

Jan Rotmans

Part I: Curriculum Vitae

Personal Details

Title and full name:	Prof.dr.ir. Jan Rotmans
Date of birth:	29-03-1961
Nationality:	Dutch
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University Education

30 May 1986	M.Sc., Mathematics, University of Delft, The Netherlands
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Doctorate

Title Thesis:	IMAGE: an integrated model to assess the greenhouse effect
Supervisor:	Prof. O.J. Vrieze
Date PhD-award:	20 september 1990
University:	Maastricht University
Publisher:	Kluwer Academic Publishers
Year of publication:	1990

Academic/Research Career

1986-1989	Researcher, Centre of Mathematics at RIVM
1989-1996	Researcher at the Environmental Assessment Department at RIVM Project Leader of the IMAGE project, Escape project and the TARGETS project
1992	Part-time Professor at Maastricht University in 'Mathematical Simulation of Human-Environment Relations' within the Faculty of Natural Sciences
1994-1998	Vice-chairman of the Scientific Advisory Board of the Potsdam Institute for Climate Impact Research (PIK) in Germany.
1995-1997	Department of Policy Coordination and Sustainable Development (Division for Sustainable Development), United Nations, New York.
1997	Founder and Director of ICIS (International Centre for Integrative Studies) at Maastricht University
1997	Full Professor at Maastricht University in 'Integrated Environmental Assessment' within the Faculty of Natural Sciences
1997-2002	Member of the Steering Committee of the European Forum on Integrated Environmental Assessment (EFIEA)
2000-	Founder of the Dutch Network KSI: Knowledge Network on System Innovation, Transition towards a Sustainable Society
2002-2005	Vice-Chair of the European Forum on Integrated Environmental Assessment (EFIEA-2), under auspices of the European Commission in Brussels
2003-2006	Vice-President of the Integrated Assessment Society (TIAS)
2003-2008	Founder of the European Sustainability Network, MATISSE

2004	Full Professor at Erasmus University Rotterdam in 'Sustainable Transitions and System Innovations' within the Faculty of General Sciences
2004	Top-advisor of TNO (The Netherlands Organization for Applied Scientific Research)
2004	Founder and Director of DRIFT (Dutch Research Institute For Transitions) at Erasmus University Rotterdam
2004-2010	Member of the Supervisory Board of the Tyndall Institute, University of East Anglia, Norwich
2007	Initiator and Chairman of the URGENDA
2012	Independent Researcher within DRIFT and full professor affiliated to the Faculty of General Sciences and the Faculty of Business Administration
2014	Founder Nederland Kantelt
2016	Co-founder Zorgeloos

Part II: Professional Achievements

Jan Rotmans is a typical interdisciplinary scholar. He started his career within the natural sciences as an integrated climate modeller and was worldwide the first one that developed an integrated climate assessment model, IMAGE (Integrated Model to Assess the Greenhouse Effect) that modelled both the causes, impacts and biogeochemical/physical mechanisms of climate change induced by human activities. The IMAGE model was during the 80s of the last century considered as a breakthrough model, that has led to hundreds of similar integrated climate assessments model in the decades thereafter. The IMAGE model has been used extensively within the IPCC (Intergovernmental Panel on Climate Change) for scenario development and impact assessment, and within the context of the negotiations of the Kyoto-protocol. The IMAGE model is still being further developed at RIVM (the National Institute of Public Health and the Environment), almost 30 years after its initiation, where it has been used within numerous European and Global environmental assessments for the EC, EEA, UNEP, Worldbank, etc. This has evoked an international school of integrated assessment and integrated assessment modellers, with its own society and journal.

Over the last 15 years, Jan Rotmans acted more with the social sciences. He started studying transitions (complex transformative societal changes) and developed the concept of transition management that has been used widely within the Netherlands, but also abroad, both in European countries but also in countries like Japan and Australia. Transition management is considered as a breakthrough concept, a new form of governance that influenced the thinking on how to influence transitions in an innovative and creative manner. He was the founder of the field of transition studies, or transition science, in the Netherlands, and co-founder of the European Transition network.

