**RIVM report 630950001/2003**

# Environmental Quality and Human Well-being. Outcomes of a workshop

Utrecht, April 28 and 29, 2002

I van Kamp, H Kruize, BAM Staatsen,
AEM de Hollander, R van Poll

This investigation has been performed by order and for the account of the Ministry of Housing, Physical planning and the Environment, within the framework of the RIVM-project: 'Policy-Supporting Instruments (630950), milestone: 'Conceptual models, consensus, and validation (CM)

RIVM, P.O. Box 1, 3720 BA Bilthoven, telephone: 31 - 30 - 274 91 11; telefax: 31 - 30 - 274 29 71

# Preface

This report summarizes the highlights of papers, discussions, conclusions as well as future plans of a 2-days workshop on 'Environmental Quality' and 'Quality of Life' held in Utrecht, the Netherlands, April 2002. The workshop was held as part of the RIVM-project 'Policy Supporting Instruments' (project number: 650930) commissioned by the Ministry of Public Housing, Physical Planning and the Environment. Other relevant products of this workshop are a multi- disciplinary network (consortium) and an Expression of Interest (EoI) for an integrated project in the 6th Framework Program that is supported by 24 international partners. The EOI was submitted to the EU in June, 2002 (see:http://eoi.cordis.lu/search_form.cfm). Moreover a selection of the papers presented at the workshop will be published in a Special Issue of Landscape and Urban Planning (accepted to be published in 2003).

We gratefully acknowledge the contributions of all presenters and participants. Special thanks go to Charles Vlek and Xavier Bonnefoy for chairing this workshop, Evalien de Groot and Tine Schoorlemmer for their organisational and mental support and Michael Pacione for his highly experienced and effective editorship of the Special Issue. Finally we hope to continue working together in this field in the years to come.

# Samenvatting

In april 2002 werd door het Rijksinstituut voor Volksgezondheid en Milieu (RIVM) een internationale workshop over Omgevingskwaliteit en Kwaliteit van Leven georganiseerd. De workshop had als doel consensus te bereiken over de belangrijkste assumpties en principes, die ten grondslag liggen aan modellen met betrekking tot omgevingskwaliteit. Een ander hoofddoel was de vorming van een internationaal onderzoeksteam (consortium). De problemen en vragen rondom de begrippen omgevingskwaliteit en kwaliteit van leven werden belicht vanuit zes perspectieven. De discussie spitste zich toe op a) definities, b) modellen, c) de keuze van domeinen en indicatoren, d) geografische schaalniveaus, e) het raakvlak tussen theorie (wetenschappers) and praktijk (beleid/ planners) en f) de noodzaak tot communicatie met en participatie van relevante belanghebbenden.
a) Kwaliteit van leven (QoL) en omgevingskwaliteit (EQ) zijn context-afhankelijke, dynamische begrippen die tevens afhankelijk van de onderzoeksdiscipline en -methode worden gedefinieerd. De noodzaak van overkoepelende definities wordt ter discussie gesteld. Maatwerk verdient de voorkeur. Toch worden drie basale kenmerken aan het begrip kwaliteit onderkend: geluk of tevredenheid, behoeften en (mensen)wensen. Daarnaast is er consensus over het belang van het verschil tussen feitelijke toestand en de beoordeling van deze toestand door mensen (‘objectief versus subjectief’).
b) Voor het modelleren van EQ en QoL krijgt een theorie-gebaseerde aanpak de voorkeur boven een data-gestuurde aanpak. Een optimale vertaling voor beide concepten vind zijn weerslag in een (serie van) stimulus-respons modellen.
c) De discussie over domeinen en indicatoren riep vragen op zoals: omgeving in stricte zin (fysisch) of in bredere zin zoals gebruikelijk in bijvoorbeeld tevredenheidsonderzoek. De discussie over indicatoren richtte zich op type indicator (sociaal, gezondheid of tevredenheid) en de keuze van indicatoren (ad-hoc of op basis van theorie). In relatie tot gezondheidsindicatoren werd gewezen op de positieve invloed van de omgeving.
d) Kwaliteitsbepalingen dienen op een zo laag mogelijk schaalniveau te worden gemaakt, de resultaten dienen echter op zowel lokaal als nationaal beleidsondersteunend te zijn.
e) Om voortgang te boeken op het gebied van omgevingskwaliteit is een brede aanpak nodig waarbij de verschillende belanghebbenden zijn vertegenwoordigd. De uitdaging is gelegen in het overbruggen van de kloof tussen wetenschap en beleid/beheer door 1) uniformiteit in gebruik van concepten en benaderingen door de diverse betrokkenen en 2) het bevorderen van het gebruik en bruikbaarheid van onderzoeksresultaten voor beleid en beheer.
f) Tot slot werd communicatie met en participatie van relevante betrokkenen als zeer belangrijk aangemerkt. Het betrekken van het publiek bij het plannen en opstellen van onderzoek werd als een garantie beschouwd voor de toepassing en toepasbaarheid van resultaten van onderzoek.
Andere relevante uitkomsten van de workshop zijn een interdisciplinair netwerk van deskundigen op het gebied van omgevingskwaliteit, een ‘Expression of Interest’ voor een geintegreerd project (IP) ten behoeve van het 6e EU Kader Programma en een speciale uitgave van het internationale tijschrift ‘Landscape and Urban Planning’, dat in het eerste kwartaal van 2003 zal uitkomen.

# Abstract

In April 2002 an international workshop on Environmental Quality and Human Well-being was held at Utrecht, The Netherlands. The workshop was aimed at obtaining consensus on basic principles and assumptions underlying conceptual models concerning Environmental Quality (EQ) and Quality of Life (QoL) and to initiate a plan for international research collaboration in this field.
The problem of environmental quality was presented from six different perspectives . The highlights of the papers, subsequent discussions and conclusions focused on six topics (for abstracts of all papers presented, see Appendix 1).
The first one was the issue of *definition*. It was concluded that QoL is context-dependent, dynamic, and dependent on research method and discipline. So why add yet another definition? Still three basic aspects of QoL came forward: QoL as happiness or satisfaction, as needs, or as whishes. Furthermore there was consensus on the importance of the distinction between facts and judgements (objective versus subjective) in a conceptual sense, not to address measurement problems because both can be measured validly and reliably.
Secondly, to model EQ and QoL a theoretical-broad approach was preferred to a data-driven narrow approach. EQ in relation to QoL may be best translated into a series of stimulus-response models.
Thirdly, the debate on domains and indicators rendered several unanswered questions: environment in a strict, physical, sense or in a broader sense, usually adopted in satisfaction research. The discussion on indicators concentrated on type (social, health, or satisfaction) and choice of indicators (ad hoc lists or theory based selection). With respect to health indicators the restorative capacity of the environment was pointed out. Fourth, spatial scale level: to what extent is decision making with respect to EQ made at the correct scale level? It was agreed upon that EQ assessments should be made at the lowest scale level (neighbourhoods). Results should serve policy making at the local and the central level. Fifth, the interface with policy makers/urban planners was discussed. It was concluded that a broad approach involving societal stakeholders is needed to further the field of environmental quality and human well-being. Two sets of players were discerned: specialists and development players (decision makers, planners, engineers, architects). The challenge is to bridge the divide between both by 1)unification of the concepts/approaches from different disciplines, 2) enhancing the usefulness of outcomes to the major players in development and planning. Finally, communication with and participation of stakeholders in EQ issues was considered to be of extreme importance. Engaging the public into the planning of research is considered the best guarantee that the research findings will actually be used.
A general conclusion was that the theoretical and empirical relation between environmental quality and well-being is far from well established, as is the influence of these factors on urban policy, planning, and design. It was also concluded that a broad transdisciplinary effort involving societal stakeholders is needed for further development of the field. These conclusions were the starting point for an Expression of Interest (EoI, EU 6th Framework Program, Integrated Project, see Appendix 2) concerning the problem of development and quality of life in urban residential areas all over Europe.
Meanwhile the EOI has been submitted to the EU. Furthermore some of the papers presented at the workshop will appear as full papers in a special issue of the journal for Landscape and Urban Planning (for the contents of this issue, see Appendix 3).

# Table of contents

# 1. General introduction

In the last decade there has been a growing interest in the quality of the urban environment among the public, scientists, politicians, and policy-makers. For instance, in the Netherlands this is reflected in recent strategic governmental papers with respect to housing, spatial planning and local environmental policy. At an international level it is discussed in numerous scientific publications, and other documents concerning policy making and urban planning. There has been a shift in thinking about urban planning from quantity to quality of life and from health to well-being. Attention is moving from health towards indicators and determinants of well-being, such as social economic status and related health differences, annoyance, sleep-quality, but also toward aspects such as social cohesion and social safety. Typical urban problems, such as segregation, neighbourhood degradation and depressed urban areas are coming forward as important issues and the discussion about compact cities versus urban sprawl seems to have been revived.
These problems have become central political issues in most EU-countries. At the same time sustainable development of liveable residential environments in multi-functional, compact cities has been put forward to prevent unbridled urban sprawl. Definitions regarding environmental quality, liveability, sustainability, well-being and quality of life are anything but uniform and a generally accepted conceptual framework has not yet been developed, nor has a coherent system to measure and properly evaluate aspects of environmental quality. We are typically dealing with a multi-disciplinary field involving many scientific and policy domains such as social quality, environmental- and urban planning, public health and well-being. The shaping of views around the concept of 'quality' is characterized in the past years by an integration of different policy-making goals and fields. The theoretical and empirical relation between the living environment and well-being has not yet been established.

In order to support policy development in spatial and urban planning and environmental quality and to shape the research agenda The National Institute for Public Health and the Environment in the Netherlands (RIVM) commissioned RIGO Research and Consultancy (Amsterdam) to perform a literature survey (Leidelmeijer, van Kamp, 2003) on 'environmental quality'. This extensive survey was a starting point for this international workshop on urban development, environmental quality and human well-being. The main aim was reaching interdisciplinary consensus on the major assumptions and basic principles underlying conceptual models concerning environmental quality. The literature survey (RIGO/RIVM) served as a blueprint for working hypotheses, the interrelation between concepts (theoretical) and the interrelation between sets of indicators (empirical). A secondary aim was to discuss the desirability and feasibility of a multi-centre study e.g. within the 6th European Union Framework Programme on aspects of environmental quality and human well-being.

Specific focus points of the workshop were:

- Scientific state of the art, which concepts used, definitions, interrelations between concepts and indicators.
- Theory versus practice (who will use the outcomes, how useful are our models?).
- Attention for different scale levels: (international, national, regional, local, individual). Do we need different conceptual models at different levels?
- Attention for different perspectives: disciplines and different stakeholders (policymakers, market, residents).
- Relation between objective and subjective characteristics.
- Relation between environmental quality and health (well-being).

Relation between physical and social domain.
Static versus dynamic approach: do different factors play a role at different times?
Cultural and societal differences concerning Environmental Quality and aspects that are of influence.
What is the relative importance of these different factors and how to take these into account (e.g. by weighing)?

