Addressing the social dimensions of environmental policy

A study on the linkages between environmental and social sustainability in Europe

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Executive summary

It is important that the interlinkages and interactions between environmental and social policy are recognised in order to avoid conflict between policy objectives and to contribute to the development of better and mutually reinforcing policies for both policy areas. These policy areas are deeply interlinked; environmental policy impacts on society in different ways while social factors affect environmental quality, for example through patterns of consumption. Therefore, there is a need for policy makers to take an integrated approach, recognising where the policy areas interface, and considering policy design and implementation that is mutually advantageous.

The concerns of environmental policy in relation to society and different socio-economic groups cover the following issues:

- **The distribution of environmental quality.** Do certain socio-economic groups experience poorer environmental quality? Does policy address such *inequalities*?
- **The drivers of environmental quality**. Which groups socio-economic create environmental problems through the consumption of goods and services? Do they pay proportionately for the resulting impacts?
- **The equity of environmental policy**. Does the financial burden of policy fall equitably with respect to the ability to pay?

All of these issues could be described as *social dimensions* of environmental policy and can be considered under the concept of *environmental justice*, which is about good environmental quality for all and fairness in environmental policy (with respect to participation, design and implementation). Within such a concept, there is a particular focus on ensuring that socially excluded groups in society, who may be most at risk, have access to good environmental quality and can participate in the decision making process relating to policy design and implementation.

This report, based on a study for the European Commission, analyses the linkages between environmental and social policies and recommends how to maximise the potential synergies between them. This report is a non-technical overview of the study, focusing on the key messages from the research. Additionally, there are numerous background reports, most of which relate to the technical work packages reports written as part of the study (see Annex 1).

The distribution of environmental quality

The research found evidence which suggests that the social distribution of environmental quality is unequal, and often biased against poorer or socially excluded groups, i.e. such groups are more likely to live in areas of poorer environmental quality than other groups. Such inequalities can be compounded by the vulnerability of certain groups (e.g. those on low income, children, elderly, those in poor health) to environmental impacts, particularly on health, and cumulative impacts (due to generally degraded environments). The evidence base is limited in many European countries, and therefore further research is required; however, this is not helped by a lack of spatial data that is required for this type of analysis.

Developing effective and efficient environmental policy is challenging; the need to address the social dimensions of environmental quality adds additional complexity. However, by recognising these, such concerns can feed into the environmental policy making process making for better integrated policy more broadly. In addition, if policy aims to protect the most vulnerable, in addition to achieving improved overall environmental quality, such issues need to be recognised.

Key recommendations include:

- Ensure that the assessment of policy design and implementation takes account of environmental inequalities in order to address them, as appropriate.
- Improve the evidence base across Europe on issues of social distribution of environmental quality, vulnerability and cumulative impacts.
- Develop standardised data and methodologies for assessing these.

The promotion of the environmental justice agenda, it could be argued, could be the catalyst in many countries for recognising the issue of environmental inequalities, and prioritising policy responses to meeting this challenge.

Impacts of household consumption on environmental quality
A second important social dimension of environmental policy is causation (as opposed to effect). The production and consumption of goods and services leads to additional pressures on the environment, giving rise to pollution and natural resource depletion. A key driver is consumption by households; analysis undertaken as part of the project clearly showed that the main factors behind the environmental impact of a particular household will be its per capita income. The number of people in the household is another important driver but on a per capita basis larger households tend to have a relatively lower impact on the environment. Other socio-economic factors appear to be less important.

The analysis suggests that the type of products and services consumed has a more limited role in the overall impacts of a household. Whilst the findings of this analysis are intuitive, this dimension is an important factor to consider in environmental policy making in order to:

- Develop policy which targets socio-economic groups according to consumption patterns, and direct resources accordingly.
- Develop policy in accordance with the polluter pays principle. This would be consistent with the concept of environmental justice.
- Ensure policy on sustainable consumption is communicated in a way that is appropriate to the target audience, and allows for 'greening' of consumption across all socio-economic groups, irrespective of income.

The equity of environmental policy
The third social dimension of environmental policy explored is how environmental policy can be developed to ensure equity in policy design and implementation in respect of the following:

- Does environmental policy disproportionately impact (financially) on specific communities, and is it fair with regard to the polluter pays principle?
- Are inequalities in the distribution environmental quality considered?
- Are social policy objectives adequately taken into consideration in environmental policy design and implementation (and vice versa)? This issue links to the above concerns, and if addressed potentially goes some way to addressing them.
- Is there adequate access to information and participation in the policy making process?

We have argued that it is important that the policy making frameworks are much more explicit with reference to the above issues, and could even use the concept of environmental justice to frame these concerns. Whilst it is important to recognise that much policy delivery is at the local level, highlighting key issues in the policy framework at the European and national levels could help to ensure that these issues are better considered at the local level.

The policy development process (at all administrative levels) could be strengthened in respect to the above issues through making distributional aspects a more important part of the policy impact assessment process, and by providing guidance on methods and approaches. This would be both to avoid negative distributional impacts but also to identify (and enhance) positive synergies between environmental and social objectives. In addition, European funding for different projects could have increased requirements for accounting for such issues of equity during the application and reporting processes.

Recognising that different environmental policy instruments can have regressive impacts on different groups in society is important, and should be captured in the policy appraisal (assessment) process. All policy instruments have the potential for regressive effects, whereby lower income groups are disproportionately impacted upon financially. However, the potentially regressive effect of these instruments depends largely on the design details of each instrument and can be offset. The analysis undertaken in this study focused on taxation based instruments and noted that impacts can be reduced to a large extent by design. The key issue is firstly recognising the potential regressive impacts, and secondly considering how these can be mitigated.

In summary, all of the above dimensions can be addressed by ensuring that during policy development the potential distributional impacts are recognised. This can be done by considering social and environmental policy outcomes in an integrated way. This is demonstrated by a range of local level case studies within this project, where social outcomes are recognised in the design and delivery of environmental policy and programmes. With respect to socially excluded groups, a useful framework for ensuring equity in policy is environmental justice, which we propose should become an important concept within policy making.

Many **recommendations** have emerged from this research. Here we highlight the key ones:

1. The concept of environmental justice should be adopted as a guiding principle for policy development at the European level and across all Member States as a means of addressing social concerns within environmental policy.

2. Environmental inequalities should be considered in the design and implementation of policy through the impact assessment process at the European, national and local levels.

3. The above recommendation requires good spatial data that can be accessed at reasonable cost, and guidance on methods to assess environmental inequalities. Investment at the European and national level must be increased to ensure that the current situation, where there is a local of good quality data, is improved.

4. Policies aimed at sustainable consumption need to recognise differences in consumption patterns across socio-economic groups so that they can be effectively targeted. The delivery of such policies comes at a cost, particularly to low income groups, which should be recognised in policy design and delivery.

5. As the financial impacts of all types of environmental policy have the potential to be regressive, policy should be designed to reduce such impacts, balanced against the need for environmental effectiveness and economic efficiency.

6. The key to capturing synergies between environmental and social policies is well designed delivery at the local level. The identification of such synergies as well as potential conflicts in policy design and delivery requires local stakeholder engagement and participation.

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Introduction

Ensuring environmental protection and addressing issues of environmental degradation have long been at the heart of environmental policy making in Europe. Sustainable development became an objective of the European Union (EU) in 1997 when it was included in the Treaty of Amsterdam as an overarching objective of EU policies. This provided a framework for environmental policy making within which the interactions with, and concerns of, social and economic policy are also considered.

The study on which this report is based was initiated by the European Commission to improve the understanding of the linkages and interactions between social inclusion and environmental sustainability (social-environmental policy interface) and to contribute to the development of better and mutually reinforcing policies for both areas. This is important in the context of European policy making within the context of the sustainable development agenda, where a guiding principle is to *promote integration of economic, social and environmental considerations so that they are coherent and mutually reinforce each other by making full use of instruments for better regulation, such as balanced impact assessment and stakeholder consultations* (Council of the European Union, 2006).

This need for an improvement in understanding is based on the premise that both environmental and social policies have often been developed in isolation, with limited account of the positive or negative impacts that could arise as a result of policy design and implementation, and limited monitoring of such impacts.

Social dimensions to environmental policy

This report focuses primarily on environmental policy and the role it can play in ensuring that good environmental quality is experienced by all. It is also concerned that environmental policy is fair in design and implementation, i.e. it does not disproportionately disadvantage one group of people more than another.

The OECD (2006) framed this discourse under the title *Social Dimensions of Environmental Policy*, the two key dimensions being –

- How environmental quality is distributed across different communities
- How environmental policy impacts on different communities

The first dimension relates to the *social distribution* of environmental quality, which is concerned with the relative quality of the environment that people experience. The starting point in this discussion is that all groups in society should live in, and have access to, a good quality environment. Given the nature of environmental problems, disparities (or inequalities) in distribution arise which need to be addressed, particularly given the negative health and economic impacts that can result.

The second dimension is about how policy design and implementation needs to ensure that 1) the financial impacts of a given policy do not disproportionately affect one group, and 2) that policies can address inequalities as described above. Furthermore, policy design and implementation should recognise the opportunities for enhancing social objectives alongside environmental objectives, not just avoiding the negative outcomes.

If these key social dimensions are not recognised or taken into account, it is possible that the most vulnerable groups in society (socially-excluded) will be at risk from the potentially negative outcomes of environmental policy design that have not been informed in respect of these social dimensions. In addition, it is unlikely that positive achievable social benefits will be realised.

The concept of environmental justice

Both of the social dimensions described above can be effectively formulated by the concept of *environmental justice* or *equity*, which is about ensuring good environmental quality for all and about fairness with respect to the participation, design and implementation of environmental policy.

A report by the UK Sustainable Development Research Network (SDRN) considered the work undertaken in this area, and reviewed what was meant by environmental justice (Lucas et al. 2004). Broadly, the term reflects the need for 1) equity in respect to the environmental quality experienced and the burden resulting from environmental policy and 2) access and participation in the process of decision making that affects environmental quality. Much of the environmental justice agenda has focused on how such issues affect the more vulnerable groups in society, particularly those that are socially-excluded. Therefore, this is a particularly important concept in this study, where the focus is on the interactions between environmental sustainability and social inclusion.

We also argue that another important aspect of environmental justice concerns the drivers of environmental pressures, which in turn impact on environmental quality. This relates primarily to the issues of consumption and equity in terms of the *polluter pays principle* and of access to greener goods and services.

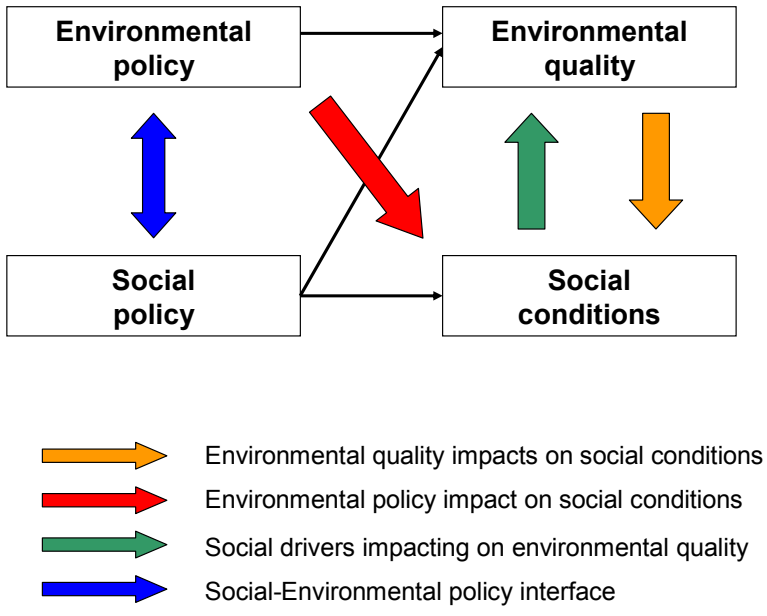
Key questions for this research

To establish what the issues are across different European countries,[1] we first need to understand the following:

1. The social inequalities resulting from exposure to poor environmental quality. In other words, what is the distribution of environmental quality, and how does this impact on different groups in society?
2. How different household types impact on environmental quality. For example, what are the social drivers that lead to additional burdens on the environment?
3. How does environmental policy impact on different groups in society?

Based on the understanding of these three issues, we can begin to understand how the social-environmental policy interface can be improved to deliver more integrated policy. It is possible to represent these issues schematically represented as linkages (by the bold arrows), as in Figure 0.1 below.

Figure 0.1. Connections between social and environmental policy



Source: based on OECD (1999)

It is important to recognise that social policy can also have implications for environmental quality, as shown in the above diagram. Whilst the focus of this report is from an environmental policy

[1] Most of the supporting analysis was undertaken across six case country countries, namely Germany, Spain, UK, Sweden, Czech Republic and Bulgaria.

perspective (by design), we note the importance of social policy also needing to recognise its impact on environmental quality issues. This is considered within the research, although to a lesser extent.

Structure of this report

This report is the non-technical summary of the project and focuses on the key messages from the research. The detailed research is reported upon in supporting reports, which provide a significant amount of supporting analysis to underpin these key messages (see Annex 1).