International reputation

Jan Rotmans is an international authority in the areas of transitions and integrated environmental assessment. That is marked by the scientific initiatives that he took that has led to new interdisciplines, societies, networks, journals, etc. Below a short list that illustrates his international authority:

- In 1991 he won the SNS-prize for the best thesis of Maastricht University
- In 1993 he received a Dutch Pioneer nomination by NWO
- In 2002 he received an award on behalf of the International Institute for Advanced Studies in Systems Research and Cybernetics
- In 2002 he received a 10 million Euro grant for the Dutch research programme KSI (Knowledge and competences of sustainable system innovations)
- He was founder of two scientific journals: Environmental Modelling and Assessment; and Integrated Assessment
- He co-founded The Integrated Assessment Society (TIAS)
- From 1994-1998 he was vice-chairman of the Scientific Advisory Board of the Potsdam Institute for Climate Research (PIK) in Germany
- From 2004-2010 he was member of the Supervisory Board of the Tyndall Institute, in Norwich UK
- From 2002-2005 he was vice-chair of the European Forum on Integrated Environmental Assessment under auspices of the European Commission
- From 2003-2006 he was vice-president of the Integrated Assessment Society (TIAS)
- From 2003-2008 he was founder of the European Sustainability Network, MATISSE
- In 2009 he was co-founder of the Sustainable Transitions Research Network (STRN)

Contacts and connections with researchers of standing in the Netherlands and abroad

Jan Rotmans participates in a wide range of national and international networks, varying from assessment networks, modelling networks, environmental networks, economic networks, sustainability networks, governance networks, transition networks and policy advisory networks. Over the past 25 years he has worked together with numerous researchers of standing, both in the Netherlands and abroad. Almost all of them are full professors, and many of them are global leaders in their disciplines.

Among many names here only a few with whom he has worked together:

prof. John Schellnuber (PIK, Germany), prof. Steve Schneider (Stanford University, passed away), prof. Carlo Jaeger (AEWAG, Switzerland, later PIK), prof. Jill Jaeger (IIASA, Austria), prof. Hadi Dowlatabadi (Carnegie Mellon University, later University of British Columbia in Vancouver), prof. John Robinson (UBC Vancouver), prof. Jerzy Filar (Adelaide, Australia), prof. Morita (Japan, passed away), prof. Pahl-Wostl (Osnabrück), prof. Tom Wigley (NCAR, Boulder and later Australia), prof. O'Riordan (East Anglia, Norwich), prof. Olson (Lund), prof. Fischer-Kowalski (Austria), prof. Funtowicz (Ispira, Italy), prof. Ravetz (retired, UK), prof. Whiteman (Rotterdam), prof. Braungart (Rotterdam) and prof. Rayner (Oxford, UK). And in the Netherlands with a range of researchers of standing: prof. Rik Leemans (Wageningen), prof. Johan Schot (Eindhoven), prof. John Grin (Amsterdam), prof. Jeroen van den Bergh (Amsterdam en Barcelona), prof. Leen Hordijk (Wageningen, met emeritaat), prof. Pim Martens (Maastricht), prof. van Asselt (Maastricht), prof. vd Laan (Leiden, met emeritaat), prof. Vrieze (Maastricht, met emeritaat), prof. Kleijnen (Tilburg), prof. Rip (Twente), prof. Geels (Manchester), prof. Geurts (Tilburg), prof. Teisman (Rotterdam), prof. Kemp (Maastricht), prof. Mommaas (Tilburg), prof. Spaargaren (Wageningen), prof. Thissen (TUDelft) and prof. Hekkert (Utrecht).

Ability to attract and inspire young researchers

Jan Rotmans is a passionate and inspiring researcher. One of his abilities is to give inspiring and motivational lectures and colleges that attract many people. Because of his moving style his colleges are quite popular among students, not only in the Netherlands but also abroad. During his career he has established several multi- and interdisciplinary research groups consisting of young, talented researchers. His first multidisciplinary research group was at RIVM around the IMAGE model that has been co-developed by dozens of young researchers from a variety of disciplines, among which several PhD-students. His second multidisciplinary research group was also at RIVM focused on the TARGETS model, a global integrated model for assessing sustainability dynamics and projecting long-term trends in global dynamics. A group of about 15 young researchers, including both natural and social scholars, developed together the TARGETS model. Some of these young researchers were very talented and got their PhDs on parts of this global dynamics research and became even a full professor, such as: Pim Martens, Arjen Hoekstra, Marjolein van Asselt and Frank Geels.