A broad introduction into the topic of environmental quality and human well-being was given from six disciplinary perspectives, sociology, human ecology, social geography, architecture, environmental psychology, and epidemiology, hereby placing the problem into the light of urban planning. Parallel session on specific themes were used to discuss these topics in more detail. Specific attention was given to the choice of models and concepts, the choice and structuring of environmental quality indicators, the interface between theory and practice, health indicators and social indicators and quality of life indicators in children. Abstracts of all papers are included in Appendix 1 of this report, for full papers of some of the presentations we can refer to a Special Issue of Landscape and Urban Planning (2003, for table of content see Appendix 3).

## 1.1 Agenda Workshop

**Day 1: April 28,**

**Plenary sessions:**
Pieter Kramers
Welcome
Charles Vlek
General Introduction
Irene van Kamp
Environmental quality and human well-being; towards a conceptual framework and demarcation of concepts
Lex Brown
Working at the interface of environment and development
**Parallel sessions:**
Kees Leidelmeijer:
Models, hypotheses, research questions
Lex Brown:
Theory versus practice
Ric van Poll:
Quest for indicators. The proof of the pudding . . .

**Day 2: April 29**

**Plenary sessions:**
Robert Marans:
Understanding environmental quality through quality of life studies: the 2001 DAS and its use of subjective and objective indicators
Roderick Lawrence:
Human ecology and its applications
Michael Pacione:
Urban environmental quality; a social geographic perspective
Marino Bonaiuto:
Indexes of perceived environmental qualities and neighbourhood attachment in residential urban environments
Maria Freitas
Residential quality – bungee-jumping into its complexity
Brigit Staatsen:
Health risks and environmental quality; an epidemiological perspective
Discussion
**Parallel sessions:**
Markus Meis:
Environmental quality and well-being in children
Peter Lercher:
Which health outcomes should be measured in health related environmental quality studies ?
Linda Steg:
Social Indicators and quality of life

**General conclusions and discussion** (Charles Vlek)

# 2. Proceedings of the workshop

## 2.1 Introduction

### RIVM and VTV-model. Pieter Kramer.

In 1909 the National Health Institute was started (RIVM), to which in 1994 the Environment branch was added to become the National Institute for Public Health and the Environment (RIVM). In its first Environmental Outlook in 1989 RIVM addressed the health impact of environmental degradation. RIVM concluded that there is an impact but it is relatively low. Later on the burden of disease due to environmental degradation was estimated to be 2-5% of the total burden of disease in the Netherlands. The health-field concept of Lalonde has meant a breakthrough in the conceptualisation of determinants of public health. Especially the explicit link between exogenous and endogenous factors and their impact on health was a step forward. The Lalonde model is at the very basis of the present Public Health Forecasting (VTV) model, which is basically a working model to structure and order the determinants of public health and its policy contributions. Important in the relationship between public health and environmental quality is the distinction between objective and subjective aspects. On the one hand we can make objective assessments, irrespective of human judgement, on the other hand human experience is a dimension of its own, which must be understood as such.
The parallel to a working model for environmental quality is obvious yet still to be achieved.

### Major issues and questions. Charles Vlek.

Research into environmental quality, urban development and human well-being cannot be a mono-disciplinary activity. Environmental psychology and physical science and knowledge should go together in this field. Moreover, the endeavour demands maturity and experienced scientists.
The objective of this workshop is to clarify what we are talking about. Without data we could already say something sensible about environmental quality and human well-being in a structured manner. The core question is: what exactly is it that we want to describe, explain, predict and manage? Environmental quality can only be described in relation to the context and activities: different demands are posed to environmental quality in different situations (e.g. traffic and leisure).

Human well-being is the other side of the medal and can be considered as indicator of sustainable development, besides economic and environmental aspects. How can these aspects be separated? Important issues that play a role are :

- How do we weigh short and long term effects and development: liveability (we, here, now) versus sustainability (them, there, later)?
- How do we define and measure perceived deprivation?

## 2.2 Highlights from the six perspectives

The concepts of QoL, EQ, health, and well-being were discussed from six different perspectives: environmental psychology, social geography, architecture, human ecology, sociology, and, last but not least, epidemiology. In this section the highlights of the papers in the plenary and parallel sessions and their discussions are summarized (for abstracts of the papers see Appendix 1). Because participants could not attend all parallel sessions, minutes of these papers are presented separately (2.4). The highlights of the plenary sessions are presented, in as far as possible, following the topics mentioned in the introduction.

### 2.2.1 Definitions

The discussion was primarily focused at the definition of the concept quality of life. Hereby the central question was: why add yet another definition? It was concluded that it is impossible to develop one definition because the concept is context-dependent, dynamic, dependent on research method and discipline. Important problem is that the definitions of concepts such as liveability, sustainibility, environmental quality, quality of life and well-being are too interdependent. It was suggested to 'skip' the concept of liveability and specify what we mean when we speak about environmental quality and quality of life. Three basic aspects came forward: quality defined as happiness or life- satisfaction, quality defined as needs and quality as wishes. In questioning people these aspects should be incorporated. In the distinction between quality of life and environmental quality we have to decide whether we use a broad or a narrow perspective.

*Objective versus subjective*

There was consensus on the importance of the distinction between facts and judgements (objective versus subjective, measured versus perceived). Research specifically on perception of quality of life is considered as very important. The relation between measured and perceived indicators of urban quality is rarely examined in one study. However, this is considered to be very important for policy-making; interventions are aimed at physical, social and environmental factors, but do not necessarily result in a perceived improvement of quality of life. Some people consider quality of life as the subjective aspect of health, while others consider quality of life as going beyond that. Both criteria should be measured at one time: a distinction between the physical aspects of quality and the perceived part might be useful.

Besides the balance between objective aspects and perceptions, environmental quality also includes relationships between people e.g. a comfortable idea about the neighborhood depends on characteristics and a match between people. Quality of life is not just a result, but its ingredients together form a process. In community sense quality of life is something like a long life, happiness related to social life and a determinant of physical life/functioning, objective measures and intangible measures such as atmosphere, policy making et cetera. It was noted that we have to be careful to contrast objective and subjective indicators of environmental quality. The question was raised to what extent can we shape our environmental quality as a function of available resources.

### 2.2.2 Models

There was general consensus that a theoretical-broad- approach is preferable above a more data driven-narrow-approach. It was agreed that the issue of environmental quality in relation to quality of life can be translated into (a series of) stimulus response model(s). Environmental quality can indeed be described in terms of environmental stressors. However,

the different exposure-response relations do not really tell the whole story. E.g. research into the effect of combined sources (noise- and air pollution) on health and well-being shows that not only differ sources with regard to their effect, but also in the way people cope with them. It was noted that the positive aspects of the environment should also be taken into account. An example from the noise field is given, hereby referring to the work of Berglund on the positive (restorative) aspects of silent environments. The multi-level hierarchy as presented by Pacione (Figure 1) works at different levels and fits to every environmental stressor.

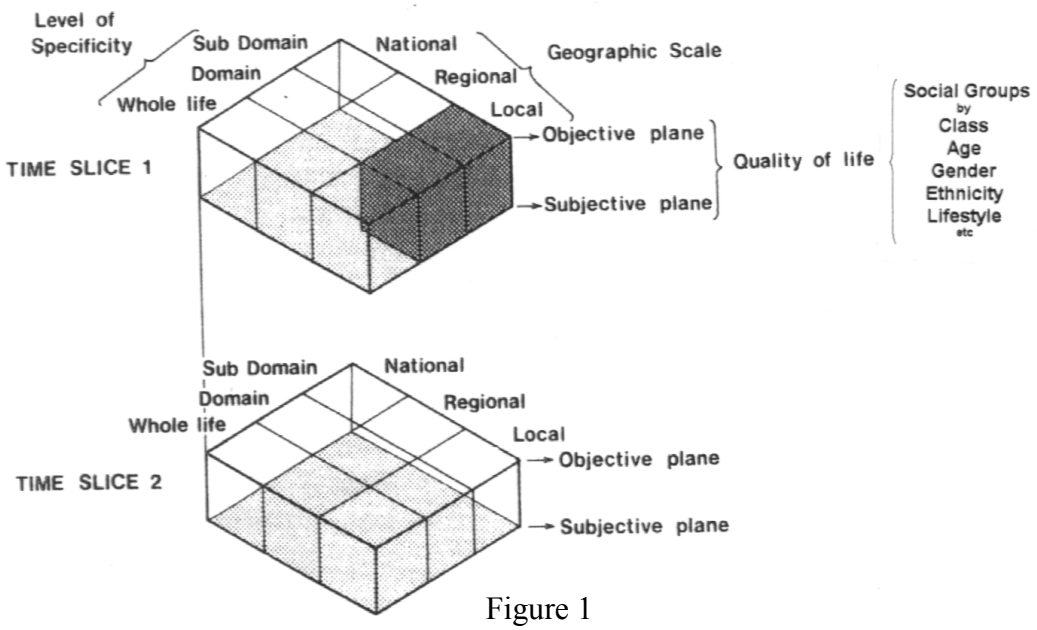


Figure 1

## 2.2.3 Domains and Indicators

The core issues discussed relating to domains and indicators were:

- which aspects of the environment do we focus on and on the basis of what do we decide on this; consultation or academic ideas? and
- which domains do we want to focus on and which relationships between different domains?

*General*

The session on choice of indicators was aimed at performing a multi-attribute evaluation of (Perceived) Environmental Quality with emphasis on the local environment. While doing so various points of discussion arose. The first one was: what do we mean with environment? Environment in a strict sense or environment in broader terms as it is addressed in residential satisfaction research? The first notion constrains itself to chemo-physical aspects of environmental pollution: noise, bad odour, air pollution. The latter comprises also psycho-social and physical aspects. It was also pointed out that the interpretation of relevant characteristics should be unambiguous. This should be done in advance, before presenting respondents with lists of indicators. Reliability of the extensive ranking task to assess relative weights of environmental characteristics was questioned ('how reliable is the ranking-process?').

*Social Indicators*

The general discussion around social indicators also focused at the choice of indicators. What is best: an ad hoc list of indicators or a theory based selection of indicators? The advantage of

a theory based selection is that the research outcomes are not data driven. It was considered important to incorporate institutional indicators: the process is relevant as well. A careful conclusion is that the development of a core set of social indicators is the aim of the study. The disciplinary approaches should be integrated into one approach.

*Health Indicators*
Regarding relevant health outcome indicators it was concluded that there is a broad range of health outcomes and lots of instruments. Two examples were presented: the noise study around Schiphol Airport and a large survey in a traffic noise area in Norway. The indicators used in these surveys range from ill-health to satisfaction and quality of life. To what extent did noise studies have had an impact on planners? In Norway the rules have become more strict and around Schiphol Airport the attention for the problem seems to have influenced annoyance in a negative way. There is an ongoing debate, but it was concluded that we should not concentrate exclusively on the negative aspects, but find explanations why people remain in high exposed areas. It would be possible to combine all the questions (one needs to ask about health outcomes) in a panel approach, enabling to spread the questionnaires in time. The largest methodological problem with this approach is that the samples are not representative. The main question is not how to choose or develop indicators, but what the relationship is between health and environmental quality/quality of life. Then later on you may add extra indicators. There was discussion about the aggregate health indicators that are most fit such as the burden of disease, life expectancy, the magnitude of health problem or DALY's.
It was also concluded that more attention should be given to environmental quality and well-being in vulnerable groups such as children or the elderly.

