Environmental Research Plan
of the Federal Ministry for the Environment,
Nature Conservation and Nuclear Safety

Environment and Health

UFOPLAN Ref. No. 3707 17 102/01

Analyses of the contributions of environmental policy and ecological modernization to the improvement of quality of life in Germany and further development of the conception of ecological justice

Subproject 01: Analyses of ecological justice: an explorative preparatory study

Abstract

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COMMISSIONED BY
THE FEDERAL ENVIRONMENT AGENCY

January 2008

Umweltforschungsplan des Bundesministeriums für Umwelt, Naturschutz und Reaktorsicherheit
Funding Agency: Federal Environmental Agency, Dessau-Roßlau, funding ref. 3707 17 102/01

Socioeconomic factors and environmental exposures in Germany – current state of knowledge and analysis of selected environmental pollutants

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Project part A:

Systematic compilation of the current state of knowledge in Germany

Against the background of the environmental justice discussion, the current knowledge of the last 15 years on the social distribution of traffic-related air pollution, noise, chemical and biological indoor pollutants, and body burden of pollutants in Germany was systematically analysed within the project part A on the basis of the scientific literature available to the authors.

The database of these topics was very heterogeneous and mainly derived from secondary analyses.

Generally, the exposure to traffic-related air pollution is higher in socially deprived people in Germany. The subjective annoyance by noise and especially by traffic noise in the residential area is higher in persons of lower social position. Studies analysing several categories of social position mostly showed an inverse social gradient of exposure to traffic-related air pollution and noise. Passive smoking, assessed either by questioning or human biomonitoring, is more frequent in socially deprived children and adults. Social differences were reported for indoor factors such as using fossil fuels for cooking and heating, dampness and house dust allergens and endotoxin. There were only single studies on further indoor pollutants. Up to now, human biomonitoring data has not been comprehensively analysed concerning socioeconomic factors. Single studies also demonstrated social differences in body burden of pollutants, e.g. low social position was associated with higher exposure to lead.

In Germany, further research is necessary with regard to distinction and comparative examination of individual social indicators, the interaction of exposure variation and effect modification concerning the impact of the social position on environmental health, and the extent of social inequalities of environmental exposures and environmental health within various sections of the population and regions.

Project part B:

Development of a strategy for the intensive analysis of the association between socio-economic factors and the body burden of pollutants

The aim of subproject B was to develop a strategy of an extended analysis of the association of socioeconomic factors with body burden of pollutants using data of the German Environmental Survey 1998 and the German Federal Health Survey 1998.

Bivariate analyses were performed with metabolites of polycyclic aromatic hydrocarbons in urine and mercury in urine and blood. Education, equivalent household income, occupation, occupational status and migration background were used to characterise social position.

Multiple linear regression, ordinal logistic regression and structural equation models were applied in multivariate analyses of the outcome body burden of mercury. Basic assumptions were that socioeconomic factors are distal causes and should be analysed separately. All analyses were stratified by gender. Those causal variables of mercury in blood and urine identified by Benemann et al. (2004) (number of teeth with amalgam filling, age of the last amalgam filling, usage of chewing gum if amalgam filling, visit to a dentist, drinking of wine, municipal dimension, age) were regarded as possible intermediate variables or confounder.

According to type of modelling, data of 1709 to 2206 women and 1812 to 2153 men was available.

Overall, individuals with a low social position had lower mercury concentrations in blood and in urine. Multivariate analyses showed that socioeconomic factors were in part independently and in men and women differently associated with the outcome. The effects of socio-economic factors on body burden of mercury could not be totally explained by the already known causal variables.

Essential elements of a strategy of an extended analysis of the association of socioeconomic factors with body burden of pollutants were deduced from these results.