In this report, we first consider the social inequalities resulting from exposure to different levels of environmental quality by addressing the following questions:

- What is the evidence relating to the social distribution of environmental quality?
- Why do disparities in the variation of environmental quality matter?
- How do the issues of vulnerability and cumulative impacts exacerbate the problem?
- How can policy ensure that inequity in environmental quality distribution is addressed, and prevented in the future?

Secondly, the issue of the consumption of goods and services and the environmental impacts arising from such consumption are assessed, in order to understand the socio-economic drivers. Understanding these is important so that policy can be better targeted and for the reinforcement of the polluter pays principle. In this respect, it is also an important element of the environmental justice agenda.

Additionally, the issue of *greener* consumption is raised, as an important area of policy for affecting a more sustainable type of consumption.

Next we consider whether and how the environmental policy making process currently takes account of social concerns, particularly in relation to socially-excluded groups. This includes an examination of whether the strategic policy making frameworks recognise and/or facilitate linkages between policy areas. This is followed by a more detailed consideration of how different policy instruments have been used in the past to address social concerns, and the ways in which the policy making process can be improved.

Finally, the report summarises a core part of the study which was to consider examples where, in the main, social/environmental policy outcomes had been considered together, whether this had led to mutually reinforcing objectives, in particular promoting environmental justice, and consideration of the extent to which this best practise could be implemented elsewhere or in policy making more broadly.

1 Social inequalities from exposure to poor environmental quality

Environmental quality differs significantly across different regions of Europe, depending on the pressures that the environment has been subject to, for example, from development, pollution and natural resource extraction.

A commonly held view is that it is often the poorer groups in society that live in poor quality environments. If this is the case, it has implications for how environmental policy should be designed and implemented to help redress such inequalities and prevent them happening in the future. This is a key aspect of environmental justice: recognising inequalities with respect to environmental quality and tackling them through policy more effectively.

Inequalities arise where specific population groups in society experience much poorer environmental quality than other groups, in terms of where they live, work or environments that they have access to. This is problematic particularly for socially excluded groups, as it can lead to further adverse health impacts, poorer quality of life, and deepening levels of exclusion. It could also be considered unjust, if we start from the premise that all communities are entitled to good environmental quality.

Hence there needs to be greater understanding of differences in the social distribution of poorer environmental quality because specific groups in society may be more vulnerable to impacts because of where they live, their current state of health and their economic status affecting how they cope / adapt.

If we consider the overall aim of the European Union's Sustainable Development Strategy (EU SDS), it is clear that both environmental protection and social justice lie at the heart of the Strategy, indicating that this social dimension of environmental policy (as embodied in the concept of Environmental Justice) is important –

> *The overall aim of the renewed EU SDS is to identify and develop actions to enable the EU to achieve continuous improvement of quality of life both for current and for future generations, through the creation of sustainable communities able to manage and use resources efficiently and to tap the ecological and social innovation potential of the economy, ensuring prosperity, environmental protection and social cohesion* (Council of European Union 2006).

The evidence for what we term *environmental inequalities* is presented below, including the impact that this has on socially-excluded communities. This is an important first step in trying to understand this issue at the European level, with limited work having been undertaken outside of the UK, Germany and Netherlands.[2]

1.1 Good environmental quality matters

It has long been established that the physical environment plays a fundamental role in society's health and well-being. A poor quality environment can lead to health problems (pollution causing health effects) or contribute to catastrophic events (flooding due to removal of natural vegetation or in the longer term, climate change). Good quality environments can help us to adapt to catastrophic events (e.g. ecosystems can reducing flooding), to enjoy our leisure time and exercise, to provide important resources sustainably and fundamentally contribute to good health.

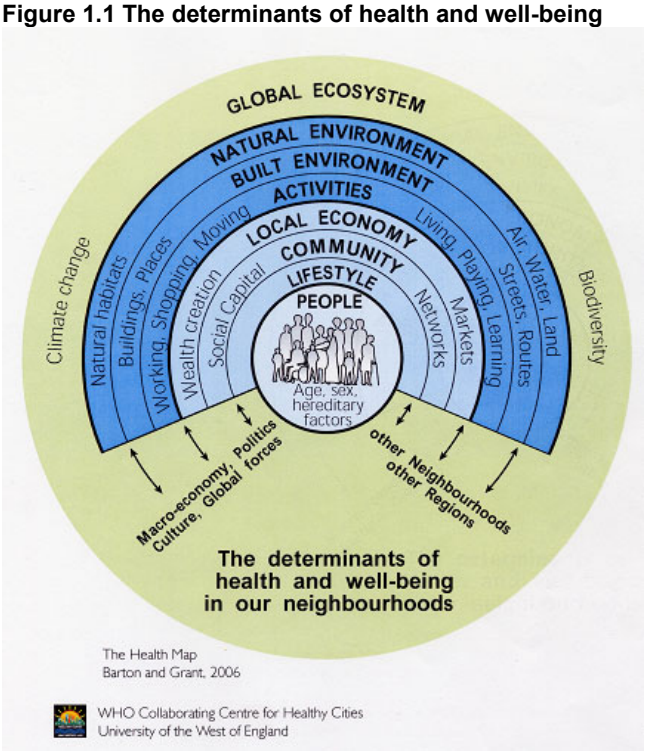
These issues are particularly important to socially-excluded groups, who may already suffer from poor health, be more vulnerable to flooding (or less able to cope), and require good environmental areas for leisure time and relaxation (for example). Therefore, if such groups live in environmentally degraded areas, problems of social exclusion become more difficult to address. In addition, there may be problems of increased vulnerability to poor environmental quality, and the cumulative impacts arising from a range of environmental problems.

[2] For a full description of this analysis, see the report for WP 2 (see Annex 1)

The role of environmental quality on economic well-being and health

Due to the associated impacts, poor environmental quality is an important determinant of health and well-being, although as shown in Figure 1.1, it is one amongst a multitude of interrelated and diverse factors that contribute to the social and economic well-being of any particular household or community.

Figure 1.1 The determinants of health and well-being



Source: Barton and Grant (2006)

The fact that the many determinants of health and well-being are interrelated suggests an integrated policy response to tackle such issues could be important.

Environmental quality can affect health and well-being through direct impacts (e.g. air quality effects on respiratory function) or indirect impacts (e.g. well-being affected by perceptions of environmental quality, reduced opportunities due to lack of investment in areas with degraded environment). There are three broad areas of impact -

- ***Health impacts.*** A person's health is vital for prospering in society; poorer environmental quality that affects health will clearly have a detrimental impact - poorer health can inhibit economic activity and detract from the quality of life. In particular, socially excluded populations tend to have poorer health in the first place as a result of their socio-economic status; additional health impacts could further entrench health inequalities.
- ***Socio-economic impacts on households and communities.*** Economic impacts resulting from poor environmental quality (e.g. on health) may result in greater economic hardship for socially excluded populations. Local environmental quality issues may also impact on employment opportunities (due to lower levels of investment) and community cohesion.
- ***Perception of environment and well-being effects.*** Poor environmental quality may result in negative perceptions of the environment by resident populations (affecting health and well-being) and by other communities and businesses (affecting regeneration and house prices). This could impact on the well-being of individuals in the community, or the community more widely. There is growing evidence that people's health is influenced by their perception of their local environment.

Measuring the social distribution of environmental quality

There were two main objectives of this part of the study; the first was to comprehensively review the literature to establish the extent of the evidence, and what could be concluded on the basis of that evidence. The second was to undertake some case studies that would provide additional information.

When talking about *environmental quality*, the focus was on issues relating to the physical rather than built environment. This included issues such as air quality, noise, and climate change. Of course the built environment has an important effect on people's lives in society, and can also be viewed in the context of environmental justice, based on the premise that all deserve the right to live in good quality, safe built environments.

The approach was also to consider environmental quality as something that could be measured, monitored or observed, rather than perceived. The focus was therefore on studies that used distributional analysis techniques rather than survey-based approaches. Again, it is important to recognise that how people perceive their environment and what they consider to be the important issues are important for their own well-being / quality of life, and often gives insights into key environmental problems and their impacts.

Evidence of the impacts of poor environmental quality

The European Commission is aware of the links between environment and health, as laid out in *A European Environment and Health Strategy* (EC 2003). This strategy sets out the following objectives, to:

- Reduce the disease burden caused by environmental factors in the EU
- Identify and prevent new health threats caused by environmental factors
- Strengthen EU capacity for policymaking in this area

It is apparent that while some understanding of the links between environmental quality and health have been established,[3] the extent of the problem is not fully known for many cause-effect relationships whilst the understanding of the interaction of different pollutants in the human body, as well as in the environment, is limited. The strategy aims to achieve a better understanding of the environmental threats to human health to identify the disease burden caused by environmental factors in the EU and to plan policy responses to the challenges that emerge. Importantly, this strategy also sets out an ambition to look at policy responses in an integrated way.[4]

At the recent WHO Fifth Ministerial Conference on Environment and Health, the following statement (WHO 2008) sets out some of the key environment-health concerns across Europe –

> *Well tested environmental health interventions could save nearly 1.8 million lives a year in the 53 countries of the WHO European Region. As children are among the most vulnerable members of society, action targeted at them would benefit the entire population: 6 million years of healthy life in children and adolescents could be gained by tackling air pollution, unsafe water, injuries and chemicals. Emerging threats that magnify the impact of the environment on health are a new challenge: most importantly, the changing climate.*

Both the strategy and recent WHO meeting illustrate two important issues – the impacts on health are large, and there are specific groups in society who may be most vulnerable. Various European assessments of impacts relating to the issues of air pollution and climate change provide additional evidence of the problems – see box below.

[3] The strategy suggests, based on current knowledge, that around 20% of the total burden of disease in industrialised countries can be attributed to environmental factors, with the bulk of this affecting children and vulnerable groups, such as poor and women in reproductive age.
[4] The document **Environment and Health Action Plan 2004-2010** sets out how the strategy will be implemented and objectives achieved.

European Health Impact Assessments: Air pollution and Climate Change

AIR POLLUTION
Over the past decade, numerous studies have shown that existing air quality concentrations lead to adverse health impacts, with the main pollutants of concern being particulate matter (PM_{10} – particulate matter less than 10 microns in diameter) and ozone (although nitrogen dioxide (NO_2) is potentially also important). More recently the focus has been on the impact of smaller particles ($PM_{2.5}$).

Health impacts arise from both short-term and long-term exposure to pollutants. Short-term health impacts include premature deaths, respiratory and cardio-vascular hospital admissions, and a potential exacerbation of asthma and other respiratory symptoms. The evidence for these effects is strongest for particles and for ozone. Long-term exposure to air pollution (particularly PM pollution) also damages health and these effects - measured through changes in life expectancy - are substantially greater than the effects of short-term exposure. For PM, there is no safe threshold for exposure.

The recent Thematic Strategy on Air Pollution (developed under the CAFE programme) and the accompanying impact assessment (CEC 2005a, 2005b) set out the current impacts, in particular those related to health, associated with air pollution and the objective of reducing such impacts. As stated in the strategy the impacts are large –

There is currently a loss in statistical life expectancy of over 8 months due to $PM_{2.5}$ in air, equivalent to 3.6 million life years lost annually. *Even with effective implementation of current policies this will reduce only to around 5.5 months (equivalent to 2.5 million life years lost or 272,000 premature deaths). For ozone there are estimated to be around 21,000 cases of hastened mortality in 2020. This has severe consequences for quality of life. Children, the elderly as well as citizens suffering asthma and cardiovascular diseases are particularly vulnerable. In monetary terms, the damage to human health alone is estimated at between €189 - 609 billion per annum in 2020.*[5]

CLIMATE CHANGE
Many impacts that affect society have been identified in recent assessments. These include:

- Degradation of ecosystems
- Increased risks to coastal areas from flooding
- Reduction in agricultural productivity primarily in southern Europe
- Impacts on energy demand and therefore supply patterns
- Impacts on tourism, including reduced winter sport tourism and a redistribution of tourism destinations across Europe
- Effects on human health, either directly related to the physiological effects of heat and cold, or indirectly, through the spread of diseases, or through the potential risks of flooding. An increase in some impacts has been observed recently in Europe with the summer heat waves in 2003 alone claiming more than 35,000 premature deaths.
- Changes to water resources across Europe: a likely decease in annual rainfall and river discharge in southern and south-east Europe, particularly in summer, and recent studies have shown that these will lead to water shortages in these areas. Such changes will have knock-on effects (EEA, 2007b) for biodiversity, agriculture, energy, health, recreation, fisheries and navigation.
- Effects on the built environment, which is particularly vulnerable to extreme events, e.g. floods and storms, though also heat-waves and drought.

See the results of the PESETA project[6] for a detailed assessment of climate change impacts and adaptation in Europe (CEC 2007a, 2007b).

Recognising inequalities in the social distribution of environmental quality

As noted above, the European Environment and Health Strategy recognises the importance of the impacts on society of poor environmental quality and is contributing to the development of understanding in this area. Policy is also being developed to tackle these problems. However, we believe that, in parallel, there also needs to be greater understanding of the differences in the social distribution of poorer environmental quality. Specific groups may be more vulnerable to impacts because of where they live, their current state of health and their economic status. In turn, these factors may affect how they cope / adapt to impacts. In addition, there is an equity dimension, from the perspective that everyone has a right to good environmental quality. Further understanding of the distribution of impacts can lead to consideration of how environmental policy making can be improved

[5] Further reading on health impacts of air pollution, and analysis underpinning the Thematic strategy can be found at http://www.cafe-cba.org/
[6] The PESETA project, http://peseta.jrc.es/index.html

to reduce impacts on more vulnerable communities, and to ways in which social policy can link with environmental policy in helping address inequalities.