### 2.2.4 Geographical Scale-level
An important question that rose during the discussions was to what extent the decisions concerning environmental quality are made at the right scale-level? For example, environmental policy making is being strongly decentralized and while there is a growing problem of traffic and local authorities do have their own traffic plan, they are powerless to a large extent and strongly dependent on national structures. It is noted that citizens feel powerless as well. How to bridge the gap between local versus national environment? It is generally felt that aggregate measures are not fit for the problem because they give less information. The core issue is global burden but this approach is only partly suitable. Although globalization has increased a sense of community identity, many problems can best be measured and evaluated at the lowest scale level (neighborhood, individual). Ideally both levels have to be addressed. Of importance are the effects of interventions and the relative costs of these interventions and the choice of indicators that measure the effectiveness of policy interventions. The scale of decision making hereby is central as well as local. So we need tools at all these different scale levels.

### 2.2.5 Interface with policy makers/urban planners
It was concluded that a broad approach involving societal stakeholders is needed to further the field of environmental quality and human well-being. Two sets of players were discerned: 1. Specialists 2. Development players (decision makers, planners, engineers, architects). The challenge is to bridge the divide between 1 and 2; why would environmental planning and urban/health planning be two separate areas? Environmental exposure is a relatively new field. Successful research programmes include: 1. unification of the concepts/approaches from different disciplines, 2. usefulness to the major players in development and planning. Transport planners are always testing scenarios/options, the central question being: what is

useful information for this process? For example in the case of noise pollution relevant information concerns the noise distribution over dwellings, the noise levels with different scenarios. The different indicators should be related to the various scenarios. Can environmental health specialist suggest other options if there are differences? The information should be provided in such a way that planners can use it (e.g. visual).
Research indicators should include the following:

Understanding how development process works
Who are the potential users? At what scale /time-frame do they operate?
Becoming familiar with language (tools/concepts of the development manager)
Assisting the development manager to formulate alternatives
What if testing the different alternatives puts enormous constraint on data responsiveness. Can we simplify without getting unreliable?

### 2.2.6 Communication and Participation

Communication with and to the citizens as well as policy makers/planners is considered to be of extreme importance in this field. Scientists have to help the politicians in their choice of indicators. The core issues should be defined in communication with the various stake holders via e.g. the focus group method. The components are as follows: identify indicators, talk these over with relevant others, while in the meanwhile the different actors do not have to give up their responsibility. Engaging the public into the planning of research is considered the best guarantee that the research findings will actually be used. It is noted that we have to include institutional indicators as well to come up with changes: while the instruments are adequate the process (power) involved in decision making may not. The input from laymen is unanimously considered to be very important in this via the participation process.

## 2.3 Parallel sessions

Minutes of the parallel sessions

### 2.3.1 Models, hypotheses, research questions. Kees Leidelmeijer

The session engaged in a discussion about definitions regarding quality of life. It was concluded that it is impossible to develop one definition because the concept is context-dependent, dynamic, dependent on research method and discipline. The discussion about models, hypotheses and research questions was thus not even started.

### 2.3.2 Theory versus practice. Lex Brown

As a kick-off Lex Brown posed the following question: what experience do people have with the interaction about the research outcomes with users/planners?
Brown discerns two sets of players:
1. Specialist
2. Development player (decision makers, planners, engineers, architects)

The challenge is to bridge the divide between 1. and 2.: why would environmental planning and urban/health planning be two separate areas. Environmental exposure is a relatively new field.
Successful research programmes include:
1. Unification of the concepts/approaches from different disciplines
2. Usefulness to the major players in development

Transport planners are always testing scenarios/options, the central question being: what is useful information for this process? For example in the case of noise relevant information concerns the noise distribution over dwellings, the noise levels with different scenarios. Then, relate indicators to scenarios. Research indicators should include:
1. Understanding how development process works
2. Becoming familiar with language (tools/concepts of the development manager)
3. Assisting the development manager to formulate alternatives
4. What if testing the different alternatives enormous constraint on data responsiveness. Can we simplify without getting unreliable?

### 2.3.3 Quest for indicators. The proof of the pudding… Ric van Poll.

This session aimed at performing a multi-attribute evaluation of (Perceived) Environmental Quality (see abstract) with emphasis on the local environment. To give the participants of this session a better insight in MAUT, they were invited to perform an evaluation themselves. While doing so various points of discussion came up. The first one was: what do we mean with environment? Environment in a strict sense or environment in broader terms as it is addressed in residential satisfaction research? The first notion constrains itself to chemo-physical aspects of environmental pollution: noise, bad odour, air pollution. The latter comprises also psychosocial aspects and physical planning aspects of the local environment. The group discussion on relevant, well-specified, local environmental (broad sense) characteristics reveals a relevant additional list of characteristics. It is also pointed out that the interpretation of relevant characteristics should be unambiguous. This should be done in advance, before presenting respondents with the list of characteristics. Reliability of the extensive ranking task to assess relative weights of environmental characteristics was questioned (‘how would I perform tomorrow’).

### 2.3.4 Environmental quality and well-being in children. Markus Meis

In this session the environmental quality and well-being in children was discussed. Children can be considered as a specific vulnerable group, since they have lower thresholds and inadequate anticipation. Most standardized questionnaires on health and well-being/quality of life are not apt for children. A need for short questionnaires was noted with special themes, that are recognizable for children.

### 2.3.5 Which health outcomes should be measured in health related environmental quality studies ? Peter Lercher.

The health outcome session (Peter Lercher) concludes that there is a broad range of health outcomes and lots of instruments. Two examples are presented: the noise study around Schiphol and traffic noise area in Norway. The indicators used range from ill-health to satisfaction/QoL. To what extent did noise studies have an impact on planners: in Norway the rules have become more strict. Around Schiphol the attention for the problem seems to have influenced annoyance. There is an ongoing debate, but we should not concentrate on the negative aspects but find explanations why people live there. It would be possible to combine all the questions (one needs to ask about health outcomes) with a panel approach, enabling to divide the questionnaires in time). But you may not have a representative sample. The main question is not to develop indicators, but concentrate on the relationship between health and environmental quality/quality of life. Then later on you may add extra indicators.

### 2.3.6 Social Indicators and quality of life. Linda Steg.

The discussion about social indicators (Linda Steg) was not finished yet. The general discussion was on the choice of indicators. What is best: an ad hoc list of indicators or a theory based selection of indicators? The advantage of a theory based selection is that the research outcomes are not data driven. We also have to incorporate institutional indicators, the process is relevant as well. A careful conclusion is that the development of a core set of indicators is the aim of the study. The disciplinary approaches should be integrated into one approach.

## 2.4 General conclusions and discussion

**Chair: Charles Vlek**

The general discussion starts with an inventory of general impressions obtained in the two days of the workshop. Charles Vlek summarises the problem in a diagram as presented in Figure 2.

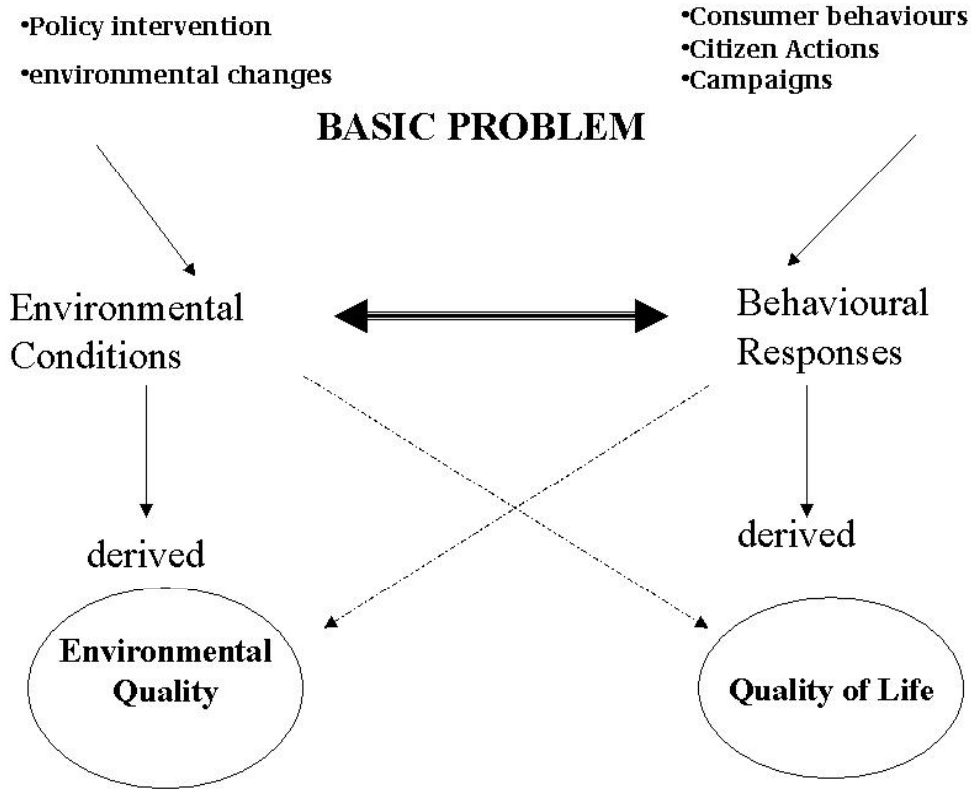


*Figure 2.*

The basic problem concerns the relationship between environmental conditions and behavioural responses, from which environmental quality and quality of life can be derived. Policy interventions and (autonomic) environmental changes are of influence on these conditions, while behavioural responses are co-defined by consumer behaviours, citizen actions and campaigns.

**SO**: We must effectively join physical science and social behavioural sciences contributions.

**BUT**: We will get lost if we don't focus on specific, delineated policy problems.

What do we need?

As a point of departure the participants agreed on the importance of a theoretical framework that covers useful concepts, different domains and practical questions. The different approaches should hereby be integrated in one overall approach such as an Environmental Health approach. Subsequently a proper methodology should be developed, in which variables, scale-levels, data sources, procedures for data-collection and analysis should be specified. It was considered crucial to overcome the 'objective-subjective divide'.

objective: physical characteristics, conditions, resources, states

subjective: perceptions, judgements, attitudes, adaptive behaviors, strategic choices about shaping our own quality of life and for environmental conditions

Scientific participation involves: describing, explaining, predicting, designing, planning, decision-making and management. The communication with policy makers, planners as well as citizens and other end-users should be effective and timely. Relations, processes and degrees of control are recognized as important for understanding and shaping quality of life.

Points for attention: Where do we go from here?

In the discussion there was consensus on the basic problem of environmental conditions versus human responses. It was deemed necessary by all participants to specify a broad multi-disciplinary framework, allowing for a synthesis and in order to structure the choice of indicators. Decision making should be a vital part in the development of these models. A need was felt for broad studies, which address several domains as well as in depth studies over longer period of time. Especially for these in-depth studies a general model could serve as a point of departure. Moreover a need for regional and local studies at different scale levels was felt by the participants. Although a theoretical framework is seen as necessary, some advocate a more pragmatic approach. In an iterative process according to the principles of the civic science, model building should include the role of the decisions making process. The *discourse* about models and indicators chosen should be a central issue. In this way a match can be sought for between policy makers visions and more scientific approaches. Hereby the point of departure are resources (human, institutions, systems).

