Italy
39-11-6688288
filippo.rossi@ntt.it

Rotmans
Prof J.
Univ. van Maastricht
ICIS
P.O.Box 616
6200 MD MAASRTICHT
31-43-3882662
31-43-3210541
J.Rotmans@ICIS.UNIMAAS.NL

Sluijs
Dr J.P. van der
University Utrecht
Dept. Science Techn. & Society
Padualaan 14
3584 CH UTRECHT
31-30-2537631
31-30-2537601
Jeroens@nwsmail.chem.ruu.nl

Sors
Dr A.
EEG/DG XII/D 5
8 Square De Meeus
1040 BRUSSELS
Belgium
32-2-2957659
32-2-2963024
andrew.sors@dg12.cec.be

Swart
Dr R.J.
RIVM
P.O.Box 1
3720 BA BILTHOVEN
31-20-2742639
31-20-2744435
rob.swart@rivm.nl

Tol
Dr R.S.J.
Institute for Environmental Studies
VU
De Boelelaan 1115
1081 HV AMSTERDAM
31-20-4449503
31-20-4449553
richard.tol@ivm.vu.nl

Toth
Prof. F.
Potsdam Inst for Climate Impact Research (PIK)
P.O.Box 601203
14412 POTSDAM
Germany
49-331-2882500
49-331-2882600
toth@pik-potsdam.de

Tuinstra
Ms W.
Wageningen Agricultural University
CMKW/WIMEK
P.O.Box 9101
6700 HB WAGENINGEN
31-317-483340
31-317-484839
Willemijn.Tuinstra@WIMEK.CMKW.WAU.NL

Vellinga
Prof P.
Institute for Environmental Studies
VU
De Boelelaan 1115
1081 HV AMSTERDAM
31-20-4449515
31-20-4449553
pier.vellinga@ivm.vu.nl