The third interdisciplinary research initiative was the ICIS institute at Maastricht University, established by Jan Rotmans. ICIS stands for Integrated Centre for Integrative Studies, that since 1997 has hosted more than 150 in particular young researchers from all over the world. The ICIS institute is still prospering and rooted in the education system at Maastricht University, with its own Master programme on sustainability science.

And the fourth interdisciplinary research institute was the DRIFT institute at Erasmus University in Rotterdam, where a group of about 20 mostly young researchers investigate various aspects of transitions and transition governance.

In total Jan Rotmans has supervised more than 15 PhD-researchers among which 4 became already a full professor.

Contribution to research valorisation

Jan Rotmans is not only science driven but also society driven. One of his driving forces is to improve functioning of society by making transition knowledge widely available. There is an increasing demand within society for transition knowledge. Not only within the public domain, in sectors like energy, health, water, mobility, agriculture and food; but also in the private sector there is a growing interest and demand, varying from multinationals to small and medium enterprises, many of which are in a transitional stage and want to apply insights from transition science within their companies.

Jan Rotmans is top advisor of the Dutch government and cabinet, in particular in guiding transition trajectories, of which the energy transition and the health care transition are the best known examples. He is also advising foreign governments, such as the Finnish, Belgian and German and is advisor of international agencies as the UN, where he worked two years for the Commission on Sustainable Development, OECD, the European Commission and the World Bank.

In order to accelerate the transition to a more sustainable Dutch society he established Urgenda, an action group that is quite successfully working according to the principles of transition management and has had quite some impact in the Netherlands.

By writing numerous articles in Dutch newspapers and magazines on sustainability transitions Jan Rotmans is reaching a wide audience. He has also written multiple Dutch books on transitions for a broad audience, including his last book 'In the eye of the hurricane' which was very well received and around which a documentary has been made (Tegenlicht documentary).

He is often appearing in the regular media (television and radio) to spread transition thinking, but he is also using social media, in particular twitter in an effective way (more than 13.000 followers) to popularize transition thinking among a broad audience.

QUANTITATIVE INFORMATION

1. Total number of articles in refereed journals

Jan Rotmans has published 95 peer reviewed publications in journals

2. Total number of books in entire academic career

Jan Rotmans has published 25 books in his career, both English and Dutch books

3. Total number of chapters in books

Jan Rotmans has published 50 chapters in books

4. Total number of PhD-these supervised as principal supervisor

Jan Rotmans has supervised 15 PhD-students so far, 5 PhD's are underway

5. Selection of grants awarded to nominee in the past 10 years

- 10 million Euro grant for the Dutch transition network KSI in 2003, for a period of 6 years, from 2004-2010, provided by The Dutch Ministry of Economic Affairs, within the framework of ICES-KIS fund, after peer review selection of the KNAW.
- 6 million Euro grant for MATISSE, provided by the European Commission, for a period of 3 years, for the coordination of a European project MATISSE, from 2004-2007.

6. Hirsch-index

The Hirsch-index of Jan Rotmans is 55

PART III: ADDITIONAL INFORMATION

Summary

Jan Rotmans is a scientific entrepreneur, a visionary researcher in both natural sciences and sciences. During his career he switched from the natural scientific community to the social science

community, but deep-down he is a typical interdisciplinary scholar. He has three major 'break through' innovations on his name. He started as a modeller, in particular an integrated assessment modeller, and was the first in the world who developed an integrated assessment model for global climate model, IMAGE. This was an unique model at that time, mid-eighties of the last century, because, as his supervisor once described 'this model contains both molecules and guilders'. First the model was criticized but later the model has been mimicked numerously by other modellers and turned into a landmark for a whole new generation of climate assessment models. Also, the fact that the IMAGE model has been used frequently in policy circles in a practical manner is exceptional.

His second major innovation was the TARGETS model, by which he 'opened' models by making the uncertainties within integrated assessment models explicit. That was done by 'colouring' these uncertainties according to different perspectives, using basics of the Cultural Theory. At that time, the mid-nineties of the last century, that was considered as controversial and criticized by both modellers and social scientists. Years later, driven by a ground breaking article on modelling uncertainties, much more attention is devoted to different kinds and sources of uncertainties in any kind of model.