The recommendations[1] can be summarized as follows:

Develop one general approach and optional subsets of models;
Develop a core set of indicators to be used in transnational comparisons;
Develop a set of indicators for in-depth studies;
Develop a ‘toolshed’ that is applicable at different scale levels;
Research with different disciplines;
Involve decision makers and citizens at an early stage.

[1] Most of these recommendations were further elaborated and worded in the Expression of Interest (see Appendix 4)

***Some remarks to put the problem into perspective***

Many questions but few answers There is more confusion than necessary
Combination of environmental/social and quality is attractive but very complex
Added value of quality is stars or moon
Large expenditure in sectorial areas might decrease environmental conditions, but not increase quality of life

**The way ahead**

It was recommended to focus future research at a problem that is common for all urban areas, such as increasing transportation and/or further segregation versus social cohesion.
Three major (combinations of) approaches were suggested: 1. meta analysis of existing data (GIS and Benchmarking); 2. multi-centre studies (broad and in-depth); and 3. Stakeholder involvement, focal group participation and information during the process. A meeting platform of special working groups was suggested as a suitable preparatory method.

The general conclusion was that the theoretical and empirical relation between environmental quality and well-being is far from well established, as is the influence of these factors on urban policy, planning, and design. It was also concluded that a broad transdisciplinary effort involving societal stakeholders is needed for further development of the field. These conclusions were the starting point for an Expression of Interest (EU 6th framework Programme, Integrated Project) concerning the problem of sustainable development and quality of life in urban residential areas all over Europe (see Appendix 2).

# 3. Appendices

## 3.1 Abstracts

**Towards a conceptual framework and demarcation of concepts:**
**A literature study.**
**Irene van Kamp**[1], Kees Leidelmeijer[2], Gooitske Marsman[2].
1. National Institute for Public Health and the Environment; 2. RIGO research and Consultancy, Amsterdam, the Netherlands.

This paper summarises the outcomes of a literature study on Environmental Quality and Human Well-Being that was performed by RIGO Research and Consultancy BV (Amsterdam) at the request of the National Institute for Public Health and the Environment in the Netherlands (RIVM). This survey is part of the RIVM project 'Policy-Supporting Instrument' which is aimed at the development of tools to evaluate multidimensional aspects of environmental quality. Eventually the tool should enable the assessment of policies with respect to spatial and urban planning, as well as the current and future quality of the (local) environment.
First the history of concepts related to environmental quality is sketched from different perspectives such as city-planning, architecture, sociology, economics, well-being and health over the past 150 years. The development of these concepts is placed in a broader framework of societal development. Next an overview will be given of the main (types of) definitions of the concepts liveability, environmental quality, quality of life and sustainability. Some examples of relevant conceptual models concerning environmental quality will be presented from the field of human ecology, liveability and sustainability research, quality of life, city planning, social indicator movement and satisfaction research and models developed from a policy point of view.
The concept of environmental quality is clarified in three manners: first a distinction is made between different types of concepts on the basis of semantic analysis. Next the domains of environmental quality are defined, and finally steps are discerned that are relevant to the evaluation of approaches to environmental quality. This is meant to serve as a basis for the discussion of assumptions and principles underlying conceptual approaches to the issue of environmental quality and well-being.

**Working at the interface of development and environment.**
**Lex Brown .**
Griffith University, School for Environmental Planning, Brisbane, Australia.

It is important to move towards a conceptual model of urban environmental health and well-being that can draw together, in a practical way, the different strands of work across several fields. Perhaps not so obvious is that an important consideration in model building should also be who might use such a model, and how it might be used. Based on experience in the environmental field, this paper suggests that one of the major challenges is to bridge the divide between the environmental/health/quality-of-life specialist, and both the players who make urban policy and the players who shape our physical and social environments – the engineers, planners, architects, service delivery specialists etc. It might be argued that the issue is how to ensure any new model improves the quality of information available to these

decision-makers. This paper suggests that the real issue is how to ensure any of it gets there at all. If it does get there, can any of it be used?
To maximise the utility of any new conceptual model and its likely offspring indicators, firstly there is a need to understand how the development and decision-making processes function. Secondly, there must be an understanding of the language, the tools and the thought processes that are used by the decision-making players. Bridging this divide requires communication. Thirdly, the approach must be one in which the information provided by the environmental/health/quality-of-life specialist assists the decision-makers to develop and test scenarios, particularly novel paths of action that could shift development activities in desirable directions.

**Quest for indicators. The proof of the pudding . . .**
**Ric van Poll.**
National Institute for Public Health and the Environment, the Netherlands.

If Environmental Quality is conceived of as a multi-attribute concept, the first step in a multi-attribute evaluation procedure is to identify and, if necessary, to structure value-relevant Environmental Quality Characteristics or Indicators (EQIs).
Several sources and methods may be used to identify and structure relevant EQIs. Relevant attributes can be elicited, for instance, by using *common sense*, by *reviewing relevant literature*, or by *interviewing relevant people* (e.g. experts, residents). Techniques available for interviewing are, for instance, direct questioning and indirect questioning. Applying these techniques and methods may result in a set of attributes that are defined at various levels of concreteness. If this is so, the EQIs may be structured in a hierarchical order.
Two approaches to structure EQIs can be distinguished: an analytic or *top-down* approach and a synthetic or *bottom-up* approach. The ‘top-down’ approach starts with an inventory of abstract, semi-specified EQIs. These are split up into more specific EQIs (e.g. environmental quality into satisfaction with the dwelling, the neighbourhood and the neighbours). The specification of EQIs is continued until they reach a level of concreteness on which they are measurable. These are the so-called ‘end-level’ EQIs. The *bottom-up* approach involves a synthesis of well-specified, concrete EQIs. Specific EQIs are put together in groups so as to yield fewer and less well-specified general EQIs. In turn, these so-called higher-level EQIs are grouped together. This may continue until only one attribute remains, the ‘top-level’ EQI.
In both the ‘top-down’ and the ‘bottom-up’ approach abstract EQIs are located higher up in the hierarchy of attributes than well-specified EQIs. The abstract ‘top-level’ EQIs branches into more and more specific EQIs ending with the ‘end-level’ EQIs. Altogether the EQI hierarchy is called a ‘value tree’. Normally, the value tree is reshaped and pruned until all important EQIs are in place. Redundancy of EQIs should be avoided. EQIs may be called redundant if they have the same meaning or are correlated. As a rule of thumb a value-tree contains eight to fifteen ‘end-level’ EQIs with ten ‘end-level EQIs’ as an optimum. Usually, the ‘top-down’ approach results in a value-tree with small numbers of EQIs per level but with many levels (deep hierarchical structure), whereas the ‘bottom-up’ approach usually results in flat, broad-based value-trees. In this parallel session elicitation and structuring of environmental quality indicators is the main course. For dessert you are cordially invited to actually perform a bottom-up synthesis of EQI’s yourself!

**Environmental Quality and well-being in children.**

**Markus Meis**[1], Monika Bullinger[2], Cara Kahl[1] .
1. Institute for Research into Man-Environment Relations, University of Oldenburg; 2. Department of Medical Psychology, UKE Eppendorf, University of Hamburg, Germany.

In the seventies, research on the effects environmental stressors have on children especially dealt with studies on traffic noise. The parameters measured were physiological reactions, annoyance reactions and in particular school performance depending on these sub-optimal environmental conditions.

Noise effect research experienced a renaissance in the nineties with children, partially initiated by the Münchener Fluglärmstudie (Munich Study on Aircraft Noise) 1991-1994. Increased attention was explicitly paid to this vulnerable subgroup, since, according to theories on stress models, children are extremely susceptible to environmental stressors due to their lack of coping strategies. Within the scope of these field studies, for instance in Germany, Austria, and England, effects generated by environmental factors were registered using various methods. This was necessary since, according to the assumptions made by stress models, the effects of stress on psychic functions occur in different dimensions of measurement. In extending established dimensions of measurement within the construct of well-being, these studies additionally registered standardised instruments measuring health-oriented Quality of Life as outcome variables in adults and children.

One question hardly pursued until now is whether the constructs 'Environmental Quality' and 'Human Well-Being/Quality of Life' represent different dimensions of measurement, or if Environmental Quality can be seen as a sub-scale of Quality of Life. It is therefore of great interest to analyse studies beyond those concentrating on traffic noise. Moreover, studies registering annoyance/disturbance by environmental conditions as well as health-oriented Quality of Life should be considered. Questioning whether the constructs health-oriented Quality of Life and experienced environmental quality correspond, and if so, how much shared variance they explain, are matters to be pursued.
An initial approximation to these questions was achieved by performing a literature analysis. The main goal was to gather and summarise findings as well as studies on the range of topics mentioned, emphasising the involvement of children as targets of research.

The results are alarming, yet somehow motivating. Solely a total of 35 references were found which more or less offer insight into the research themes mentioned here. The majority of results offered by online databank services pertained to research on *very specific* groups, i.e. children with particular disorders or illnesses (asthma, brain or head injuries, allergies, cancer, victims of abuse, patients with specific protein deficits). Moreover, results most often pertained to *very specific* areas. Often, retrieved results were based on specific locations in the Third World or particularly named health facilities. The results collected offer basic insight into research concerns presented here. These references can be used to gather general ideas on topics and methods already used in research studies. Moreover, their sources (journals) can eventually be contacted for further searching. All in all, these findings implicate that very little has been discovered within the realm of research concepts mentioned here.

In a primary intervention study (construction of an airport) with children between 11-13 years (age at the third wave of measurement) over a period of three years, results revealed that children are very capable of naming and perceiving subjectively felt impairments of

environmental quality. Exposure-dependent effects were clearly registered. However, effects concerning health-oriented Quality of Life were also revealed in some scales (scale 'Psyche'), although less distinctive.

In an epidemiological follow-up study implemented via telephone interviews, a total of 350 children between 13-16 years were questioned on exactly the same environmental factors in the respective areas. Additionally, health-oriented Quality of Life was registered (KINDL, Sub-scale SF36, FLZ). Furthermore, the mothers of these children were also interviewed on both the environmental factors as well as on Quality of Life. Both mothers and their children clearly stated the impairing environmental sources as being disturbing, but the effects environmental stressors on Quality of Life were only slightly distinctive. In comparing mothers and children regarding the environmental factors considered disturbing, pronounced differences arose. This implies that children and adults have different concepts concerning subjectively experienced environmental quality.

Based on this, first suggestions are proposed concerning which instruments should be utilised for future epidemiological and experimental studies, and regarding if and how highly 'Environmental Quality' can be quantified in children.