The concept recognising the rights of communities in terms of their local environmental quality was first established in the USA over 30 years ago, and was encompassed by the term *environmental justice*. This was primarily a civil rights based issue, focused on the proximity of toxic waste and dump-sites to low-income black communities.[7]

In Europe, the recognition and use of the concepts of environmental justice and environmental inequality are more recent. Social deprivation and exclusion have long been areas of concern in Europe with many studies identifying and assessing population groups with limited financial and other resources, and limited life opportunities. Similarly there has long been interest in environmental quality, identifying poor or degraded environments, and assessing ways of improving the environment. This issue is highlighted by Bolte (2006a, 2006b); in Germany, the study of the environment and health are recognised as being well established, but there is a lack of a systematic link up between social, environmental and health data, and as such there is very little material on the social distribution of environmental exposures (the lack of a generally accepted definition of unjust is also cited as a problem).

Over the last 10 years, an increasing number of researchers across Europe (mainly in the UK, Germany, and the Netherlands) have started to investigate the issue of the social distribution of environmental quality, using different techniques. This has been driven by specific interest by policy makers, particularly in the UK (from Scottish Government, Environment Agency), or academic interest. As indicated previously, much of this work falls into the research field on *environmental equity*, *environmental justice* and *environmental inequalities*, reflecting the particular concerns around the distribution of degraded environments and poor, vulnerable or socially excluded groups.

1.2 Evidence of inequalities in the distribution of environmental quality

The evidence base

Limited work has been undertaken at the European level on the distribution of environmental impacts making this study timely and important, particularly in reviewing the extent of the evidence base. However, there are two notable pieces of research at the European level, first by Serret and Johnstone (2006) for the OECD, and secondly by Bolte and Kohlhuber (eds 2005) for the European Commission.

Serret and Johnstone (2006) is a major OECD publication, which describes some of the most significant studies in the area of distributional effects of environmental policy. Much of the emphasis is on the distributional impacts of environmental policy. Issues of environmental quality distribution are also covered as part of the study, with a review undertaken in chapter 2 by David Pearce. He concludes that in Europe *while the evidence is very limited, the data for the UK suggest that existing distribution of risks is biased towards the poor*. All studies cited are from the UK with the exception of a study from the Netherlands by Kruize and Bouwman (2003) discussed later in this section.

Bolte and Kohlhuber (eds 2005) report on the study findings from a major Framework Programme 6 project known as the PINCHE study. They reviewed the link between the impact of socio economic factors on environmental exposure and the health of children in Europe. The study concentrated on four main themes - indoor and outdoor air pollution, carcinogens, neurotoxicants (neurobehavioural and neurodevelopment toxicants) and noise. Environmental justice was used as a key concept in the study to examine the unequal distribution of environmental burden and health risks across social groups. The key results were that there was a lack of information in general (especially peer reviewed articles) on these issues in Europe and especially in Eastern Europe, and that based on the fragmentary evidence, in most cases there was an inverse social gradient with increased burden (exposures, health disturbance) in children of lower socio-economic status.

[7] A review of the US-based literature can be found in chapter 2 of Serret and Johnstone (2006).

The majority of the national studies undertaken in Europe that were reviewed as part of this study[8] are from the UK, and tend to focus on the following:

- Distribution of air pollution (for pollutants included in the Air Quality Directive / National Emission Ceilings Directive (NECD))
- Distribution of noise pollution
- Proximity to industrial facilities
- Proximity to flood risk areas
- Proximity to so-called *good quality* environments

Clearly other issues of environmental quality are important e.g. chemicals in the environment, water quality etc; however, many such issues may not be covered in the literature yet due to lack of environmental data and / or understanding of the impacts (particularly health) on the population.

Air pollution

Studies on the social distribution of air quality are most numerous in this research area. Key national scale studies in this area include Walker et al. (2003c), Fairburn et al. (2005), Mitchell and Dorling (2003), and Pye et al. (2005). Most of these UK-based analyses show that average pollution levels are worse for the most deprived population deciles (but also that the least deprived deciles experience above average pollution levels). When the worst air pollution areas are analysed (rather than average figures), the bias against the most deprived communities is much greater i.e. these are much more likely to be found in the worst polluted areas. Both findings are illustrated by analysis for England in Walker et al. (2003c) shown in Figure 1.2. Analysis for Wales does not show this pattern however due to different demographic patterns in this part of the UK.

The observed trends at a national scale are driven in part by urban populations having higher numbers of deprived communities, and worse air pollution, particularly that caused by road transport. Urban scale analyses also provide similar findings (although the strength of the correlation differs by study depending on the measure of pollution and analysis scale). Such studies include Mitchell (2005), Brainard et al. (2002), Bateman et al. (2002), McLeod et al (2000) and Pye et al. (2001).

Other studies have focused specifically on vulnerable groups, such as children's exposure to air pollution. In Sweden, Chaix et al (2006) examined the link for children between their socio-economic status and exposure to NO_2 in Malmo, and found that low socio-economic status children tended to be located in the most polluted areas, whilst those of high socio-economic status were not.

Distribution of noise pollution

A more limited number of studies have been undertaken to assess noise levels and exposure on the basis of population socio-economic characteristics. Kohlhuber et al. (2006b) examined a perceived exposure to noise and air pollution for a cohort (sample size 7,275) amongst a range of different social characteristics such as whether the person was of non-German nationality, East German, and based on income and education levels. They found that environmental exposure was unequally distributed particularly with regards to economic differences. This result was similar to earlier work by Hoffman et al. (2003) which found that people with lower socio-economic status often lived nearer main roads with high traffic noise and as a result felt more aggravated by traffic noise.

A study by RIVM (2001) also found that low income areas were built more densely, more likely to be situated near a road where the NO_2 standard was exceeded and more likely to experience higher noise levels than high income areas.

Proximity to industrial pollution and waste sites

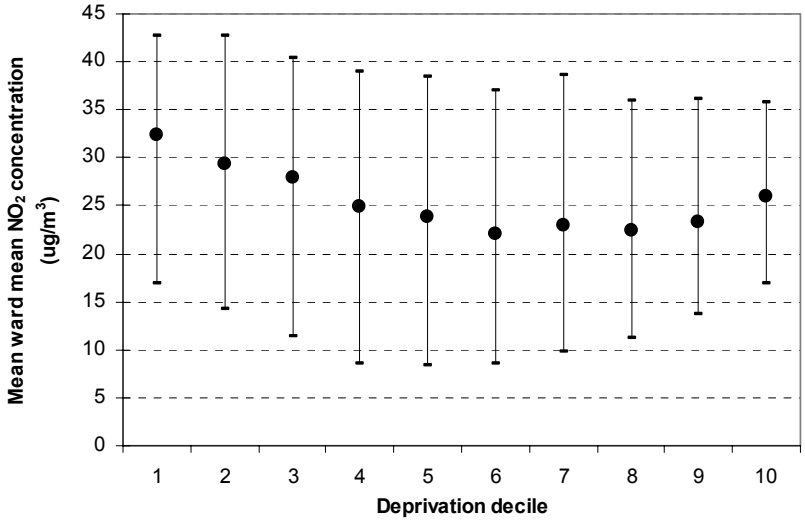
Some of the earliest distribution analyses carried out in the UK focused on proximity to industrial sites. These studies provide an understanding on proximity but are limited with respect to insights on impacts. Pye et al. (2005) assessed the contribution of point sources (e.g. industrial installations) to background levels of pollution and were unable to identify any clear trend suggesting that even though the more deprived communities live closer to IPC sites, they do not necessarily experience worse air quality as a result. However, it is important to note that other impacts might arise based on proximity – associated traffic, odour, and perceptions of environment.

[8] Ref to WP 2 report

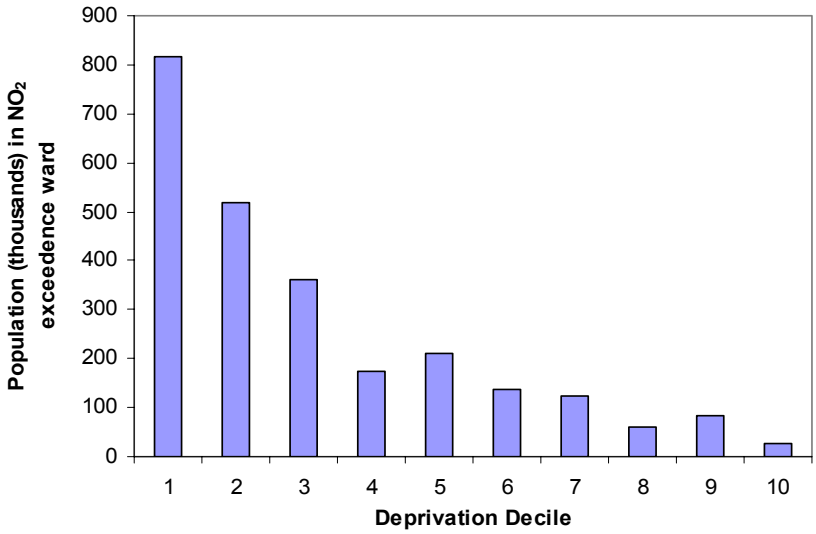
Walker et al (2003c) found compelling evidence of a socially unequal distribution of IPC sites[9] in England, which means that significant sources of pollution are disproportionately located in more deprived areas. Six times as many people belonging to the most deprived decile live within 1 km of an IPC site, compared to the least deprived decile. IPC sites are also more clustered in deprived areas, with the proportion of people living within 1 km of multiple sites higher than in more wealthy areas. Fairburn et al (2005) found similar results for Scotland.

Figure 1.2 a) Distribution of ward mean NO_2 2001 in England and b) Distribution of ward mean NO_2 exceedences in England (2001)

a)



b)



Source: Walker et al. (2003). Decile 1 = most deprived 10% population

The UK Environment Agency (2007c) showed that waste management sites in North West England were concentrated in the most deprived areas. The exception to this was landfill sites, which have been decreasing in numbers for years. In Wales, the urban locations of recycling and waste transfer sites mean that not only is the total number of people living near to them high, but also that they tend to have higher proportions of deprived people living near them. Other sites, particularly landfills, are located further away from populations; the total number of people living in the vicinity of such sites is low and not biased towards the deprived (Environment Agency 2007e).

Proximity to flood risk areas

Flood risk is becoming an increasing concern, and is recognised as one of the major (future) impacts of climate change. There have been a series of studies in the UK that have looked at the issue of

[9] i.e. industrial installations, such as those covered by the IPPC Directive.

flooding and deprivation. This has been possible by the extremely good data sets that exist, both in relation to flood risk, and multiple deprivation.

Walker et al. (2003) found different relationships for tidal and fluvial flooding using these two data sources. For the analysis of tidal floodplains, the resulting relationship showed that the more deprived communities were likely to live in higher flood risk areas. In contrast they found an inverse relationship for fluvial floodplains. They considered the latter was due to the rural nature (often more affluent) of many fluvial floodplains, and the fact that riverside locations often have a premium value in terms of property prices. The higher share of deprivation in tidal floodplains was considered to be due in part to the large size of the population at risk in London and the Thames Estuary.

Fielding et al. (2005) examined the distribution of flood hazard (fluvial and tidal combined) against social class for England. They found that those people at significantly increased risk are the lower social classes (Class 3 and 4 at 9 per cent increased risk) and the unemployed (3.4 per cent increased risk); those in Class 1 and 2 (higher income, less deprived) have a significantly lower risk of flooding (8.5 per cent decreased risk).

The most recent study, by the Environment Agency (2007a), undertook a similar analysis using the updated Environment Agency flood map and the index of deprivation. Their findings are similar to that of Walker et al. (2003):

- More deprived populations are more likely to be living within zones at risk from flooding.
- For river flooding and when considering England as a whole, the proportions of population at risk are approximately equal across the different deprivation bands. However, this masks considerable variability at a regional level[10].
- The relationship of deprivation and flood risk is dominated by sea flooding. Within the English regions shows that there are disproportionate concentrations of deprived populations in zones at risk from sea flooding across nearly all of the affected regions. They go on to suggest that a common factor (or set of factors) may have influenced the development of areas near to the coast and along estuaries which has, over time, led to them being occupied predominantly by deprived populations.

The EA (2007a) report also discusses the issue of choice (voluntary risk) in relation to this relationship, i.e. i*f people have exercised 'free choice' in the housing market fully informed of flood risk implications, then arguably there is no injustice in any bias towards particular social groups in the profile of who is and is not living at risk. However, if there is evidence that there have been biases in the decision making processes which lead to well-off areas being better protected by flood defences than deprived areas, then an injustice may be claimed.*

Proximity to *good quality* environments

This issue is as much concerned with access to good quality environments as it is with the distribution of poor environmental quality. Good quality environments can be measured by different indicators such as green spaces in an urban environment, river quality levels, or unspoilt rural environments.