And his third major scientific achievement was his interdisciplinary research into transitions. At the time he started studying transitions, about 15 years ago, there was hardly any attention in social sciences for transitions, especially not for the governance of transitions. Through the innovative concept of transition management, also criticized first, there is worldwide scientific attention for the governance of complex transformative changes.

International Referees

1. Professor John Schellnhuber, Potsdam Institute for Climate Impact Research, emailaddress: John@pik-potsdam.de
2. Professor Hadi Dowlatabadi, University of British Columbia, Vancouver, emailaddress: Hadi.d@ubc.ca
3. Professor Steve Rayner, University of Oxford, emailaddress: steve.rayner@insis.ox.ac.uk
4. Professor Bill Clark, Harvard University, emailaddress: william_clark@harvard.edu
5. Professor Lennart Olsson, University of Lund, lennart.olsson@lucsus.lu.se

PART IV: CROSS DOMAIN

1. Cross-domain activities

Jan Rotmans is an exceptional scientist because he more or less created his own cross-domain disciplines or interdisciplines. The field of integrated assessment modelling contains various disciplines, because it combines economic models and ecological models. Later these integrated assessment models were extended with knowledge pieces from other disciplines, both from social sciences (such as social psychology, cultural anthropology and socio-technical theory) and from natural sciences (such as biogeochemistry, climatology and ecosystem theory).

He also set up an interdisciplinary research programme on sustainable development, bot for modelling the phenomenon and for assessing it. Assessing sustainable development in an

integrative and reflexive manner was new at that time and combined the knowledge of several disciplines: macro- and micro-economy, complex systems theory, ecosystem theory, ecological economics, etc.

Similarly, he set up an interdisciplinary research programme on transitions, starting in the Netherlands, involving a wide range of scientific disciplines. Out of this arose the concept of transition management, a blending concept that merges basic insights from complex systems science with key elements from sociology and governance studies. This unique endeavour led to a new interdisciplinary concept for studying transitions in an analytical manner (such as transition patterns) and for governing transitions (such as transition management).

2. Contribution to science in general

Jan Rotmans has influenced and inspired many researchers all over the world. His innovative concepts turned into cornerstones that also influenced knowledge development within several disciplines. His transition endeavour influenced the scientific agenda, first in the Netherlands and later in Europe and also outside Europe. One of his basic scientific contributions has been 'agenda setting'. Modelling and assessing climate change in an integrated manner was set on the agenda from the mid-eighties, also thanks to his pioneering efforts in this field. Later on, integrated assessment was extended to other environmental problems (other than climate change) and turned into assessing sustainable development, namely Integrated sustainability assessment that entered the research agenda in Europe during the nineties, where the influence of Jan Rotmans was noticeable.

And the last remarkable example of agenda setting is the transition research, as a result of the pioneering transition activities that started in the Netherlands. Nowadays it has extended to a fast growing research field in itself, with three key domains, among which transition management (governance) is an important one.

In each of these research agenda setting activities this was illustrated by key publications that influenced researchers and research community. The key publications on the IMAGE model (1990), on Integrated Assessment (1998), and on transition management (2001) turned into cornerstones.

3. Miscellanea

- One of the pioneers in the emerging scientific field of Integrated Assessment, which tries to build a bridge between complex scientific problems and decision-making.
- The founder of the field of transition studies, or transition science, and initiator of the the Dutch Transition Network (KSI) and the European Transition Network (www.transitionsnetwork.org).
- Participated in more than 1000 national and international conferences, workshops and seminars, predominantly by giving lectures, demonstrations or presentations. Also organized national and international conferences on Integrated Assessment, Integrated Assessment Modelling and sustainability Transitions in the Netherlands and in foreign countries.
- During the first decade of my career I have been involved in IPCC-work: developing the IPCC-scenarios, doing model calculations, and lead author of several chapters within different working groups.
- Lead author of the book entitled 'Human Choice and Climate Change', an initiative by the

Human Dimensions of Global Change Research Programme.