**Which health outcomes should be measured in health related environmental quality studies?**

**Peter Lercher.**
Institute of Hygiene and Social Medicine University of Innsbruck, Austria.

The epidemiological shift in life expectancy resulted in increased interest in 'health related quality of life' in medicine and public health over the past 20 years. Unfortunately, most efforts in this area split in two separated fields – 'environmental quality of life' and 'health related quality of life'. It is therefore not surprising that the number of studies that conceptually fully integrate both environmental quality *and* well-being are sparse. While the health related quality of life research perspective remains predominantly clinically oriented the social and environmental quality of life approach mostly focuses on satisfaction or happiness as outcomes. Although many useful single and multidimensional measurement instruments have been developed and validated in both areas the experience with the *integrated use* of these instruments in population studies is rare. The reasons given for this situation are manifold, often as simple such as 'the number of items is too large' or 'the battery has not been shown to relate to health or well-being'. However, we can learn a lot from the detailed experience more specialised researchers have.
Examples of integrated use can be found in the approach used

- in the open model developed by Lindström and its application in the Scandinavian countries
- in the Norwegian traffic & environment studies
- around the EHIA of Schiphol airport
- in a research study around Munich airport, integrating adults and children
- in an EHIA in an alpine valley, integrating adults and children

Extracts of these particular approaches and their use will be prepared/presented and their utility for studies into environmental quality and health will be discussed. Furthermore, the selective use of valuable work done by WHO-groups in the healthy city area and recently in the WHO-Environmental Health Indicator project should be considered for indicators at the aggregate level. Other experiences from the World Values Study Group and the Eurobarometer surveys could also help at this level.

The specific aim of the health outcomes group will be the discussion of :
- which health outcomes are appropriate
- the use of both ecological and individual designs
- the utility of the various scales and batteries
- the utility of the outcomes for calculating DALY's & QUALY's
- the question of sufficient exposure and outcome contrast in sampling
- the question of frequency/importance weighting

Obviously, not all these topics can be dealt with in sufficient detail at this meeting; however, the initial ignition should be given here.

**Social factors and quality of life.**
**Linda Steg**
University of Groningen, the Netherlands.

The aim of the workshop is to discuss social factors influencing quality of to environmental qualities. Quality of life is dependent on the degree to which important needs and values are fulfilled. Different conceptions and measures of quality of life have been distinguished, which generally focus on specific aspects of quality of life, e.g. health or working conditions. However, no clear model to examine quality of life related to environmental qualities, or more generally, sustainable development, has been developed yet.

In general, quality of life is dependent on economic, social and environmental qualities, as well as on individual factors. This session focuses on social factors influencing quality of life. Quality of life indicators may be measured objectively, by examining general statistics that refer to objectively measurable societal conditions such as educational level, employment, availability of goods and services and income. Subjective (i.e. individual-perceived) quality of life indicators refer to (aggregate) individual judgements and evaluations of people's perceived conditions. Quality of life indicators may be assessed at different scale levels, e.g. individual, local, national.
In this session it was discussed which social factors be examined in order to better understand the effects of environmental qualities on quality of life.

**Understanding environmental quality through quality of life studies: the 2001 DAS and its use of subjective and subjective indicators.**
**Robert W. Marans**.
University of Michigan, United States of America.

In recent years, a number of cities and counties in the United States and elsewhere have developed indicator programs aimed at tracking their progress toward becoming more sustainable. At the same time, programs have been launched in several cities that aim at measuring the quality of life and more specifically, quality of community life. These programs have used either a series of objective measures to assess quality of life or resident surveys that tap the attitudes and behaviours of citizens. Seldom have both types of measures been employed. Typically the programs have been designed to inform policy decisions of local governmental, corporate, and non-profit organisations. At the same time, they offer opportunities to advance theories and methodologies appropriate to linking the physical environment with behavioural outcomes including health.
This paper suggests that such programs are powerful vehicles for understanding environmental quality and its relationship to human well-being. As an example, the paper describes a major program of research aimed at assessing the quality of community life in the

Detroit metropolitan area. The program is viewed as a mechanism for monitoring social and environmental change in the region and involves the collection and analysis of demographic, behavioural, attitudinal and environmental data. Sources of data include sample surveys using face-to-face interviews and mail questionnaires, the 2000 U.S. Census, aerial photos, and GIS maps.

The theoretical background guiding the research is then outlined including the presentation of conceptual models showing relationships between objective measures of the environment and quality of life outcomes including life satisfaction, environmental satisfaction and other behavioural outcomes.
Finally, the paper demonstrates how the research in the Detroit region has evolved from and relates to policy making.

**Human ecology and its applications.**
**Roderick J. Lawrence.**
University of Geneva, Switzerland.

It is generally agreed that Ernst Haeckel first used the term ecology in 1866. Other biological scientists to designate a science that deals with the interrelationships between organisms and their surroundings then used it. The ecological perspective originated in the natural sciences (botany and zoology) during the late 19$^{th}$ century in order to study plants and animals by reference to what Darwin called 'the web of life'. From early in the 20$^{th}$ century social scientists applied ecological principles to study human behaviour and community organisation. The term human ecology was first used in 1921 by sociologists at the Chicago School of Sociology. From that date the main branches of ecology – animal, plant, fungi, bacteria and human – developed and continued to be studied more or less independently of each other. Since the 1920s definitions and interpretations of human ecology have varied considerably, not only between the natural and social sciences, but also among academic disciplines in the social sciences including anthropology, psychology and sociology. There are other sets of interpretations that stem from worldviews of people-environment relations including the origins of the universe, the status of human beings on earth, and ethic, moral and political perspectives. Despite the divergence of definitions and interpretations of human ecology there have been efforts in recent decades to develop a synthetic human ecology that is explicitly integrated with general ecology. These efforts have not been wholly successful because an additive approach based on disciplinary concepts and methods has usually been applied. An interdisciplinary approach that adopts a combination of methods should replace this additive approach. This kind of approach will be illustrated by a study in one municipality in the canton of Geneva, Switzerland.

The author of this paper is a representative of the University of Geneva in the Cantonal Housing Observatory, founded by the public administration in 1998. This housing observatory is defined by a partnership of representatives of the private sector (property owners of residential buildings including banks, insurance companies and pension funds); the public sector (the cantonal housing office and other departments); the city of Geneva; the association of tenants; building unions and the University of Geneva. By common consent these partners have decided to examine housing demand in the canton of Geneva in terms of both its quantitative and qualitative aspects. The author is responsible for research on the latter. In his role as a representative of the University of Geneva he has formulated a programme of research to identify and understand the qualitative aspects of housing in the municipality of Meyrin which has a population of 20'000 residents. The viewpoints of

representatives of the municipality as well as the partners in the housing observatory have been used to define the topics and methods of research.

A pilot study with 205 households has led to the identification of some key issues that help understand why although 90% of the respondents are satisfied (with their housing unit, the residential building and the neighbourhood) not less than 27% wish to move. The key issues identified by this approach can be interpreted with respect to the information and data collected during the study which has been analysed statistically and represented by a Geographical Information System. This kind of visual representation encourages the communication and discussion of the results by all the partners in the housing observatory as well as the public, especially those residents who participated in the research. At a more general level, the approach used shows that there are good reasons to challenge the traditional way that politicians and public administrators use research contracts accorded to scientists. A participatory approach can be used to replace the common way of transferring knowledge between research and practice. This approach involves many groups of actors at the outset in order to formulate a pertinent research agenda for scientists. This innovative approach enables each actor to maintain his/her expertise and share it with other partners while learning from them.

**Urban environmental quality - a social geographical perspective**
**Michael Pacione.**
University of Strathclyde, Glasgow, Great Britain.

Concern over the quality of life is a characteristic of contemporary societies. This paper discusses research on quality of life and urban environmental quality undertaken in social geography. The paper describes the social geographical perspective on quality of life and human well-being, and considers a number of key conceptual and methodological questions. These relate to indicator types, indicator specificity, scales of analysis, the 'fifth dimension' of social groups, the composition of quality of life, the measurement conundrum, structural models of life quality, and theories of urban impact. Two case studies are presented to illustrate the application of the concepts and methods of urban social geography to identification and interpretation of quality of life. Finally consideration is given to the potential policy relevance of quality of life research.

**Indexes of perceived environmental qualities and neighbourhood attachment in residential urban environments.**
**Marino Bonaiuto**, Ferdinando Fornara, Mirilia Bonnes.
Dipartimento di Psicologia dei Processi di Sviluppo e Socializzazione *Università degli Studi di Roma 'La Sapienza'*, Italy.

The aim of this contribution is to present the development of two psychometric instruments, tested in urban contexts, which are composed respectively by a series of scales measuring the perceived quality of residential environment, and by a scale measuring neighbourhood attachment.
The creation of tools for measuring lay people's perception of environmental urban qualities is particularly important if we consider the often divergent results obtained in comparing lay persons' 'subjective' evaluations and experts' 'objective' assessments of the environment. Inhabitants' relationships with their urban place of residence (at different scale levels, such as home, neighbourhood and town) has been mainly examined by either specific assessments of the residential quality or global place-related patterns such as place attachment and other

related constructs (such as place identity, roots, territoriality. In general, however, environmental psychology literature shows a substantial lack of valid and reliable tools for measuring these constructs, as also stressed by various authors. The importance of having better tools was the starting point of our research interest. The initial version of our instruments was based on the analysis of the literature on residential satisfaction that highlighted three principal evaluative aspects: spatial (i.e. architectural and planning), human (i.e. people and social relationships) and functional (i.e., services and facilities). A fourth evaluative aspect regarding context factors (i.e. pace of life, environmental health/pollution and maintenance/care) emerged during a study carried out in twenty neighbourhoods of Rome. Such aspects were used as generative criteria for the construction of the instruments. Besides, the two operative steps were followed: 1. a qualitative analysis of explorative interviews of a small sample of residents (i.e. 'contextual mapping' phase) and 2. a collection of data by means of a structured instrument (i.e. 'contextual specification' phase) based on the results of the previous phase.
The large amount of data gathered, and the consequent step-by-step refinement of the instrument, led to the present version, with some changes respect to the preliminary versions. More specifically, some items were added and some others were modified to increase the validity and reliability of scales.
The present instruments consist of eleven scales measuring the perceived environmental qualities of urban neighbourhood and one scale measuring the neighbourhood attachment. The eleven scales belong to the four generative criteria as follows: three scales regard spatial aspects (i.e. architectural-planning space, organisation and accessibility of space, green space); one scale regards human aspects (i.e. people and social relations); four scales regard functional aspects (i.e. social, recreational, commercial, transportation facilities); three scales regard contextual aspects (i.e. pace of life, environmental health/pollution, maintenance/care).
The present instruments, which have the form of a self-report questionnaire, were used in two different studies with the following aims:
1. to verify similarities and differences in comparison with previous studies (in which a former version of these instruments was used, as regards the structure and number of both the resulting indexes of perceived environmental quality and the neighbourhood attachment index;
2. to verify similarities and differences among urban contexts of different extension, particularly between a large urban context and medium/small towns;
3. to improve the psychometric qualities (i.e. internal consistency coefficients) of the scales;
In the first study the sample is composed by 312 residents of 8 different neighbourhoods of a great urban context as the city of Rome.
In the second study, 1.488 residents of 11 Italian medium- and small-size towns (ranging from 400.000 to 50.000 inhabitants) were interviewed.
Data elaboration included series of Principal Component Analyses and the analysis of the internal consistency coefficients (i.e. Cronbach's Alfa) for the resulting indexes.
In both studies, results systematically confirm the factorial structure of the scales, which include nineteen perceived quality indexes and one neighbourhood attachment index. Such scales show an increased level of reliability with respect to the previous studies, reaching the usual accepted standards.
The indices have been applied and are presently applied in aiding the renovation of existing residential urban areas as well as in aiding the design of new residential urban areas.