Fairburn et al. (2005) considered such issues for Scotland. They found that:

- Where there were rivers in deprived areas they were more likely to have poor water quality compared to rivers in less deprived areas.
- People in deprived areas were also less likely to live near woodlands compared to the general population. This may have implications for access to natural recreation areas.
- Within rural settings it was deprived groups who were more likely to be living near to quarries and open cast mining.

The UK Environment Agency (2007b) reviewed the links between river water quality and river environments and deprivation in England and Wales and found that it is extremely difficult to establish a direct casual link between deprivation and river water quality. The small amount of literature that does exist is often anecdotal and postulated. However the study did find that poor quality rivers were concentrated in deprived areas. Within this overall pattern there is also evidence that, as river water quality worsens, the concentration towards deprived people living near to those rivers increases (Environment Agency 2007e). What such an analysis means in term of health and socio-economic

[10] Analysis of river flooding shows different patterns. There are concentrations of the most deprived populations living at risk of river flooding in some regions and concentrations of the least deprived in others (reflecting the underlying highly uneven geography of deprivation).

impacts is difficult to determine, as river quality is not linked for example to drinking water, and quality of water may or may not affect the amenity value of the surrounding environment.

A number of studies have considered a range of environmental issues affecting local communities. In the Netherlands, a study by de Hollander and Staatsen (2003) concludes that *clustering of social and health problems are mainly in deprived neighbourhoods where there is an accumulation of unfavourable environmental, spatial and social quality*. Similar to statements in the UK (see Defra 2005, Middleton 2003) they call for a multidisciplinary approach and recognition of the interrelated nature of problems in deprived areas. Kruize and Bouwman (2004) provide a very comprehensive analysis of the Rijnmond region of the Netherlands, in which the location of different income groups was assessed against a range of environmental data, including both objective (e.g. air quality) and subjective measures (e.g. perception of air quality. This analysis found that the higher the income, the lower the levels of NO_2, the higher the availability of public green areas and the lower the chance of having a waste disposal site in the surroundings. It also found that the lower the level of income, the lower the chance of noise levels below 50 dB(A).

Steger (2007) presents a range of case studies from Central and Eastern Europe focussing on Roma communities. The siting of Roma settlements on or near waste sites, floodplains, lack of provision of basic utilities including clean running water are all documented as being significant problems for many Roma. In one distribution study in Hungary it was found that 15% of Romany settlements were within 1km of an illegal waste dump and 11% were within 1km of animal carcass disposal sites (Gyorgy et al 2005).

Some broad conclusions can be drawn from the literature review:

- There does appear to be evidence from a limited number of countries that suggests it is often the lower income or deprived communities that experience poorer environmental quality.
- The evidence base is strongest from the UK; in respect of themes, air quality is the most common measure of environmental quality. Outside of the UK, Germany and Netherlands, the evidence base is limited.
- The type of data used, its spatial resolution, geographic scope and methodologies differ significantly across many of the studies

The evidence base provides a clear indication that this is an issue of concern, although in many countries the evidence is limited. There is therefore, a need for additional research in this area, not only on the distributional patterns, but also on what this means in terms of actual impacts, and how the issues of vulnerability and cumulative impacts are factored in.

The importance of vulnerability and cumulative impacts

It is important that concern over environmental inequalities does not just focus on their distribution but also considers the issue of vulnerability. Bolte (2006a, 2006b) characterises these distinct (but related) issues as:

1) The variation in environmental exposures, i.e. some people may live in noisier or more polluted areas (using the Chaix et al. 2006 study to illustrate); and
2) Effect modification: this is the idea that a specific environmental exposure does not have the same impact on everybody. People who are deprived already may experience increased negative effects (the same point is made by Gee and Payne Sturges (2004) for the USA).

In this section we focus on the idea that distributional inequalities can be worsened by vulnerability,[11] and that vulnerability alone (irrespective of variation in environmental exposure) can lead to environmental inequalities.

Concerning **air quality** impacts, there is an increasing amount of published evidence investigating the links between socio-economic status and vulnerability, some of which suggests that there is a link. This is important because it could mean that i) lower socio-economic households incur greater impacts

[11] Blaike et al (1994) provide a definition of vulnerability for natural hazards - *By vulnerability we mean the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard. It involves a combination of factors that determine the degree to which someone's life and livelihood is put at risk by a discrete and identifiable event in nature or in society*.

at the same pollution levels; and/or ii) that this could be further compounded where lower socio-economic groups experience worse air quality (as reflected in many distributional analysis). Additionally, there is a well-established association between deprivation and ill health giving rise to lower life expectancies and greater morbidity in deprived areas. Higher background rates of ill-health mean that the impacts of any proportionate increment in risk arising from exposure to air pollution in deprived areas is relatively greater (in terms of additional cases per 1000 population or loss of life expectancy) than in better off areas (see box).

Air quality impacts and vulnerability

An Italian study found that the increase in daily mortality associated with PM_{10} was more pronounced among persons with lower income and socio-economic status (1.9% and 1.4% per 10$\mu g/m^3$, respectively) compared to those in the upper income and socio-economic status levels (0.0% and 0.1%, respectively) (Forastiere et al 2007). Canadian studies have reported an increased effect of PM_{10} on long term life expectancy in lower income neighbourhoods (Finkelstein et al, 2003) and an increased effect of PM_{10} on daily mortality in people with low socio-economic status and those with lower educational attainment (Villeneuve et al, 2003; Jerret et al, 2004). In contrast, a study of the relationship between PM_{10} and mortality in the four largest US cities, Zanobetti and Schwartz (2000) found little evidence that social factors or race had an important impact on PM_{10} effects and the relationship between cardiac hospital admissions and daily concentrations of gaseous air pollutants in ten large Canadian cities was unaffected by community level of education or income (Cakmak et al, 2006).

A small number of studies have demonstrated that the impact of PM_{10} on daily mortality risks is greater in older age groups than for the population as a whole (e.g. Gouveia and Fletcher, 2000; Bateson and Schwartz, 2004) and although Zeka et al (2005) reported that age did not have a modifying effect on the effects on PM_{10} on age standardised mortality rates, the relative impact of an increment in PM_{10} was greater in cities with older populations (that is with higher proportions older than 65 or 75 years in age), which is consistent with the elderly being more susceptible. They noted that Katsouyanni et al (2001) had reported a similar effect in a study of European cities.

In a small US panel study involving adults and children with asthma, Mar et al (2004) found that children appeared to be more susceptible to the effects of air pollution than adults with a relationship between airborne particles and respiratory symptoms being apparent in children but not adults. A number of studies have demonstrated that new born babies may be particularly susceptible to the effects of air pollution (Sram et al 2005; Glinianaia et al 2004a). There is limited evidence that the increase in daily mortality for new born babies associated with PM_{10} is about 0.3-0.5% per $\mu g/m^3$ (Lacasana et al 2005; Ha et al, 2003), compared to a increase in risk of about 0.05% per $\mu g/m^3$ for the population as a whole. The increase in risk of respiratory deaths may be of the order of 1.8-2.2% per $\mu g/m^3$.

Differences in vulnerability are reflected in current air quality impact assessment methodologies. Under the Clean Air for Europe Programme, the evidence for health effects was recently reviewed in order to further develop the impact assessment methodology (Hurley et al. 2005). However, within impact assessment methodology, no differentiation is made on the basis of socio-economic factors. However, it is widely recognised that lower income groups will have poorer health (as measured by background rates in impact assessment) and therefore be more vulnerable.

Concerning **noise**, children may be particularly susceptible to the associated adverse effects. Several studies have demonstrated associations between exposure to aircraft noise and adverse effects on learning in school (e.g. Clark et al, 2006; Stansfeld et al, 2005). Children exposed to rail and/or road noise have been shown to have increased stress levels (Evans et al, 2001, Ising et al, 2004). There may be a social economic dimension in that the adverse impact on learning may be of more significance for children from less affluent homes whose parents may be less able to support learning at home than in more affluent households.

An environmental issue for which the issue of vulnerability appears to be extremely important is in respect to the impacts of future **climate change**. (Across regions of Europe, there is also likely to be considerable variation in distribution of impacts). For example, there may be greater vulnerability to impacts amongst vulnerable groups to health effects, including the elderly and the socially deprived. The box below outlines some issues of vulnerability linked to heat-related mortality.

Heat-related mortality

The relationship between climate and heat related mortality have been extensively studied (see WHO, 2004). The risk of heat illness exists for the whole population. However, epidemiological studies have identified broad groups that are at higher risk of dying during a heat wave or from heat stroke, particularly the elderly[12]. In the European population, the cCASH project (Menne and Ebi 2006) showed that the elderly are the most effected by both heat (and cold). People who have pre-existing illnesses, especially heart and lung diseases, are also at higher risk of dying in heat waves.

The evidence for this was seen clearly in the France 2003 heat wave (see e.g. WHO, 2004; Kovats et al 2004), where excess mortality was estimated at 20% for those aged 45-74 years, at 70% for the 75-94 year age group, and at 120% for people over 94 years (Pirard, et al. 2005). A considerable number of studies have identified relationships between temperature and mortality, generally using time series analysis.[13] In London, the effects of the 2003 heat wave were greatest, in terms of the number of deaths per head of population, amongst the elderly (out of the 600 additional deaths in the city) (GLA, 2006).

A review of the literature on the factors that affect heat vulnerability concluded that the key determinants of vulnerability to heat were age (elderly at greatest risk), hospital inpatients and nursing/care home residents (general vulnerability, often poor ventilation / cooling), having pre-existing health problems, and deprivation, linked to housing, general health and ability to adapt. Other London-specific studies (e.g. LCCP, 2002) have identified that the high levels of inequality in London mean that many of the additional impacts from climate change will be felt most acutely and with greatest consequence by the underprivileged.

Overall, relatively few studies have looked at the effects of temperature on health by socio-economic grouping rather than by age group. The results of a number of studies have demonstrated that the elderly are at increased risk and there have been a number of investigations of factors that modify the risks of heat or cold-related deaths in elderly people. These factors (e.g. living alone, living in a care home, dementia) are not directly related to socio-economic status, although they do reflect various sources of inequality among elderly members of the population.

The results of several studies that have specifically examined the interaction between temperature and socio-economic status suggest that lower socio-economic groups are at greater risk of the adverse effects of extreme temperatures than others. Other studies, however, have found no evidence of an association between deprivation and increased excess risk associated with extreme temperatures. The available information appears to be limited to studies of mortality risk rather than wider health effects.

US studies suggest that there is a strong relationship between heat-related deaths and deprivation (Curriero et al. 2002; O'Neill et al. 2003), as do some European studies (e.g. low socioeconomic status in Rome (+17.8%) and lower education levels in Turin (+43%)) (Michelozzi et al. 2005), though in the UK, no effect was found (Hajat et al. 2007). The latter may be (though there is no evidence as yet to confirm this) due to the very low levels of air conditioning more generally in the domestic sector in the UK (as air conditioning reduces potential heat exposure, but the presence of air conditioning tends to be concentrated in higher income groups).

In relation to climate change, the literature also provides a useful illustration as to how vulnerability manifests itself in relation to flooding:

- Deprived neighbourhoods contain concentrations of vulnerable individuals. These groups have lower levels of flood awareness and so are likely to be less well prepared when a flood arrives.
- The most immediate risks of flooding on health involve the direct risk of injury (or even death), and the damage to property and possessions. However, much wider effects on well-being and health are associated with flooding. Psychological health impacts associated with the flood itself but also the aftermath of the flood (stress and anxiety) can also be considerable. Recent work shows a much higher incidence of depression in flooded communities – up to fourfold normal rates (Reacher et. al. 2004).
- Deprived areas have lower levels of insurance which means uninsured people will have more difficulty in repairing houses and replacing goods. Research by the Association of British Insurers (ABI 2006) has found that 50 per cent of households in the lowest income decile do not have contents insurance[14].

[12] Vulnerability to heat in old age occurs because of intrinsic changes in the regulatory system or because of the presence of drugs that interfere with normal homeostasis.
[13] See WP 2 report (see Annex 1).
[14] Note the UK has a different system to many other European countries, where insurance risk to individuals is largely through private agreements, i.e. there is not state or regional insurance).

- There can also be additional elements (e.g. availability of water, increased health risks) in flooded areas immediately following flood events, as well as longer-term economic impacts.

Werritty et al. (2007) assessed the social impacts of flood risk and flooding in Scotland. They found that the intangible impacts (such as emotional losses, living in temporary accommodation and dealing with insurers) were more severe than the material losses particularly amongst the elderly. The trauma of being flooded was the biggest impact and was disproportionately felt by the elderly and vulnerable (defined as low income households). The level of economic protection that groups had to help them cope with flooding were also assessed, and showed that tenants in social housing had the lowest levels of protection.

Other economic impacts associated with climate change that may most affect low income or socially excluded groups include changes in employment structure or increased costs of goods. Less qualified workers in seasonal industries (e.g. tourism and agriculture) that may be most affected by climate change may have difficulty finding other employment, particularly if these sectors are major employers in the area. Impacts on local agricultural sectors could see local prices increasing.

Finally, it is likely that there will be strong distributional issues with adaptation, i.e. the potential for communities to adapt to potential impacts, and therefore potentially strong inequality issues. Given that adaptive capacity is positively correlated with economic development, it follows that access to efficient adaptation is greater for high-income groups and richer countries (or regions or areas), and less for the poor. This poses a potential problem of equity and distribution. It also raises the issue of whether planned adaptation should specifically try and target such groups, or apply distributional analysis to ensure equitable adaptation strategies.