- Co-author of two influential UN assessment reports: 'Critical Trends: Global Change and Sustainable Development' from UNDP/CSD, and the 'Global Environmental Outlook' from UNEP, which both appeared in 1997.
- Coordinator of the UN Global Modelling Forum on Sustainable Development, which functions under the auspices of DESA, UNEP, and UNU.
- Founded the scientific journal 'Environmental Modelling and Assessment', together with Professors Filar (Australia) and Vriese (The Netherlands), of which the first issue appeared in June 1996.
- Founded the scientific journal 'Integrated Assessment', together with Professor Hadi Dowlatabadi of University of British Columbia (UBC), Canada, of which the first issue appeared in March 2000.
- Main editor together with Hadi Dowlatabadi of an Electronic Scientific Journal: the Electronic Series on Integrated Assessment Modelling, published by Baltzer Science Publishers, Amsterdam, The Netherlands.
- Founded The Integrated Assessment Society (TIAS), together with Prof. Claudia Pahl-Wostl (University of Osnabruck) and Prof. Hadi Dowlatabadi of UBC, Canada.
- Advisor of the Dutch Government on sustainability transition processes in the fields of energy, mobility, agriculture, biodiversity and the biobased economy. Advisor of Dutch provinces and municipalities on sustainability transition processes in the fields of regional sustainable development in relation to spatial planning, economic development, mobility, energy use and agriculture.
- Advisor of Foreign Governments on sustainability transition processes, such as the Governments in Belgium, Austria, Germany, UK, but also outside Europe, such as in Canada, Japan and Australia.
- Advisor of International Bodies as the United Nations: Commission on Sustainable Development (CSD), United Nations Environment Programme (UNEP), European Commission (EC) and the European Environment Agency (EEA).
- Supported a variety of regional sustainability transition processes in the Netherlands and in Europe. In the Netherlands in regions as Zeeland, Limburg, Texel, Friesland, Noord-Holland, Haarlemmermeer, het Groene Hart en de Zuidvleugel and in cities as Rotterdam, Maastricht and Almere. Outside the Netherlands in cities and regions as Venice, Manchester and Gent
- A major task is to promote and perform integrated assessment and sustainability transitions research, and guide researchers and PhD students how to do this. Have had 15 PhD-students so far, who produced PhD-theses on: Integrated Assessment Modelling, Human Health Modelling, Modelling Complex Systems, Integrated Model-based Water Assessment, and an Integrated Approach towards Uncertainty & Risk. I have guided the following PhD-students on various aspects of Integrated Assessment and Sustainability Transitions Science: Michel den Elzen; Marco Janssen; Pim Martens; Arjen Hoekstra; Marjolein van Asselt; Bas Amelung; Philip van Notten; Derk Loorbach; Jasper Grosskurth; Pieter Valkering; Saartje Sondeijker; Rutger van de Brugge; Suzanne van den Bosch; Hans de Haan; Flor Avelino (cum laude). Mattijs Taanman; Nele d'Haese; Roel van Raak.

I speak and write Dutch, English fluently and German reasonably

Research Interests:

- Integrated Sustainability Assessment
- Transitions and System Innovation
- Sustainability Science
- Global Change Research
- Multi-Inter-Transdisciplinary research
- Leading interdisciplinary research teams
- Innovative, applied research
- Policy advising

General Interests:

- Sports
- Literature
- Music
- Art

Key Words:

- Pioneer
- Innovator
- Go-getter
- Creativity
- Energetic
- Team-builder

Publications

1.