**Residential Quality concept – bungeejumping into its complexity**
**António Reis Cabrita, Maria João Freitas, João Branco Pedro.**
National Civil Engineering Laboratory, Lisbon, Portugal.

In this paper the concept of residential quality was discussed and its evolution during the last decades, with main focus on the sociological and architectural contribution. In this point we will defend that the definition of residential quality is more complex than the usual quality concept ('adequacy of product characteristics to user's needs'). The balance between individual and collective needs, the generative process dynamic of user's needs and the mechanisms of innovation implementation and development make this object a complex one in need of an effective interdisciplinary approach. We will present the LNEC interdisciplinary contributions to the residential quality definition, analysis and evaluation. Some research examples will be used in this paper. Based in our experience we will point some of the main issues that the development of this research field still demands.

**Health risks and environmental quality; an epidemiological perspective**
**Brigit Staatsen,** Augustinus de Hollander.
National Institute for Public Health and the Environment, the Netherlands.

Health in the Netherlands, as in other Western countries, has improved considerably in the past 150 years. Life expectancy has doubled from 35 to 77 years. This development is largely the result of improvements in the physical environment (drinking water, sewage and waste management and quality of housing indoor-environment). Factors such as increased economic welfare, development in health care and elaborated systems of health protection (work, food and the environment) have also contributed to improved health. Now that much has been accomplished, in terms of life expectancy, the focus has shifted from a longer life towards a 'good life' = quality of life. The same holds for the domain of public health and environmental quality.

The long list of potentially harmful agents from the document 'Concern for tomorrow' has been narrowed down to a great extent, partly as a consequence of the progressing insight in the (un) harmfulness of some environmental factors, partly because the levels of exposure have been reduced successfully by environmental policy. On the basis of recent information regarding health risks, the amount disease burden due to physical factors is estimated to be 2-5% of the total burden of disease in the Netherlands. Air pollution (particulate matter, ozone), UV-radiation, noise, unhealthy indoor-environment, and microbic contamination of food and water are important contributors to this disease burden related to environmental quality. New potential public health threats may include electromagnetic fields from power-lines and mobile phones, pseudo-oestrogen substances and genetically modified organisms. Within the context of environmental quality a similar shift from quantity to quality of life and from health to well-being can be discerned. In this paper we will discuss the advantages and disadvantages of a series of outcome indicators from the public health domain, as well as from the social-psychological domain. Specific attention will be given to the desirability of an aggregated measure (e.g. DALY'S) and the possibility to incorporate subjective health measures into this approach.

## 3.2 Expression of Interest for the EU 6th Framework Programme

**Integrated Project on: Urban development, Environmental Quality and Human Well-being ( Call Identifier: EOI.FP6.2002)**

**Abstract**

Typical large city problems, such as segregation, neighbourhood degradation, socio-economic deprivation and inequities in health, well-being and health-care accessibility have become central political issues in most EU countries. At the same time, sustainable development of liveable residential environments in multifunctional, compact cities has been put forward to prevent unbridled urban sprawl. To support policy-making on the quality of urban environments, this Integrated Project (IP) will provide knowledge-based, digital tools for assessment, monitoring, and forecasting in the context of sustainable development, social cohesion and quality of life. To achieve this, a conceptual framework, a set of indicators concerning aspects of environmental quality in relation to health and well-being will be developed and/or synchronised and comparative data-bases will be collected in multicentre studies across Europe by multidisciplinary teams. Societal stakeholders will be involved to safeguard the relevance to the public, planners and policy-makers and the applicability of tools in planning- and decisionmaking activities at different scale levels.

**Partners**[2]

1 Australia[3]
2 Austria
3 Europe JRC
4 Europe WHO
5 Finland
6-7 Germany
8 Italy
9 Lithuania
10-14 Netherlands
15 Norway
16 Portugal
17 Slovak Rep
18-19 Switzerland
20-23 UK
24 USA[2]

EoI Co-ordinated by:

1. National Institute for Public Health and the Environment, the Netherlands. Contact person: Dr. Ir. E. Lebret, RIVM, LBM, P.O.Box 1, (mailbox 10), 3720 BA BILTHOVEN, the Netherlands, tel: 0031 30 274 4194/3821
2. University of Groningen, the Netherlands
3. Brabant University, the Netherlands

[2] For a full list of participants see table 1
[3] Australia and USA participation with own finances and/or as advisor

# 1 Need and relevance

Overall objectives and outcomes of the proposed IP

Typical urban problems, such as segregation, neighbourhood degradation, socio-economic deprivation and inequities in health well-being and health care accessibility have become central political issues. The overall objective of this IP is to provide knowledge-based digital tools to assess urban problems and policy solutions on different scale levels. To activate this a multi-disciplinary research team was formed of 24 accomplished European and international researchers from University-, National and EU research centres representing 15 different countries. The consortium covers a broad range of relevant disciplines (see page 3). The overall objective will be achieved through a three-tiered approach. Firstly a transdisciplinary framework to describe and evaluate physical, spatial and social aspects of environmental quality, health and well-being in an integrated manner, will be developed. Secondly a core set of indicators will be developed and/or synchronised, involving societal stakeholders to safeguard the relevance to the public, planners, politics and policy-makers. Thirdly, comprehensive and coherent databases of (trends in) physical, spatial and social aspects of environmental quality across Europe in relation to health and well-being will be collected in multicentre studies. These components are necessary for building a toolbox that will be tested on its applicability for policy-making, decision-making, planning and in scenario studies, by confronting the framework with the database from the multi-centre component.

**Priorities Thematic Area of Framework 6**

The proposed IP will contribute to the Priority areas:

1.1.7 Citizens and Governance in a Knowledge-based society-
***1.1.7.i Knowledge-based Society and social cohesion.***

1.1.2 Information Society technologies –
***1.1.2.i Applied IST research addressing major societal challenges.***

1.1.6 Sustainable development, global change and ecosystems –
***1.1.6.2 Sustainable Surface Transport.***

**Relevance to EU needs**

The proposed IP addresses several of the EU's urgent needs in managing the continuing process of urban sprawl in a satisfactory fashion. In particular, recent strategic EU documents and governmental policy papers identify sustainable development, social cohesion and quality of life as top priorities for a balanced and practical way ahead.

**Background**

In Europe, as well as at a global level urban growth of large cities, metropolises and 'mega-cities' is continuing. Today over 50% of the European population lives in strongly urbanised areas. This increasingly results in an accumulation of functions (work, residing, commuting, and recreation) in a restricted area/space. At the same time the amount of road traffic has increased, due to affluence and an increased variety of options. In densely populated areas, the development of liveable environments in multi-functional, compact cities has been put forward as a policy against unbridled urban sprawl. However, densification of urban areas has led to relatively new metropolitan problems that have been largely neglected in Europe. These typical urban problems have become central national and EU political issues. This is reflected in the crucial role of local environmental quality in recent strategic European and

governmental policy papers with respect to housing, spatial planning and local environmental policy [4]. At an international level this focus is apparent in numerous scientific publications, and other documents concerning liveability and urban planning (review available).

So far, science has not advanced a comprehensive framework to address these issues in an integrated manner and to enable an evaluation of physical, spatial and social indicators. A recent review of relevant literature revealed that neither a generally accepted conceptual framework, nor any coherent system to measure and properly evaluate aspects of and trends in environmental quality in relation to well-being has been developed. During a two day workshop on this topic attended by an international group of researchers from different disciplinary backgrounds, it was concluded that the theoretical and empirical relation between environmental quality and well-being is far from well established, as too is the influence of these factors on urban policy, planning, and design. It was also concluded that a broad transdisciplinary effort involving societal stakeholders is needed to further the field. These conclusions are the starting point for an IP concerning the problem of sustainable development and quality of life in urban residential areas all over Europe.

To date, data on environmental quality and public health in urban residential areas in the EU have been incomplete and inconsistent, making fair comparisons between countries impossible. In this project, transnational and interdisciplinary comparative data (see priority 7) will be collected on urban conditions across Europe, thus providing both databases and knowledge-based tools for the assessment of urban problems and policy solutions (see objectives of the Lisbon Council, 2000). This IP will contribute to the development of such databases by achieving consensus on basic concepts, by developing and testing a core set of qualitative and quantitative indicators in European large cities, by examining trends and performing applied research on them. The views of key societal stakeholders will be incorporated in the model building, as well as in the choices of indicators. These indicators will be made usable for environmental health impact assessments, monitoring and forecasting quality trends as well as for the evaluation of planning strategies.

This broad approach to environmental quality fits with the societal objectives of priority 1.1.7.i (thematic areas FP6) of sustainable development, social cohesion and improved quality of life. It is also linked to the objectives of priority 1.1.2.i for the FP6 for more effective health, security, mobility and environment management and knowledge-based systems for risk prevention as well as aspects related to noise in surface and air transportation as described in priority 1.1.6.2. The environment program of the United Nations (GEO-3, May 2002) also places environmental issues in a broad context of careful coordination of other environmental policies with issues as poverty, lifestyle and governance. Integration of environmental concerns into all relevant policy areas, improved accessibility of infor-mation on the environment for citizens and a comprehensive and holistic approach to environment and health are brought forward as key strategic approaches in the 6$^{th}$ Environmental Action Programme.

**Scale of ambition and Critical mass**

The ambition of the IP is to develop and apply a practical, transdisciplinary framework on physical, social, and environmental aspects of urban quality in relation to health and well-being and to collect, analyse and report coherent trans-European information on these aspects of environmental quality in selected urban areas in 15 countries. For the first time the perspective of physical, spatial and social aspects of environmental quality and the perception of these will be combined into one project to assess impacts on health and well-being of EU

[4] i.e. Green paper on the Urban Environment, EU, 1996; The Commissioner's speech in Copenhagen 1998; Sustainable Urban Development in the European Union: A Framework For Action, 1998; The Sixth Environment Action Programme of the European Community 2001-2010, 2001.

citizens. To this aim the proposed IP will combine extensive expertise from leading experts in the fields of public health, social- and environmental psychology, architecture, sociology (environmental- and housing), urban-, environmental-, and spatial planning, human ecology, psychiatry, and noise- and air-pollution. These experts also bring intimate knowledge of the urban quality in their country, as well as broader networks. Thus, the proposed IP not only ensures critical mass in the science component of the project, but also allows intimate involvement of stakeholders and policy-makers on the local, national and transnational level. Most members of the consortium have extensive experience in international collaboration. Moreover several centres have experience in managing multi-centre, EU funded, studies[5].