In addition to the issue of vulnerability, few studies have considered the issue of cumulative impacts. This is the issue concerned with how poor environmental quality across a range of different indicators might impact on communities. Most studies explore one environmental quality indicator; some assess more than one indicator but rarely in an integrated way, whereby combined or cumulative impacts are measured. According to Environment Agency (2007) report, *this field of study is at an early stage. There are currently no standard definitions of 'cumulative' or 'multiple' impacts; nor are there standard approaches to their measurement.*

This is has been highlighted as being important; the key difficulties lie in understanding the interactions between types of impacts, and their impact on different individuals who vary significantly in terms of susceptibility to impacts. Understanding needs to be improved through further epidemiological studies, and subsequently the approaches or methods that mean this issue can be effectively incorporated into tools such as health impact assessment.

Causes of different social distributions of environmental quality

OECD (2006) proposed four factors which help explain why inequalities are observed:

- Differences in preferences for environmental quality between different types of households
- Differences in access to information which would allow low-income households to express their demand for environmental quality
- Existence of failures in associated markets which affect low-income households acutely e.g. split-incentives for landlords and tenants with respect to energy conservation measures
- Existence of policy failures limiting access of low-income households to political decision making

All are important elements covered by the concept of environmental justice. The first factor should probably be qualified by stating that *preferences* would also be traded-off against other factors, including the economic ability to move to an area of better environmental quality, and social preferences such as community preferences, and proximity to place of employment, schools, and other facilities. In respect to environmental justice, a key issue would be whether preferences would differ if better information was available.

It is clear that provision of information and access to decision making are key factors in ensuring that local communities have a say in any developments that may affect local environmental quality. Irrespective of the reasons for causality, a social distribution exists that means more vulnerable groups

may be experiencing worse environmental quality. Policy needs to be focused on addressing the current state, and ensuring that such inequalities do not worsen or recur in future years.

1.3 How can policy address environmental inequalities?

The evidence presented, although limited in many cases, suggests that the social distribution of environmental quality is unequal, and often biased against poorer or socially excluded groups i.e. such groups more often live in areas of poorer environmental quality than other groups. In addition, a more limited evidence base also suggests poorer access to areas of good environmental quality for lower income groups.

In addition to this distributional evidence, we also know that certain groups (poorer, children, elderly) are often more vulnerable to the effects (particularly on health). This vulnerability can lead to or increase the observed distributional inequalities (as impacts are likely to be more significant), even where distributional evidence suggests an absence of inequalities.

There is also the issue of the cumulative impacts on health, where specific groups may experience multiple impacts resulting from a generally degraded environment. Such cumulative impacts are poorly understood; it is one of the areas that the European environment and health strategy is looking to tackle.

Developing effective and efficient environmental policy is challenging; the above issues add additional complexity. However, by recognising the above social dimensions, these concerns can feed into the environmental policy making process, making for better integrated policy more broadly. In addition, if policy is also formulated around protecting the most vulnerable in addition to achieving better environmental quality, such issues need to be recognised.

These issues can be effectively framed using the concept of environmental justice, which would seek to address inequalities, ensure that such inequalities did not increase through inadequate policy making, and ensure that there was effective participation in the process from all parts of society. This also involves access to information and access to the decision making process. The need for such an approach is argued in many of the studies reviewed. For example, Eikmann et al. (2005) discuss the importance of environmental justice as a concept when assessing health impacts from air pollution with regards to fine particulate matter. They state that the move to threshold compliance of air quality standards has neglected the assessment of the differential health impacts of poor air quality amongst different groups in the population. Health, socio-economic and environmental quality data needs to be combined to assess the individual and group specific vulnerability to air quality and then be considered in future clean air plans.

The following practical steps are important for policy makers in addressing the issue of unequal social distribution of environmental quality:

- Identify inequalities; only then can they be addressed.
- Ensure that the data systems and methodologies allow for this identification and understanding.
- In policy design and the implementation process, recognise these distributional issues, and consider how to address these (see box below for examples at local level).
- Facilitate community engagement and participation in addressing environmental quality issues.

Examples of local policy delivery strategies that take account of inequalities / vulnerability

For air quality policy, regional or local authorities could consider the following:

- Engagement with local health services to ensure that the necessary services are available and advertised to the more vulnerable groups.
- Consider the possibility of introducing health-based measures including early warning systems (e.g. text alerts re bad air quality).
- Consider the extent that other factors, e.g. housing quality, exacerbates health problems associated with air pollution and take the necessary action to reduce these in authority-owned or managed properties.

For noise policy, regional or local authorities could consider the following:

- Ensure that social housing providers recognise noise issues in the course of the planning and construction of housing and that mitigating measures are taken, as appropriate, both to the buildings themselves, and to the surrounding premises.

In relation to climate change adaptation strategies, regional and local authorities could consider the following:

- Identify any associated risks, noticeably flood risks, and communicate these to those affected, bearing in mind the likely lower levels of awareness and engagement of vulnerable groups, in particular
- Review the risks posed, particularly from flooding, to any authority-owned or managed properties, and take action to 'flood-proof' these, as far as is possible.
- Provide information on insurance, particularly for non-mortgage holders
- Review the state of the air conditioning/cooling systems in social housing and other residential properties, particularly where the elderly live, and take any necessary action
- Engage with local health services to ensure that the necessary services are available and advertised to the more vulnerable groups, particularly the elderly in the context of heat waves.
- Review the possibility of introducing health-based measures including early warning systems e.g. for heat waves.

An important conclusion from the review and case study analysis is that while the evidence is strong for certain countries, further evidence is needed across the rest of Europe on the social distribution of environmental quality. Serret and Johnstone (2006) also underline this message, by stating that *caution must be exercised when generalising the results to other countries.*

However, significant barriers to improving the evidence base remain, but would be overcome by the following:

- Better environmental and social data.
- Consistent methodology to help harmonise research, thus enhancing comparability.
- Additional coverage of environmental themes to provide a more complete picture.
- Addressing issues of vulnerability and cumulative impacts, and incorporating actual impact analysis.
- Thinking through the policy implications of findings.

In undertaking distributional analysis, systematic European analysis was impossible based on the available datasets. Case study analysis for specific Member States was also difficult.[15] Some of the key problems, which form the basis for recommendations, are outlined in the box below.

[15] For a full review of the case study analysis, see the Work Package 2 report.

The use of spatial data for distributional analysis

a. ***Spatial data for the units under consideration were not consistent within countries at the small area unit (LAU2).***
Excluding the United Kingdom, most capital cities and large urban areas are described as a single administrative unit. This effectively obscures sub-municipal variations in socio-economic data and prohibits researchers from detailed examinations of the relationships between social deprivation and environmental quality. Furthermore, population size variation of LAU 2 units within a single nation often ranges from 10 persons to 10,000,000 persons; a condition that strongly discourages statistical comparison. These data characteristics prohibit researchers and policy makers from accurately identifying those most-impoverished urban neighbourhoods that experience sub-standard environmental quality.

b. Socio-economic data was not readily available at a small area unit.
In many instances, socio-economic data was only available at NUTS level 3 or coarser since it is the aggregation level that is delivered to Eurostat. Those fine-scale socio-economic data sets that were identified were commonly unavailable for a number of reasons including confidentiality issues, lack of a geographic reference, and limited or incomplete geographic distribution. Lastly, some suitable data fine-scale data sets are simply not advertised and are only known to individuals that work with the data.

c. Lack of spatial data recording environmental quality a for a range of scales.
Much of the environmental data for noise and air quality was available at only the municipal scale. Because of variations in data collection and intended used of the data, municipal data sets are not well suited for comparative purposes. Synoptic coverage of environmental data at the national level was sparse and often exhibited abrupt discontinuities at national boundaries. At the European level there are exceptionally few data sets and these are not synoptic as they exclude EFTA nations (e.g. CORINE) or cover only a portion of Europe (e.g. APMoSPHERE).

d. High costs for data.
With few exceptions, both census data and GIS data at fine geographic scales were expensive. These high costs of data are likely to impact the scale at which research is carried out and its geographic extent. Policymakers are also affected by these data costs through the research they commission and the coarser scales at which it will most likely occur. Even data sets that have no inherent information associated with them such as administrative boundaries can be exorbitantly expensive and out of reach for many institutions

e. Lack of quality pan European data to enable consistent analysis across regions and countries in the EU.
There is considerable variation in the methods to collect and derive both environmental and socio-economic data. Efforts to identify data needs and the development of well-conceived data set components are essential to creating adaptable data that suits multiple research programmes.

f. Lack of consistent countrywide data.
In the instances of both socio-economic and environmental data sets, consistent and comparable data sets are rare. Differences in the geographic extent, spatial resolution, thematic quality, measurement methodologies, result in a patchwork quilt of data sets. Examinations of national level trends and spatial patterns become highly problematic and interpretations of results become increasingly subjective. In part, this is due to the fact that data is collected at devolved levels of administration.

2 Impacts of different household types on environmental quality

While production and distribution activities may be the direct cause of environmental damage, it is ultimately the consumption of the resultant goods and services that drives these damages, and hence determines environmental quality. To the extent that consumption patterns vary across different socio-economic groups – both in terms of magnitude and composition – it is possible to assess the underlying socio-economic drivers of environmental quality by identifying the impact of different household types on the environment.

An understanding of these drivers is important for helping achieve positive synergies between environmental and social policies. Such information is needed by policy makers to help better target sustainable consumption policy, encourage expenditure on 'greener goods' and apply the polluter pays principle, an important aspect of environmental justice.

2.1 Differences in impacts from consumption by socio-economic groups

In order to investigate the issue, the total environmental impacts (i.e. both direct and indirect) of different household classes as a result of their consumption of goods and services have been estimated along eight individual environmental dimensions (e.g. global warming potential, human ecotoxicity, etc.). From these individual impacts, a weighted average environmental impact score has been estimated – see box below for details – and only these are considered in this report.[16]

Calculation and decomposition of household environmental impact scores

Relative environmental impact scores (EIS) were calculated for household classes along six different socio-economic dimensions by combining household expenditure breakdowns by COICOP level-3 categories – collated from national household budget surveys – with environmental impact factors (EIF) per unit expenditure derived from the study on the *Environmental Impacts of Products (EIPRO)*, undertaken by the European Science and Technology Observatory (ESTO, 2005).

In order to determine the factors driving differences between household classes, the overall environmental impact scores were decomposed into the following four multiplicative components:

- average household size (AHS) – i.e. the average total number of people in a household in that class;
- average disposable income per capita (DIPC) – i.e. average total disposable income for a household in that class, divided by the number of people in the household (including children);
- average propensity to consume (APC) – i.e. the average proportion of disposable income that is consumed by a household in that class;
- average environmental impact factor (EIF) reflecting the average consumption mix of a household in that class.

The product of the last two components (i.e. APC $\times$ EIF) gives the environmental impact per Euro (PPS) of disposable income for an average household in that class. This provides an indication of the constituent households "ability to pay" for the environmental damages caused by their consumption – with higher values indicating a lower ability to pay.

To facilitate the graphical representation of the results and to allow comparisons to be made across countries, the actual EIS values and their respective components were all converted into index values. This was done by dividing each value by the corresponding value for an average household in that country and then taking the log of the result.[17] This has two advantages. First, the resultant index values are now additive and hence the EIS is equal to the sum of its components (some of which may be negative).[18] Second, the sign of the index value

[16] The impacts for the individual environmental dimensions are provided in the country datasets, which are available in the WP1 report (see Annex 1).

[17] The EIS value for an average household is calculated by applying the individual category EIFs to the average expenditure profile. The latter is equal to the weighted average of the individual household class profiles where the weights are given by the proportions of the total number of households in each class.

[18] That is: ln(EIS/EIS) = ln(AHS/AHS) + ln(DIPC/DIPC) + ln(APC/APC) + ln(EIF/EIF), where the superscript * denotes the value for the average household in that country. If a particular component value is equal to the average household value, then the resultant index value is ln(1) = 0. If this is true for all four components, then the EIS index value is equal to zero.

indicates whether the environmental impact (or component) is greater than, or less than, that of the average household in that country. A positive value indicates that the environmental impact is greater than average, while a negative value indicates that it is lower.