BOOKS

1. Rotmans, J. (1990), 'IMAGE: an Integrated Model to Assess the Greenhouse Effect', PhD.Thesis, published by Kluwer Academic Publishers, Dordrecht, The Netherlands.
2. Rotmans, J. (1990), 'IMAGE: an Integrated Model to Assess the Greenhouse Effect, Book, ISBN 0-7923-0957-X, Kluwer Academic Publishers, Dordrecht, The Netherlands.
3. Rotmans, J. and de Vries, H.J.M. (1997), 'Perspectives on Global Change: the TARGETS approach', Cambridge University Press, Cambridge, U.K.
4. Rotmans, J. (1998), 'Geïntegreerd denken en handelen: een noodzakelijk goed', Universiteit Maastricht, Oratie, 18 september 1998.
5. Martens, W.J.M.. and Rotmans, J. (1999), 'Climate and environment: an integrated perspective', Kluwer Academic Publishers, Dordrecht, The Netherlands.
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7. Van Asselt, M.B.A., Rotmans, J. and Greeuw, S. (2001), 'Puzzle-solving for Policy: a Provisional Handbook for Integrated Assessment', ICIS, Maastricht, The Netherlands.
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9. Rotmans, J. and Rothman, D. (eds.) (2003), 'Scaling Issues in Integrated Assessment', 2003, Swets & Zeitlinger, Lisse, The Netherlands.
10. Rotmans, J. (2003), 'Transitiemanagement: sleutel naar een duurzame samenleving', van Gorcum Uitgeverij, Assen.
11. Van Asselt, M.B.A., Rotmans, J. and Rothman, D.S. (2005), 'Scenario Innovation: Experiences from a European Experimental Garden', Taylor & Francis, U.K.
12. Rotmans, J. (2005), 'Maatschappelijke innovatie: tussen droom en werkelijkheid staat complexiteit', Erasmus Universiteit Rotterdam, Oratie, 3 juni 2005.
13. Rotmans, J. (2005), 'Societal Innovation: between dream and reality lies complexity', Shortened inaugural speech, Rotterdam School of Management, ERIM, Erasmus University Rotterdam.
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15. Rotmans, J. (2007), 'Duurzaamheid: van onderstroom naar draaggolf: op de rand van een doorbraak', DRIFT, Erasmus Universiteit Rotterdam.
16. Van den Bosch, S. and Rotmans, J. (2009), 'Deepening, broadening and scaling up: a framework for steering transition experiments', Knowledge Centre for Sustainable System Innovations and Transitions (KCT), Delft/Rotterdam.
17. Grin, J., Rotmans, J. and Schot, J. (2010), 'Transitions towards sustainable development', KSI-book series part I, Routledge Publishers, UK.
18. Rotmans, J. and Loorbach, D. (2010), 'Towards a better understanding of transitions and their governance: a systemic and reflexive approach', Part II in Grin, J., Rotmans, J. and Schot, J. (2010), 'Transition towards sustainable development', KSI-book series part I, Routledge Publishers, UK.

19. Rotmans, J. (2010), 'Transitieagenda voor Nederland: investeren in duurzame innovatie', Kennisnetwerk Systeem Innovaties (KSI), Amsterdam, Nederland.
20. Rotmans, J. (2011), Krosse, P. en Roorda, C. (2011), 'Merwe-Vierhavens: van Woestijn naar Goudmijn', DRIFT boekje, in opdracht van Stadshavens Rotterdam
21. Rotmans, J. en Krosse, P. (2011), 'Drijvend Ontwikkelen: een unieke kans', DRIFT boekje, in opdracht van Stadshavens Rotterdam
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24. Loorbach, D., Rotmans, J. en Lijnis-Huffenreuter (2014), 'Ondernemen in transitie. Bedrijfstransties als innovatief model voor duurzaam ondernemen'. Stichting Maatschappij en Onderneming, SMO, Den Haag.
25. Rotmans, J. (2014), 'Een verandering van tijdperk: Nederland kantelt', AENEAS Uitgeverij, Boxtel.

NATIONAL & INTERNATIONAL PUBLICATIONS

1. Rotmans, J., Boois, H. de, and Swart, R.J. (1990), 'An integrated model for the assessment of the greenhouse effect: the Dutch approach', *Climatic Change* 16, no.3, 331-356, 1990.
2. Rotmans, J., Swart, R.J., and Vrieze, O.J. (1990), 'The role of the CH₄-CO-OH cycle in the greenhouse problem', *Science of the Total Environment* 94, no.3, 233-252, 1990.
3. Rotmans, J., and Swart, R.J., 'The gloomy greenhouse: should the world phase out fossil fuels?', *Environmental Management* 14, no.3, 291-296.
4. Rotmans, J. and Vrieze, O.J. (1990), 'Metamodelling and experimental design: case study of the greenhouse effect', *European Journal of Operations Research* 47, 317-329.
5. Rotmans, J., Ham, G. van, Kleijnen, J.P.C. (1990), 'Sensitivity analysis by metamodels and experimental designs, applied on a simulation model of the greenhouse effect (in Dutch)', *Kwantitatieve Methoden* Nr. 35, 51-86.
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18. Den Elzen, M.G.J. and Rotmans, J. (1993), 'Modelling feedback processes in the carbon cycle: balancing the carbon budget', *Tellus* 45B, 301-320.
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