During the workshop held in April 2002 geographic as well as interdisciplinary spread was considered an important ingredient for a successful consortium. The 24 partners, who all agreed to join represent 22 EU centres. We estimate that a period of 6 years is needed for the implementation of the integrated project. During these six years each research centre will need 2 researchers. For the total IP 3 extra persons for management and 1 for secretarial support will be needed as well as 3 advisors/EU and international liaisons (total estimate 30.000.000 Euro). Representatives from policy makers and public administrations and the community will be asked to participate in the consortium at a later stage such as: (National Platforms of) Municipal (Health) Services, European Academy of the Urban Environment, European Environment Agency.

## 2 General approach

The basic problem addressed in the IP is the interaction between environmental conditions and human responses and adaptations. The focus is on specific delineated policy problems. A combination of broad studies and in-depth studies over a longer period of time is proposed. This implies regional and local studies as well as transnational comparisons. The main objectives of the IP are: 1. to gain knowledge on environmental quality (physical, social, spatial) and subsequent effects on health and well-being across European large cities; 2. to develop an integrated transdisciplinary and intersectorial approach and a digital toolkit to properly assess, monitor and potentially forecast developments of environmental quality and well-being; 3. to make a toolkit available, tested on its applicability to real life policy and decision-making activities/planning.

Three major methodological approaches will be combined: 1. Meta analysis of existing data (GIS and Benchmarking); 2. Multi-centre studies (broad and in-depth); and 3. Stakeholder involvement, focal group participation and information during the process. Hereby the following issues will be addressed:

**Domains:** ***General****:* the residential environment in relation to health and well-being. ***Specific***: environmental quality of urban residential areas concerns spatial, social (e.g. SES, safety) and physical aspects (e.g. green, noise (transport, neighbour-), air pollution) as well as perceived residential quality (e.g. annoyance, safety, social cohesion, perceived quality of life).

**Indicators**: the relation between measured and perceived indicators of urban quality is rarely examined in one study. However, this is very important for policy-making; interventions are aimed at physical, social and environmental factors, but do not necessarily result in a perceived improvement of quality of life. Understanding the association between both and

[5] A linkage will be made with related projects/networks on (sub) areas such as: ISHTAR co-ordinated by the WHO Centre for Environment and Health in Rome, CALM, Network on Noise in surface and air transportation, annoyance and comfort, Nopher, Smile, Propolis, Spartacus, URBISnet, SDEMA (5th Framework),STILE ( IST Programme). RIVM and other partners participate in several of these projects.

identifying determinants, responsive to policy measures, is one of the core subjects of this study.
**Geographic Scale level**: a transnational comparison of European large cities (and international comparison) will be performed. The advantage is that the influence of context (such as concrete interventions) can be evaluated.
**Time-frame**: quality is not static; cross-sectional and longitudinal studies will therefore be used. This approach may help to properly address the dynamics of quality of life.
**Social group:** to be of real value to both citizens and policy-makers a quality of life study program must be directed to the appropriate social groups based on SES, age, lifestyle, gender, ethnicity, behaviour and common interests.

**Enhancement**
The IP will make a major step forward in developing a base of knowledge of urban problems in Europe and the mechanisms behind these, as well as gaining insight into region-specific aspects influencing inequities in environmental quality, health and quality of life. A longitudinal element will enable comparisons of the effect of different planning strategies. At the end of the IP, knowledge tools to better advise policy makers and to facilitate the policy-making at different scale levels will be available for implementation. We envision highly informative GIS maps with integrated quality indicators (aspects of environmental quality, health and well-being as well as the perception of these) in different European urban areas. Such policy instruments are aimed at singling out problematic areas and areas where governmental action could be effective. For example, planners could be provided with tools for implementing densification that balances the need to achieve energy conservation goals against other goals (local environment, green areas, and societal needs). These tools will be relevant to European, national and local authorities involved in the management of environmental quality, public health, land-use and urban planning, housing and transport as well as to European citizens.

## 3 Integration

***Tentative modules***
1 **Interfacing between fields of expertise** by further creating consensus on concepts, definitions and basic models that can be used as a instrument for prognostic evaluations.
2 **Interfacing with users:**
  2.1 Interfacing with users (community) by elucidating preferences among residents,
  2.2 Interfacing with users (decision-makers) by elucidating priorities of stakeholders, policy- makers, and politicians about the main issues, concepts and indicators. Here a pragmatic approach will be used in an iterative process (civic science), whereby model building includes the role of the decision-making process and intervention.
3 **Development and testing a set of core indicators,** synchronising national indicators and development and or choice of a standardised international measurement tool to assess (subjective aspects of) environmental quality, well-being, health, quality of life and psychological and social factors. This again will be carried out in close collaboration with stakeholders and incorporate indicators already developed by e.g. Eurostat.
4 **Meta-analysis** on existing data, including data from European surveys such as the Eurobarometer (GIS and Benchmarking).
5 **Multi-centre surveys** in selected urban communities of participating countries to assess and compare prevalence of the relevant dimensions. The detection and prediction of sensitive areas will be addressed in particular.

6 **Empirical evaluation** of the relations among dimensions within and across communities studied including broad and in-depth studies as well as longitudinal studies to evaluate different planning strategies.
7 **Specific evaluation of sensitive** or vulnerable groups on the basis of demographic, psychological and social indicators e.g. children, elderly, socially deprived.
8 **Training/exchange** of researchers and community users and decision-makers, policy-makers.
9 **Dissemination of results** by activities such as: development of websites, such as a GIS-based digital toolkit with indicators and an interactive website for the dissemination of data on different scale levels; presentations at scientific gatherings/manuscripts for submission to peer reviewed literature; results Start and Evaluation Workshop and workshop report; popular version of main results in local languages for general public; dissemination of information to facilitate empowerment programmes at different levels, such as direct to users (e.g. workshops, training courses, communities of excellence, email groups, e-Learning initiatives), input to EU and National Policy Committees, input to Regional Development Organisations (Innovation Regions).
10 **Integration of all activities**: will consist e.g. of workshops, establishment of shared databases and shared websites.
11 **Management**: The organisational structure will consist of a Management and Co-ordination team, assisted by a professional management co-ordinator, National Research Teams, Advisory Committees with representatives of the primary stakeholders at different scale levels, advisors/liaisons with EU, AUS and USA networks and research.

***Participants in the Consortium***
The scientific and European research centres that will join in the Integrated Project are listed in table 1. All partners agreed to join the IP (see section 2). Most of the participating centres have been engaged in preparatory work in this field and participated in expert meetings. Many of them participate in related networks and FP4, FP5, EoI FP6 EU-projects (see footnote 4).

| No. | Country | Institute | Contactperson | Area(s) of Excellence | Potential Role |
|---|---|---|---|---|---|
| 1 | Aus* | Griffith University, Brisbane | Prof. Dr. A.L. Brown | Environmental planning research Interface science and urban planning | Advisor: research design, interfacing users; Integration between the disciplines.Liaison between EU and AUS |
| 2 | Austria | University of Innsbruck | Prof. Dr. P. Lercher | Epidemiology, EHIA, Noise &Air pollution | Integration Models, health indicators; Application |
| 3 | Eu | EC – Joint Research Centre | Dr. C. Lavalle | Sustainable land use in urban areas | Indicators and models sustainability |
| 4 | Eu | WHO, Environment & Health | Dr. X. Bonnefoy | Environment and health, noise and health | Linking to other networks and research institutions, EU countries |
| 5 | FlN | University of Tampere | Dr. M. Wallenius | Environmental psychology, noise, perceived health, stress, well-being | Indicators/questionnaires perceived health, well-being; Application |
| 6 | D | Centre for Environmenta l Research Leipzig , | Dr. S. Kabisch | Urban Sociology/ Urban Ecology, Health Risks; social resources | Indicators Residential segregation; Application |
| 7 | D | University of Oldenburg | Dr. M. Meis | Environmental Psychology, Medical Psychology, QoL in children | Questionnaires Qol Children, Application |
| 8 | It | University of Rome | Dr. M. Bonaiuto | Social and environmental psychology. | Social indicators, perceived environmental quality; Application |
| 9 | Lith | State Public Health Centre of Lithuania | Dr. I. Zurlyte | National environmental health management; monitoring programs; housing surveys | Health and (perceived) QoL indicators, Application |
| 10 | NL | National Institute for Public Health and the Environment | Dr. Ir. E. Lebret | Epidemiology, Public Health, Environmental Psychology, GIS, noise, air-pollution, | Statistical methods for multi-centre comparisons, Co-ordination meta-analysis; GIS model/testing; Application |
| 11 | NL | TNO Bouw, | Dr. A. de Groot | Sustainability, quality of living environment, built environment, GIS models | Sustainability indicators; dissemination methods, GIS-modeling |
| 12 | NL | TNO-PG Leiden, | Dr. HME Miedema | Local environment and health, data management, statistical analysis of large databases, GIS | Local tools residential quality; Application |
| 13 | NL | University of Groningen | Prof. Dr. Ch. Vlek | Environmental Psychology | Theoretical foundation of indicator choice; Integration modeling; instruments Application |
| 14 | NL | Tilburg University | Prof. Dr. P. Ester | Environmental sociology, comparative social research, cross-national research. | Development perceived quality of life indicators Application |
| 15 | No | Institute of Transport Economics Norwegian | Dr. R. Klaeboe | Combined environmental effects, Urban dynamics | Models for the impact of multiple environmental exposures, dynamic social changes |
| 16 | P | National Civil Engineering Laboratory) LISBO | Dr. M. Freitas/ Dr. João Pedro | Sociology; residential satisfaction; social dynamics, Architecture; | Communication tools; Link projects and technical production, decision makers and planners; Application |
| 17 | Slov | Slovak Institute of Housing Bratislava | Arch. J. Zapletalova, PhD. | Housing, environmental planning, interface with policy making | Space, physical and zone planning; Interface; Education; Application |
| 18 | CH | Universität Basel, | Prof. Dr. Ch. Braun/ Dr. S. Kahlmeier | Environmental epidemiology, public health, Noise, Air pollution | Physical indicators (air pollution, traffic, electromagnetic fields); dissemination methods; Application |
| 19 | CH | University of | Prof. Dr. R. | Humane ecology | Integrated framework and indicators; |

| | | | | | |
|---|---|---|---|---|---|
| | | Geneva | Lawrence | | Application |
| 20 | UK | Berry Environmenta l Ltd. London | Dr. B. Berry | Acoustical measurement, noise prediction, environmental policy. | Technical advice on physical indicators Intern. networking and assessment of policy implications |
| 21 | UK | University of Strathclyde Glasgow | Prof. Dr. M. Pacione | Applied urban geography; urban disadvantage and social exclusion. | Modeling; urban-planning, spatial and qol Indicators, Application |
| 22 | UK | Queen Mary & Westfield College, London | Prof. Dr. S. Stansfeld | Epidemiology/ Psychiatry SES research | Indicators Mental Health and social deprivation; Application |
| 23 | UK | London School of Hygiene & Tropical Medicine | Dr Simon Lewin/ Dr. T. Fletcher | Ethnography, epidemiology, participatory research methods | Focus Groups; variation across different settings and social groups. |
| 24 | USA* | Institute for Social Research, University of Michigan | Prof. R. Marans | Urban planning and design, public policy research | Advisor: design, quest , meth. Liaison resources Michigan University; EU and USA |

* Own finances and/or role of advisor-liaison

## 3.3 Contents Special Issue 'Landscape and Urban Planning'

As a spin-off of this workshop, 8 of the papers presented during the workshop have been submitted for publication in a special issue of the journal of 'Landscape and Urban Planning'. Guest-editor for this issue was Prof. Michael Pacione. Below the contents of the special issue is presented:

Introduction to the Special Issue on Urban environmental quality and human well-being - Michael Pacione.