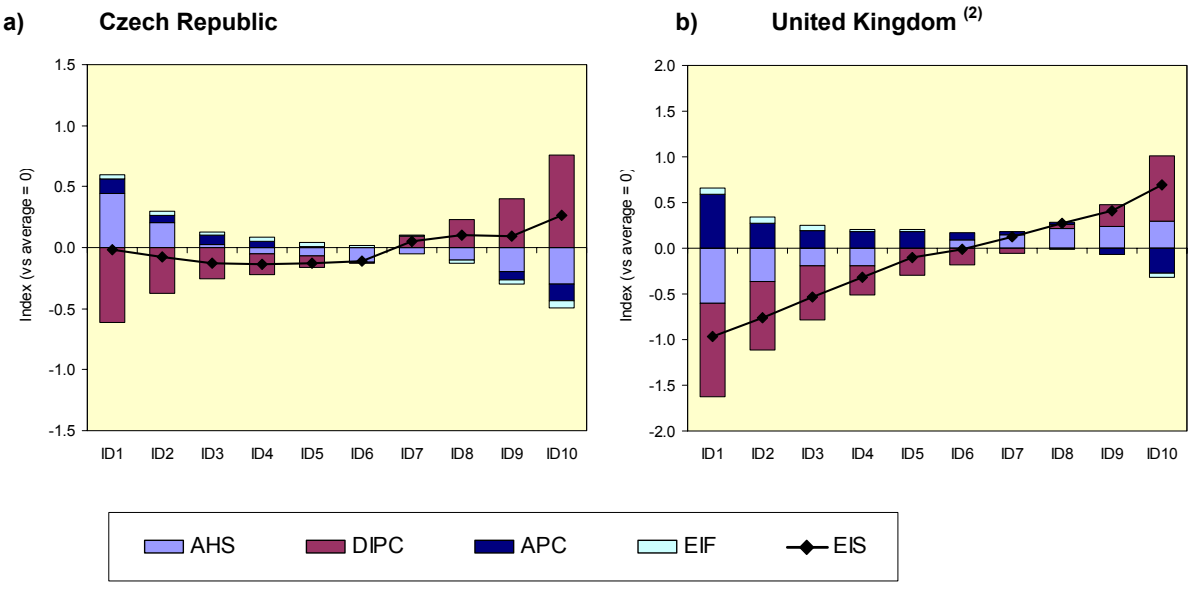
The graphs in this section of the report show the overall environmental impact scores (EIS) by socio-economic category, of which there are six. The EIS is also broken down into four components that drive the trend – household size, disposable income, consumption propensity and average impact factor (which is a function of the type of goods bought). The overall EIS is shown by the solid black line; the individual components are represented by the coloured bars.

Income

Figure 2.1 shows how the environmental impact scores of households in the Czech Republic and the United Kingdom vary by income decile. For the United Kingdom (as well as Spain, Germany and Sweden) the environmental impact increases as one moves up the income deciles i.e. richer households have a greater absolute environmental impact. As shown by the figure, this is driven by household size and disposable income. The breakdown of expenditure on goods and services by income decile (which drives the overall impact factor) is less important in this trend. The average propensity to consume (APC) has a significant moderating influence in the observed trend, reflecting the declining share of income that is consumed as household income increases.

In the Czech Republic (and Bulgaria) the EIS profile is much flatter, with limited variation in the impact across income deciles. This is due to an inverse relationship between household size and disposable income suggesting that higher disposable income households tend to be smaller. However, this is due to differences in the collection and use of statistical data. [19]

Figure 2.1 Aggregate environmental impact by income [(1)]



(1) Deciles are based on average gross household income per capita for the Czech Republic and on gross household income for the United Kingdom.

(2) Note the different scale for the United Kingdom.

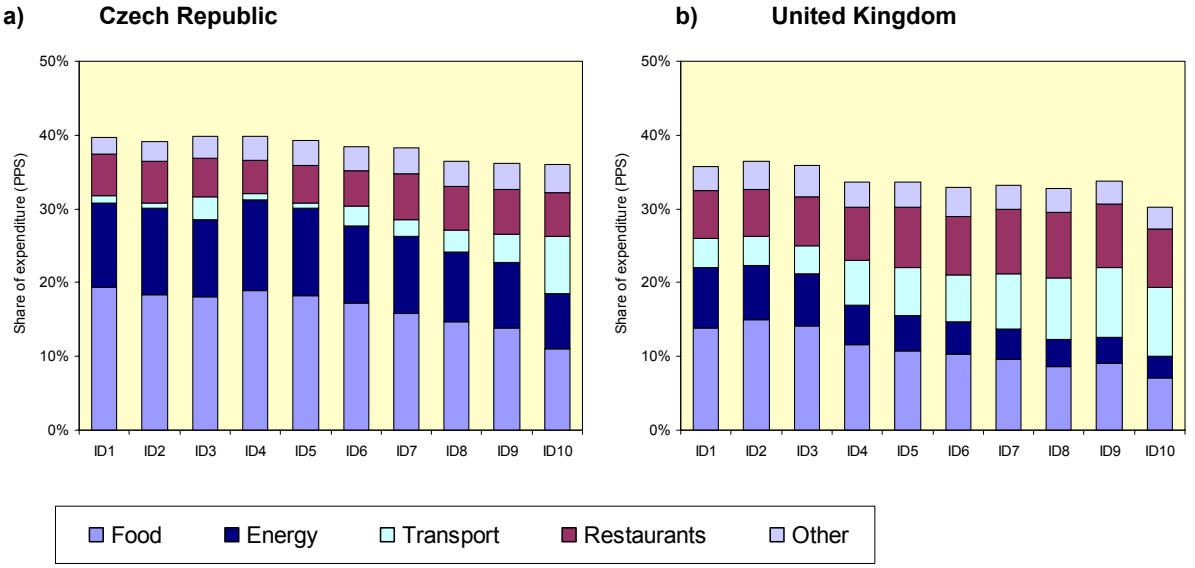
The variation in the average EIF across deciles is driven by differences in the mix of product categories consumed. Figure 2.2 shows the proportions of total consumption accounted for by the twenty product categories with the highest environmental impact factors per unit expenditure, grouped into five broad consumption areas.[20]

[19] Income deciles are based on total gross household income in the UK (and Germany, Spain and Sweden) and on average gross household income per capita (i.e. total gross income divided by the number of persons in the household) in the Czech Republic (and Bulgaria). While the number of earners typically increases as household size increases, the ratio of earners to non-earners typically falls (e.g. due to the presence of children or other dependents). Consequently, while total income per household tends to increase with size, average income per capita tends to fall.

[20] A list of the product categories is provided in the Work package 1 report (see Annex 1).

While the proportion of total expenditure spent on these categories is slightly higher in the Czech Republic (at around 38% versus 33%), the profiles across deciles are remarkably similar for both the Czech Republic and UK. In both countries, the proportion of total consumption accounted for by high-impact food and household energy categories declines significantly as income increases – despite the differences in definitions used for the deciles, with the proportion for the highest income decile being around 50-60% lower than that for the poorest. However, this is partially offset by an increase in the proportion accounted for by motor car ownership (not usage), so that there is only a slight overall decline in the share of high-impact categories as income increases (from 40% to 36% for the Czech Republic and from 36% to 30% for the United Kingdom).

Figure 2.2 Share of total consumption expenditure accounted for by high impact COICOP categories (1)



(1) The twenty COICOP level-3 categories with the highest environmental impact factor per euro (PPS) of expenditure.

While differences in the absolute levels of environmental impacts across household classes are interesting, it is the differences in the environmental impact per Euro of disposable income that are more relevant to the potential social implications of environmental policy interventions. These differences can be seen by comparing the product of the APC and EIF components across deciles in Figure 2.1 (i.e. the dark blue and light blue bars). This shows that the impact per unit income declines as income increases, being between 44% and 169% higher for the lowest income decile (ID1) than the highest (ID10).[21]

Note however that this does not provide insights into the levels of sustainable consumption, as there is no differentiation between product type within the individual product categories.

Activity and employment status

Figure 2.3 shows how the environmental impact scores of households in Germany and Spain[22] vary by activity and employment status, with a similar trend between countries.

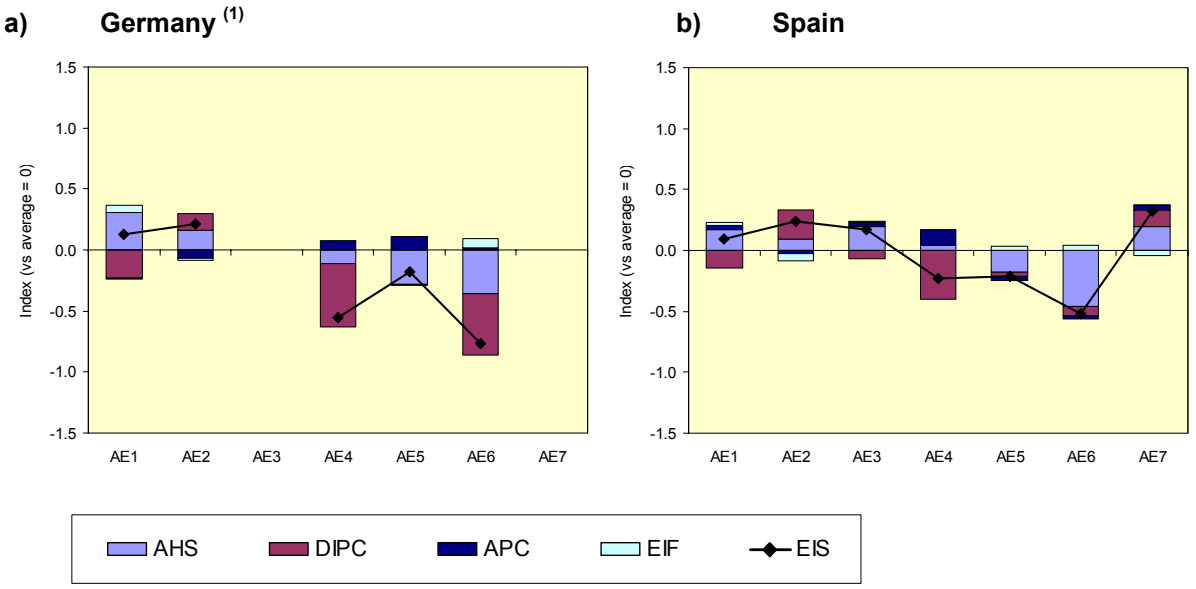
The analysis suggests that households that are economically active (AE1-3) have a higher environmental impact than those that are inactive (AE4-6); being on average around 75% greater. These differences are driven mainly by differences in average household size (AHS) and disposable income per capita (DIPC), with economically active households larger than average, and disposable income greater than average for households where the reference person is a non-manual worker (AE2).

[21] Total expenditure by ID1 households in the United Kingdom is 34% greater than their disposable income, suggesting that the latter may be incorrect or may exclude certain social transfer payments. Consequently, the APC component value may be overstated and the DIPC component value understated (NB: there is no impact on the overall EIS value). If the actual APC value for ID1 is around 100%, then the environmental impact per unit income for that decile is double that of ID10.

[22] Expenditure breakdowns by activity and employment status (with decomposition) were not available for Bulgaria or the United Kingdom. While breakdowns were available for the other two case-study countries, some classes were missing or combined, or had very small sample sizes. However, the partial profiles for these countries are consistent with the two shown here.

In terms of the environmental impact per unit of disposable income, there are some differences between the classes, although the magnitude of the variation is much less than for income deciles. The impact is slightly above average for “manual” and “unemployed” households (AE1 and AE4), and slightly below average for “non-manual” households (AE2).

Figure 2.3 Aggregate environmental impact by activity and employment status

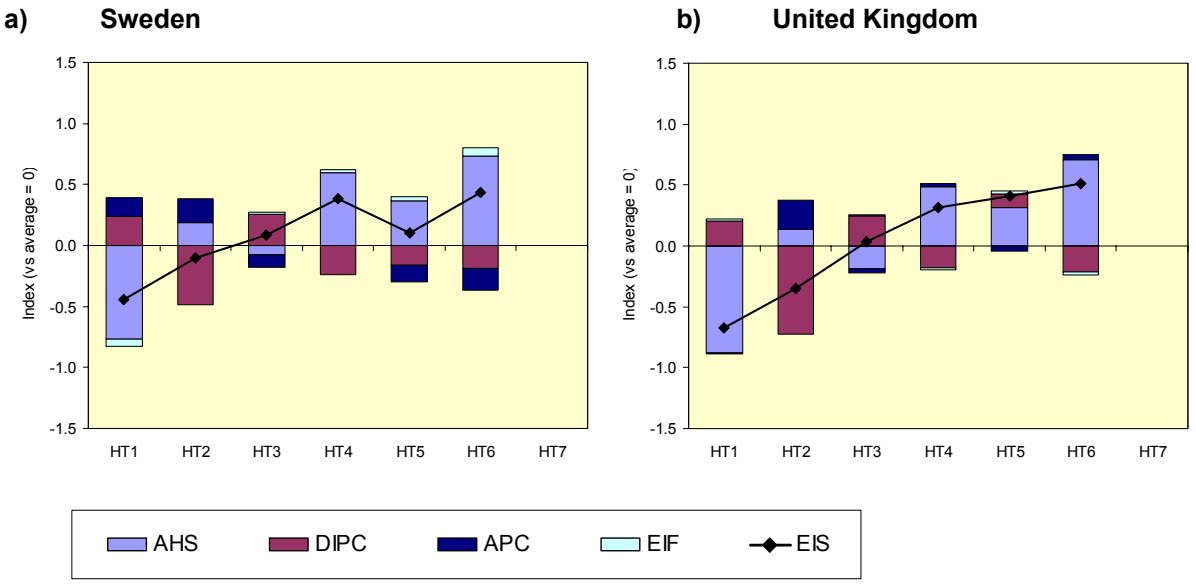


(1) The household budget survey in Germany does not include households where the reference person is self-employed (AE3). Consequently, it was not possible to estimate the environmental impacts for this class.

Household type

Figure 2.4 shows how the environmental impact scores of households in Sweden and the United Kingdom vary by household type.

Figure 2.4 Aggregate environmental impact by household type



Single person households without children (HT1) have the lowest environmental impact, while multi-adult households with dependent children (HT6) have the highest impact. For any given number of

adults, the presence of dependent children increases the environmental impact of a household by around 35% (i.e. HT2 vs HT1, HT4 vs HT3 and HT6 vs HT5). As would be expected, it is the average household size that drives the overall impact trend, although not for category HT2 (single parent households).

The environmental impact of a household increases as the number of adults increases (i.e. HT1 vs HT3 vs HT5). However, there appear to be "economies of scale", with the magnitude of the increases diminishing – particularly in Sweden. This is supported by the profiles for the other three countries with available data (not shown). Based on the profiles for all five countries, the environmental impact for two adults cohabiting (without children) is around 95% greater than for a single person, while the impact for three adults is 165% greater. This implies that the move towards single person households over recent years has had an adverse impact on environmental quality. For example, an adult child leaving the parental home to live alone would lead to an 11% increase in the family's combined environmental impact.

Other socio-economic factors

Three further socio-economic classifications were considered of which two – age of reference person in the household and number of economically active persons – yielded results of interest. For the first, the reference age, households in the middle age ranges (i.e. where the reference person is aged 30-60 years) have the highest environmental impact, being around 50% higher than younger or older households. By the number of economically active persons, the environmental impact increases as the number of active persons in the household increases, being 160% higher where there are three or more active persons than when there are none. No significant variation was found for the final socio-economic dimensions considered, i.e. the degree of urbanisation

Conclusions

The environmental impacts of households do vary across different socio-economic groups. There are significant variations in the environmental impact score (EIS) along all of the socio-economic dimensions considered, apart from degree of urbanisation. The variations are most pronounced for income deciles (ID), household type (HT) and economic activity status (AE); where the highest environmental impacts are more than three times greater than the lowest. The variations are less pronounced for age of reference person (AR) and number of economically active persons (NA); with the impact scores varying by a factor of two.

This variation implies that socio-economic factors do have an impact on environmental quality. It also implies, to the extent that the costs imposed by environmental policy reflect environmental damages, that the financial burdens are likely to vary across different socio-economic groups.

There is a great deal of similarity across countries for all six of the socio-economic dimensions considered – particularly for the environmental impact score profiles. While the component profiles show more variation, there is still a relatively consistent picture across the case-study countries. This suggests that the conclusions drawn from the analysis could be valid more widely in the EU.

A clear picture emerges from the analysis of the key socio-economic drivers of the absolute levels of households' of environmental impacts:

- Low impact households are more likely to be single person households (with or without children) with a low household income, where the reference person is economically inactive (i.e. retired or unemployed) and either younger (less than 30 years) or older (more than 60 years).
- High impact households are more likely to be multi-adult households (particularly with children) with multiple earners and a high household income; where the reference person is a non-manual worker in industry or services and is middle-aged (30-60 years).

This might suggest that there should not be a conflict between environmental and social policy, with those households most responsible for causing environmental problems also being those most able to bear the costs. However, the picture is very different when one considers households' environmental impacts relative to their disposable income. In this case, it is the lowest income households (i.e. ID1-ID4), households where the reference person is unemployed (i.e. AE4) and single parent households

(i.e. HT2) that have highest environmental impact per unit income, while the very richest households (i.e. ID10) have the lowest impact. Thus, to the extent that abatement costs are passed on in the final prices of goods and services, a strict application of the polluter-pays principle would be highly regressive, hitting some of the most socially vulnerable households the hardest.

2.2 Patterns in 'green' consumption

Reducing the impacts from the consumption of goods and services requires both sustainable production and consumption. At the household level, increased sustainable consumption is required, so that for every Euro of expenditure, the associated impact is reduced. Greener goods tend to encompass a wide range of goods and services from organic food and fuel-efficient appliances, to green electricity tariffs (based on renewable sources).

A rapid review of the relevant literature provided indicative evidence that there is a tendency towards higher levels of consumption of green goods by those in higher socio-economic groups. Given that these goods are often (but not always) more expensive than non-green equivalents, higher levels of green consuming in higher socio-economic groups can be partly explained by higher levels of income.

However, higher socio-economic groups also tend to have higher absolute impact levels (as shown in the previous analysis) suggesting that the environmental impact of their higher consumption levels more than outweighs the relative benefits of the higher proportion of green goods that they consume. This points to the need for greater penetration of such goods in the market.

There are two important issues that need to be addressed in this policy area: 1) information needs to be targeted to ensure that different groups in society have all of the relevant information to make informed decisions, and 2) once informed, 'greener' goods need to be made more affordable to lower income groups to ensure that they are cost competitive with the alternatives.

Apart from by income/socio-economic group, there were few other general conclusions about consumption patterns across other population groups that arose from the review. Indicative findings suggest that, in several countries, there is evidence for women being more likely to choose green goods than men. By age group, it was often the younger age groups and the elderly who are less likely to buy green goods. The findings relating to socially excluded groups and age, however, could both be linked to the likely lower incomes of these groups.

There are important synergies between social policy and a move to sustainable consumption, in particular in the area of energy consumption by lower income households. With global commodity prices increasing, household and transport fuel bills look to increase in the near and medium term. Affordability of technologies that allow for more efficient consumption becomes more important, particularly for low income groups. In addition, measures to reduce consumption are also key, such as improved insulation in households (see case study 3 in section 4) and alternatives to private car use.

The issue is all the more important because low income households spend a higher proportion of their income on energy needs; therefore price rises disproportionately affect such households. Policy development needs to consider these market forces in the context of lower income households, particularly in the area of energy use. This is challenging of course as market prices are able to fluctuate considerably whilst policy is developed within structured time frames.

3 Impacts of environmental policy on different socio-economic groups

There are some key challenges for policy makers with respect to the issues discussed in the previous two sections. Firstly, there is evidence that it is often the low income groups who suffer disproportionately from poorer environmental quality due to the distribution of environmental quality and vulnerability of groups exposed (Section 1). Secondly, from the consumption analysis, it appears that it is the higher income groups that cause a disproportionate amount of the environmental damages (although not necessarily on a unit expenditure basis; see Section 2).

For greater environmental justice, we would argue that both need to be addressed - a more equitable situation in terms of the environmental quality experienced and the application of the polluter pays principle.

Another key social dimension of environmental policy that this study has also explored, which is a key part of the environmental justice agenda, is how environmental policy can be designed to ensure that there is equity in policy design and implementation. The key question here is whether environmental policy disproportionately impacts (financially) on specific communities.

It could be argued that the above three issues – reducing environmental inequalities, ensuring that the polluter pays, and removing regressive policy effects – could be achieved through greater consideration of social policy objectives in environmental policy design and implementation (and vice versa).

Finally, another important dimension of the environmental justice agenda is access to information and participation in the policy making process. Through bringing all stakeholders into the process, the above issues can be considered from all perspectives, and potentially identified more easily.

3.1 Getting the policy framework and process right

We have argued that it is crucial that the policy framework under which policies are developed has to encourage fuller consideration and better integration of policy objectives. In addition, the policy development process needs to facilitate this.

The strategic policy frameworks at the European and national levels have been reviewed to assess the extent to which they do recognise the social dimensions of environmental policy (and vice versa). Secondly, the policy process has been assessed to identify the extent to which social dimensions are considered in environmental policy, in particularly through the impact assessment process, and how public participation feeds into this process.

Finally, the current indicators that have been put in place at the EU level have been reviewed, and consideration given to those that might be required to effectively monitor important issues across the environmental-social policy interface.

A key point to highlight here is that successful policy linkages that promote the objectives of environmental justice can only be tested by implementation at the local level, as this is where issues of environmental quality and socio-economic status (particularly exclusion) are most apparent. However, we would argue that the more strategic European and national frameworks have a role in setting the principles, and ensuring policies at the European and national level recognise the need for better social-environmental policy integration.

Strategic policy frameworks at the European and national levels

Strategic policy frameworks set the guiding principles for policy development, and therefore can be considered important in the context of this study – in promoting the need for consideration of social dimensions in environmental policy and vice versa. A simple statement of the importance of

recognising the potential for synergies between social and environmental policies within these frameworks can contribute to raising awareness in policy making.

The EU Sustainable Development Strategy (Council of the European Union, 2006) sets out the principles by which EU policies are developed, which subsequently have to be implemented in the Member States (Council of the European Union, 2006). In this way, it sets the framework within which some national policies (i.e. those within areas of EU competence) are implemented.

The EU SD Strategy clearly recognises the potential impacts of environmental (and other) policies on different communities, as one of its explicit overall objectives is to create a socially inclusive society. However, within the detail of the SD strategy's operational objectives, it is arguable that the potential impacts on different communities could be made more explicit. For example, the operational objectives associated with the overall social inclusion objective make no reference to explicit environmental inequalities or the distributive impacts of environmental policy. The strategy also makes links between health, the environment and inequalities in the context of the objective to improve public health. For example, one of the public health operational objectives talks about the need to reduce 'health inequalities' by addressing the wider determinants of health and another mentions improving information on environmental pollution, although the link between environment and health is not made at this level. Linkages between social and environmental concerns are highlighted; however, the issue of environmental justice and associated concepts could be made more explicit.

The EU SDS also makes reference to the ongoing EU cooperation to improve social inclusion, which is taken forward under the EU Social Protection and Social Inclusion Process[23]. This process has an overarching objective of promoting social cohesion, which highlights the need to promote 'equal opportunities for all', while another overarching objective calls for the promotion of 'good governance, transparency and the involvement of stakeholders in the design, implementation and monitoring of policy'. However, as with the SD Strategy, the issues identified above are not mentioned as explicitly as they might be. For example, issues raised in section 1, such as unequal proximity to environmental hazards, exposure to poor air quality or a lack of physical access to goods and services that might cause or exacerbate social exclusion, is largely absent from the current framework, even though these are all issues that could be identified as subsets of the 'health' inclusion agenda at the delivery level.

The six case study countries that were the focus of this project all have strategic policy frameworks in place for promoting sustainable development and social inclusion. As with the EU strategies, more explicit linkages between the potential impacts of environmental policy on different communities could arguably be made.[24]

When discussing the strategic policies and processes at the EU level, it is important to bear in mind the competencies and role of the European Commission with respect to its Member States. These are governed by EC treaty and – amongst others – the principle of subsidiarity. From the perspective of the relationship between the EU and its Member States, therefore, decisions should be taken at the Member State level, unless EU level action is more appropriate. The role of the Commission is set out in the Treaty and varies between policy areas. For example, while a large proportion of Member States environmental policies have their origins in EU environmental legislation (Pallemaerts 2007), most aspects of social policy remain the competence of Member States. Hence, the EU has only limited powers in the field of social policies, including those aimed at reducing social exclusion. This is reflected in the fact that the measures to take forward the social exclusion agenda focus on coordination of Member State approaches, whereas action on the environment often takes the form of legislation.

Given the importance of recognising the potential impacts of environmental policy on different communities at the strategic level, a **key recommendation** is that the European Commission and Member States should work together to identify how such links could be made more explicit in the respective European and national strategies.

The policy development process

To address the social dimensions of environmental policy making, it is important that the policy development process takes such issues into account. One of the primary ways in which such issues

[23] For further information, see DG EMPL website - http://ec.europa.eu/employment_social/spsi/common_objectives_en.htm
[24] A more in depth analysis of these can be found in the report of tasks A-B of WP3 (see Annex1).

can be considered is at the appraisal stage, when the potential impacts of any proposed policy can be assessed. Such an assessment can consider the issues outlined previously – financial impacts of policy, existence of environmental inequalities and potential mutual benefits across both policy areas.

At the European level, the European Commission has detailed guidelines on how Impact Assessments (IAs) of European policies should be undertaken (EC, 2005). These guidelines are rooted in the concept of sustainable development as they underline the importance of assessing the economic, environmental and social impacts of the proposed policy. They do this by setting out three tables of questions – one for each of the three policy areas – that remind policy makers of the range of issues that should be considered when assessing the different potential impacts of the policies. The guidelines note that the assessment of the impacts of a policy would contribute to the identification of trade-offs and synergies between the three pillars, which should be recognised and addressed, as appropriate. The guidelines also explicitly remind policy makers to consider the potential impacts of policies on vulnerable groups.

An independent evaluation of the IA system concluded that, whilst progress had been made, the majority of IAs that had been undertaken fell short of reaching their full potential for a range of reasons (The Evaluation Partnership, 2007). The MATISSE project (Methods and Tools for Integrated Sustainability Assessment) has also criticised the IA approach arguing that, in practice, the focus is principally on economic aspects, while non-economic aspects are usually framed in an economic way (e.g. social issues are typically reduced to employment considerations, for example). Additionally, it concluded that IAs on environmental policy proposals did not cover social aspects well, while 'non' environmental policy proposals tended not to cover environmental aspects well (Hertin et al, 2007).

In spite of the Guidelines reminding policy makers of the need to identify and take account of the potential impacts of policy proposals on vulnerable groups, there is no guidance on how to do this. Other authorities, however, require 'equality impact assessments' to be undertaken as part of some policy impact assessments, e.g. Transport for London (TfL) required such an assessment of the London Low Emission Zone (Gould et al. 2006). Both TfL and the Greater London Authority (GLA 2003) have produced guidance on undertaking equality impact assessments, in order to ensure that the potential impacts of measures on vulnerable groups are understood and addressed in the course of policy design.