Environmental quality and human well-being: towards a conceptual framework and demarcation of concepts; a literature study - Irene van Kamp, Kees Leidelmeijer, Gooitske Marsman, Augustinus de Hollander.

Urban environmental quality and human well-being: a social geographical perspective - Michael Pacione.

Human ecology and its applications - Roderick. J. Lawrence.

Indexes of perceived environmental quality and neighbourhood attachment in urban environments: a confirmation study on the city of Rome - Marino Bonaiuto, Fernando Fornara, Mirilia Bonnes.

Health, environment and quality of life: an epidemiological perspective on urban development - Augustinus de Hollander and Brigit Staatsen.

Which health outcomes should be measured in health related environmental quality studies? - Peter Lercher.

Understanding environmental quality through quality of life studies: the 2001 DAS and its use of subjective and objective indicators - Robert. W. Marans.

Increasing the utility of urban environmental quality information - A. Lex Brown.

## 3.4 Participants

In alphabetical order:

Drs J.F.M. Besseling
Ministerie van Verkeer & Waterstaat
Adviesdienst Verkeer en Vervoer (AVV)
Postbus 1031
3000 BA Rotterdam
Netherlands
Phone: +31 10 - 282 5725
E-mail: J.F.M.Besseling@avv.rws.minvenw.nl

Prof. Marino Bonaiut
Social and Environmental Psychology at the University of Rome within the
terms of reference of the MAB-UNESCO Project.
Via dei Marsi n. 78
00185 Roma
Italy
Phone: +39-06-49917661
Fax: +39-06-49917652
E-mail: marino.bonaiuto@uniroma1.it

Dr Xavier Bonnefoy, WHO
European Centre for Environment and Health Bonnoffice
Herman Ehlerstrasse 10
D-53113
Germany
Phone: + 49 228 20 94 416
Email: xbo@who.dk
Email: CPM@ecehbonn.euro.who.int (secr)

Matthias Braubach
Project Officer Housing and Health
European Centre for Environment and Health Bonnoffice
Herman Ehlerstrasse 10
D-53113
Germany
Phone: +49 228 20 94 416
E-mail: MBR@ecehbonn.euro.who.int

Prof. A. Lex Brown
School of Environmental Planning
Nathan Campus
Griffith University
Brisbane Qld 4111
Australia
Phone : +1161 (0)7 3875 5344
Fax : +1161 (0)7 3875 6684
E-mail: Lex.brown@mailbox.gu.edu.au

Dr J. van Dongen
TNO/PG
Postbus 2215
2301 CE Leiden
Netherlands
Phone: +31 71 5181813
Email: J.van.dongen@pg.tno.nl

Prof. Dr Peter Ester
Institute for Globalization and Sustainable Development
PO BOX 90153
5000 LE Tilburg
Netherlands
Phone: +31 13466 3350
Fax: +31 13 466 3348
E-mail :PEster@kub.nl

Tony Fletcher, PhD
London School of Hygiene & Tropical Medicine
Environmental Epidemiology Unit,
Keppel Street,
London WC1E 7HT
U.K.
Phone: +44 172 927 2429 (prive:+44 1 272 29 22; Frankrijk:+33 475 387 400)
Fax: +44 171 580 4524)
E-mail: Tony.fletcher@lshtm.ac.uk

Dra Maria João Freitas
Laboratório Nacional de Engenharia Civil (the National Civil Engineering Laboratory)Grupo de Ecologia Social
Av. Do Brasil, 101
1700-066 LISBOA
Portugal
Phone: +351 21 844 35 89
E-mail:mjfreitas@lnec.pt

Ir Adrie de Groot
TNO Bouw, afdeling bouwprocesinnovatie
kamer MN 3 160
Postbus 49
2600 AA Delft
Netherlands
Phone: +31 152 69 52 35
Fax : +31 152 69 53 35
E-mail: a.degroot@bouw.tno.nl

Dr Sigrund Kabisch
UFZ-Centre for Environmental Research Leipzig:
Standort Leipzig
Permoserstrasse 15
D-04318 Leipzig
Germany
Phone: +49 341 235 2366
Fax: +49 341 235 2825
E-mail: kabisch@alok.ufz.de

Dr Sonja Kahlmeier
Institut für Sozial- und Präventivmedizin der Universität Basel,
Abteilung Umwelt und Gesundheit.
Steinengraben 49, 4051 Basel
Switzerland
Phone: +41 061 / 267 65 05.
Fax: +41 061 / 267 61 90.
E-mail: s.kahlmeier@unibas.ch

Dr R. Klaeboe,
TOI
P.O. Box 6110 Etterstad
N-0602 Oslo, Norway
Phone: +47 22573800
E-mail: rk@toi.no

Dr Jeanet Kullberg
SCP
Postbus 16 164
2500 BD Den Haag
Netherlands
Phone: +31 70 - 340 6231
E-mail: JN@SCP.NL

Prof. Roderick Lawrence
Centre for Human Ecology and Environmental Sciences
Faculty of Social and Economic Sciences
UNI MAIL BUILDING
University of Geneva
40 Boulevard du Pont d'Arve
1211 Geneva 4
Switzerland
Phone: +41-22-7058174
Fax: +41-22-7058173
E-mail: Roderick.Lawrence@cueh.unige.ch

Dr K. Leidelmeijer
RIGO Research en Advies BV
De Ruyterkade 139
1011 AC Amsterdam
Netherlands
Phone: +31 20-5221111
E-mail: Kees@Rigo.nl

Peter Lercher, MD, MPH;Associate Prof
University of Innsbruck;Institute of Hygiene and Social Medicine
Sonnenburgstrasse 16/I;A-6020 Innsbruck
Austria
Phone: +43-512-507-2718
Fax:+43-512-507-3583
E-mail: Peter.Lercher@uibk.ac.at

Prof. Robert Marans Senior Research Scientist
Professor of Architecture and Urban Planning
Taubman College of Architecture and Urban Planning
2000 Bonisteel Boulevard
The University of Michigan
Ann Arbor, MI 48109-2069
USA
Phone: +111 (734)763-4583
Fax: +111 (734)763-2322
E-mail: marans@umich.edu

Dr Gooitske Marsman
RIGO Research en Advies BV
De Ruyterkade 139
1011 AC Amsterdam
Netherlands
Phone: +31 20-5221111
E-mail: Gooitske@rigo.nl

Dr Markus Meis
Institute for Research into Man-Environment-Relations
Department of Psychology
University of Oldenburg
POB 2503
D-26111 Oldenburg
Germany
Phone: +49 441 798-5523 (secretary Mrs. Harings)
Direct Phone: +49 441 798-5525
E-mail: markus.meis@uni-oldenburg.de

Prof. Michael Pacione
Department of Geography
University of Strathclyde
Glasgow
G1 1XH
UK
Phone: +44 (0)141 548 3793
Fax: +44 (0)141 552 7857
E-mail: Michaelpacione@aol.com

João Branco Pedro
Laboratorio Nacional de Engenharia Civil
Av. Do Brasil 101
1799 Lisboa Codex
Portugal
Phone: +351 21 844 37 82
FAX: +351 21 844 30 28
E-mail: jpedro@lnec.pt

Prof. Stephen Stansfeld
Professor of Psychiatry
Basic Medical Sciences Building
Queen Mary & Westfield College
Mile End Road
London E1 4NS
UK
Phone: +44 20 7882 7725/7
Fax: +44 20 7882 7924
E-mail : S.A.Stansfeld@QMW.ac.uk

Dr Linda Steg
Faculteit Psychologie
Rijksuniversiteit Groningen
Grote Kruisstraat 2/1
9712 TS Groningen
Netherlands
Phone: +31 50 3636482
E-mail: L.Steg@ppsw.rug.nl

Prof. Dr. Charles Vlek (Sociale Psychologie Groningen)
Faculteit Psychologie
Rijksuniversiteit Groningen
Grote Kruisstraat 2/1
9712 TS Groningen
Netherlands
Phone: +31 50 363 6443/6386
E-Mail C.A.J.Vlek@ppsw.rug.nl

Marjut Wallenius
PhD, researcher
Department of Psychology
University of Tampere
Kalevantie 4
33014 University of Tampere, Finland
Phone: +358 (0)3 215 7209
E-mail: Marjut.Wallenius@uta.fi

Dr F. Woudenberg (GGD Rotterdam)
Municipal Health Service Rotterdam e.o.
Postbus 70032
3000 LP Rotterdam
Netherlands
Phone: +31 10-4339933
Email woudenbergf@ggd.rotterdam.nl

Dr Jaroslava Zapletalova
Director of Slovak Institute of Housing
Presovska 39
821 08 Bratislava
Slovak Republic
Phone: +421 (-0) 7 55574919
Fax : +421- (0) 7 5555219
E-mail : instbyv@psgnetba.sk

Dr Ingrida Zurlyte
State Public Health Centre of Lithuania
Kalvariyu 153
2042 Vilnius
Lithuania
Phone: +370 2 36 04 81
Fax: +370 (2) 737 397
E-mail: ingrida@post.omnitel.net

RIVM-participants:
Drs. A. Bouwman
RIVM/LAE
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2743044
E-mail: Arno.Bouwman@rivm.nl

Drs Evalien de Groot
RIVM / LBM
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-274 3281
Fax: +31 30-2744451
E-mail: Evalien.de.Groot@rivm.nl

Drs Guus de Hollander
RIVM / MNV
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2744535
Fax: +31 30-2744435
E-mail: AEM.de.Hollander@rivm.nl

Dr Irene van Kamp
RIVM / LBM
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2743222
Fax: +31 30-2744407
E-mail: Irene.van. Kamp@rivm.nl

Dr Pieter Kramers
RIVM / VTV
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2742163
Fax: +31 30-2744450
E-mail: PGN.Kramers@rivm.nl

Ir Hanneke Kruize
Faculteit ruimtelijke wetenschappen
Heidelberg 2
3508 TC Utrecht
Netherlands
Phone: +31 30-2533398
E-mail: h.kruize@geog.uu.nl

Dr Ir Erik Lebret
RIVM / LBM
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2744194
Fax: +31 30-2744451
E-mail: Erik.Lebret@rivm.nl

Dr Ric van Poll
RIVM / LBM
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2744389
Fax: +31 30-2744451
E-mail: Ric.van.Poll@rivm.nl

Drs Jan Ros
RIVM / LAE
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2743025
Fax: +31 30-2744417
E-mail: Jan.Ros@rivm.nl

Drs Brigit Staatsen
RIVM / LBM
Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Netherlands
Phone: +31 30-2742915
Fax: +31 30-2744407
E-mail: Brigit.Staatsen@rivm.nl