A **key recommendation** is that the European Commission and national, or regional administrations as appropriate, should develop guidance and other tools, as necessary, on assessing distributional impacts (e.g. through Equality Impact Assessments), and require this to be followed if there is the potential that a proposed policy might have adverse impacts on vulnerable groups.

The European Commission's IA Guidelines also underline the importance of consultation and participation in the development of policy proposals. Public participation is seen as important in EU policy making, as part of the ongoing development of good governance. Additionally, it is seen as important in the context of promoting sustainable development, social inclusion and environmental justice (ESRC Global Environmental Change Programme, 2001). EU policy in this area has its origins in the 1999 Aarhus Convention on 'Access to Information, Public Participation in Environmental Decision-Making and Access to Justice to Environmental Matters', which provides for:

- The right of everyone to have access to environmental information that is held by public authorities.
- The right to participate from an early stage in environmental decision-making. Public authorities should enable citizens and environmental organisations to comment on, for example, proposals affecting the environment.
- The right of access to justice, i.e. citizens should be able to challenge, in a court of law, public decisions that have been made without respecting the two aforementioned rights or environmental law in general.

However, vulnerable groups are often more disengaged with the policy process than other groups, as noted in section 1. Hence, there is arguably a need to actively engage such groups, rather than relying on a more passive approach to their engagement. Indeed, such an active engagement is advocated by much of the guidance on undertaking Equalities Impact Assessment in the UK (see above).

A **key recommendation** is that the European Commission, national and regional authorities, where appropriate, should ensure that their respective legislation and guidance on public participation requires the active engagement of vulnerable groups in the course of policy development and ensures that such groups have access to the necessary environmental information.

In summary, we would argue that getting the strategic policy framework right is important to establish the key principles relating to policy making. This has been done, with recognition, at least in the EU SD Strategy, that both social and environmental concerns need to be addressed. However, the strategies (both European and national) could be more explicit concerning the interactions and the potential for both negative and positive outcomes of such interactions.

The policy process, at both the European and Member State level, needs to comprehensively cover the environmental-social interactions, recognise the potential interlinkages, and negative and positive outcomes that could result. This means more robust assessment (through the IA and equivalent national processes) and better public engagement (at all administrative levels), but particularly at the local level (where groups can be best engaged with respect to their local situation).

There is also a need for pragmatism, recognising that the administrative level (European, national, local) will affect what is feasible (and appropriate) in terms of ensuring distributional effects are accounted for or that full public participation occurs.

3.2 Consideration in environmental policy design

In designing an environmental policy, we have explored the social dimensions that need to be taken in to account, namely addressing inequalities (as described in section 1), ensuring fair distribution of environmental policy impacts and realisation of mutual objectives with social policy.

Serret and Johnstone (2006) also argue that the above issues need to be balanced against the impact on the economic efficiency of the policy. In other words, what impact does mitigating the financial burden on specific groups have on the efficiency of the policy? They propose three policy principles when thinking through the development and implementation of environmental policies:

- Assess impacts systematically – what are the potential distributional impacts of a policy?
- Preserve efficiency and effectiveness – whilst distributional impacts are important, the environmental effectiveness of a policy needs to be maintained, whilst the overall economic efficiency of a policy needs to be considered.
- Ensure access to decision making – it is important that stakeholders can participate in the process in an informed manner, so this is about access to the process and to the necessary information.

Serret and Johnstone (2006) provide an extensive review of the possible distributional effects of environmental policy. They conclude that all environmental policies have *distributional* effects *on households; there are likely to be winners and losers*. They state that most analysis has tended to focus on economic instruments, such as environmental taxes or tradable permits. Less work has been done to consider the impacts of other policy instruments, such as direct regulation, although there is evidence of regressive effects. Certainly the extent of the literature on direct regulation does not mean that the regressive effects are less important.

They cite earlier studies on the distribution of pollution abatement costs which indicate that direct regulation can be regressive, with pass-through of costs into goods and services produced falling disproportionately on low income households. Other more recent evidence reflects that certain policies on mandatory performance standards for energy using products may also be regressive where lower income households are assumed to have higher discount rates, resulting in lower future benefits from lower operating costs.

In this study, the issues of policy design specific to environmental taxation were considered. It is in the introduction of fiscal instruments, particularly for the purposes of encouraging greener behaviour, where the potential adverse impacts on the more disadvantaged groups need to be recognised and addressed. This is due to the fact that there is a clear danger of regressive impacts, i.e. that those with less money are disproportionately affected, whenever taxes are added to the cost of consuming goods

or services. However, analysis undertaken within this project showed that, while there is a risk of environmental taxes and charges having regressive effects, it is possible to introduce them in a fairer way.

It is important to note that many different taxes and charges are often labelled as being 'environmental'. Some are levied in an attempt to encourage people to change behaviour (for instance taxes on electricity); while others mainly aim to cover the costs for a service (e.g. water supply and wastewater treatment). Taxes on motor fuels and energy for domestic heating usually do not have the intention of changing behaviour, rather they are often seen as a revenue-raising tool. Having said that, clearly taxation of motor fuels or domestic energy use has the potential to influence behaviour – and indeed this has been the claimed rationale behind some increases in the past.

Within this study, an analysis of the tax burden based on expenditure data from national surveys was undertaken.[25] The key findings were that there is a clear danger of regressive impacts, but that they do not occur in all cases. Underlying income distribution and price elasticities are important determining factors, as is whether consumption is regressive. Also there are a number of options to avoid or mitigate such unwanted effects, such as how the revenue is used.

In order to determine the net distributive effects of environmental tax instruments, the use of tax revenues plays a key role. If environmental taxes are revenue-neutral, for instance due to a parallel reduction in income taxes or a lowering of social security contributions, they can have beneficial effects on the overall economy, and the direct regressive effect of the environmental tax itself can be compensated to a higher or lesser extent. Another option is to earmark revenues for purposes that particularly benefit lower-income groups. For instance, subsidising public transport through revenues from motor fuel taxes has a progressive effect, since members of low-income households are more likely to use public transport than own a car, and would thus benefit most from improved public transport services and/or lower prices. However, it is important to note that even though such an approach may well not be regressive, on average, there is still the potential that some low income groups may still be worse off, e.g. those who do not live near good public transport services.

The social impacts of environmental taxes vary with the tax base – this has been shown by several studies and is again clearly illustrated by our analysis. Generally, if poor households or vulnerable groups spend a large share of their income on a certain product (such as heating fuels) in the first place, an additional tax on this product is likely more likely to have a regressive effect, particularly if there are no substitute products or behavioural options for households to reduce consumption.

The net distributional effect of environmental taxes can be defined as to also include the distribution of benefits from its effects on behaviour, resource use and the environment. There are some indications that the environmental effects add a progressive element, since lower income households often experience higher levels of environmental pollution, and would therefore benefit more than other groups from pollution reduction. However, there is no straightforward way of expressing this relationship in monetary terms.

The extent to which an environmental tax is regressive largely reflects the underlying distribution of income in a given country: in a reasonably wealthy society with small income disparities, distributional impacts of environmental taxes can be expected to be less problematic than in societies with a large income inequity and poverty problems. Thus it can be argued that creating equitable societies and eliminating poverty, in addition to being desirable in its own right, will also make it easier to implement effective environmental policies. However, as long as this is not achieved, compensating measures may need to be implemented in order to mitigate unwanted social effects of environmental taxes. Many compensation measures and packages are analysed in the relevant literature, and some have already been successfully applied in practice.

While the available evidence from research on the social and distributional impacts of environmental taxes allows the identification of broad trends and characteristics, several aspects seem not to have been analysed in sufficient detail yet. In particular, more research is needed to develop a satisfactory methodology to estimate the net effect of taxes and tax reforms, taking into account both dynamic aspects (changes in behaviour and demand) and the distribution of environmental benefits. In order to model such dynamic effects, information about the differential elasticities for different household groups and for different product categories would be needed.

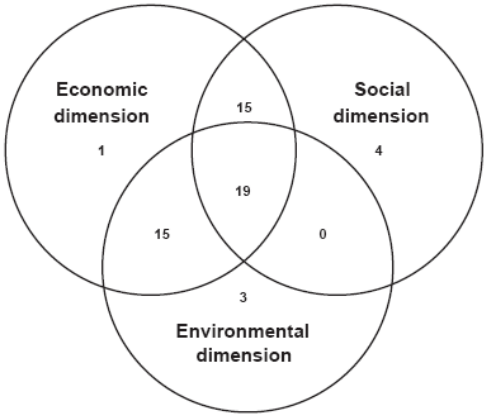
[25] See report of Task 1d of WP1 for full description of methods and detailed results (see Annex 1).

3.3 Monitoring the social dimensions of environmental policy

It is important that we understand how the social dimensions of environmental policy are monitored, and whether the objectives of both social and environmental policy are being met within the framework of sustainable development. At the European level, monitoring is effectively done through the use of indicators, a set of which has been developed by Eurostat (2005) for the EU SD Strategy.
This set of Sustainable Development Indicators (SDIs) was adopted by the European Commission in 2005, as a tool to monitor, assess and review the EU SDS, and to inform the general public about progress in attaining the commonly agreed objectives of sustainable development.

Currently the SDI set does not adequately reflect the interface between social and environmental issues. The European Commission (2005) observes that out of the 57 preliminary EU sustainable development indicators, 19 integrate all three dimensions of sustainable development (economic, social and environmental). While 15 indicators are situated at the interface of economic and environmental aspects, no indicator was found to represent the interaction between the social and environmental dimension. [26]

Figure 3.1. Integration of economic, social and environmental dimensions within the EU SDIs- Number of indicators of levels I and II



At the European level, there is also a set of common **social inclusion indicators** that has been adopted to compare best practice and measure progress under the EU's Social Protection and Social Inclusion Process. The current set of indicators was adopted by the Social Protection Committee in June 2006 (European Commission, 2006). This indicator framework includes commonly agreed EU overarching indicators and national overarching indicators based on commonly agreed definitions. However, as the indicators are derived solely from the EU social inclusion framework, there is no reference to environmental issues.

Within this study, we considered how to strengthen the social-environmental interface in the SDI set by identifying indicators that were able to articulate the interplay between the environmental and social dimensions. Firstly a long list of indicators was identified that could potentially be used to capture this interplay, with the potential to strengthen the social-environmental interface in the SDI set. The potential indicators focused on income groups although other socio-economic factors, such as education levels, may also be relevant.

Fifteen indicators were identified based on the following three criteria:

- Relevance in the current policy context;
- Relevance to both environmental and social issues; and
- Data availability.

Most indicators met the first two criteria (although to varying degrees); many however failed to meet the third criterion on data availability, as often no breakdown by income group is provided; this gap is

[26] These indicators were reviewed in 2007 (see Eurostat 2007). However, the findings based on the ealrier set of indicators is still valid.

particularly relevant at the EU level. In addition, many inequalities between population groups are not picked up because the data are not available on a small enough geographical scale - most municipal level and national level data are of no use in this respect. For a substantial number of EU Member States, further work is needed to make all indicators operational.

In conclusion, the following indicators were prioritised to potentially take forward.

1. Population perception of suffering from noise and pollution by income group
There is growing evidence suggesting that socio-economic status has an impact on vulnerability to air quality impacts, and socially deprived areas are likely to be noisier. Thus, including an indicator that measures environmental inequalities in terms of noise and air pollution would greatly strengthen the social-environmental linkage.

2. Ratio of passenger km public transport/private car transport by income group
As greater income is a major driver of increased transport volumes and higher transport speeds, this indicator is particularly suited to show the interaction between environmental and social policies. Relevant European data on modal split are available but lack breakdowns by income groups. Existing national data can fill this gap in some cases, e.g. Germany and Sweden.

3. Proportion of the population that uses bicycles for everyday transport by income group
Against the backdrop of increasing emissions from transport, overweight and related diseases caused by the lack of exercise, the promotion of sustainable transport, in particular human powered mobility, is amongst the very best tools to create synergies between social and environmental policies but also between social, environmental and health policies.

4. Flight km per person by income group
Aviation is growing faster than any other transport mode. At the same time, there is evidence that rising incomes have made air travel a significant contributor to the increased passenger transport volume. Eurostat provides various data on International Passenger Transport by Air, e.g. passengers per thousand inhabitants but - similar to previous indicators – currently used European data are not broken down according to social groups.

5. Energy consumption and greenhouse gas emissions by income group
Differences in income are one of the most important factors for energy consumption apart from household size. The Eurostat SDI set contains “Electricity consumption by households” and “Greenhouse gas emissions by households” as “best available” indicators. The social dimension could be introduced by using expenditure data from national statistics/household budget surveys as a proxy.

6. Employment generated by environmental industries and services
As creating employment is key for social cohesion, this indicator is particularly relevant for the purposes of this study, although disadvantaged parts of the population might not necessarily benefit from new employment in the environmental sector. Currently, the data available on employment in the environmental sector are not sufficient. However, efforts are being made both at national and EU level, and methodologies could be developed further to improve the data basis.

A **key recommendation** concerning the use of indicators is that the European Commission should work with Member States to include the following indicators in the appropriate EU and national indicator sets to help to monitor the interactions between the social and environmental pillars of sustainable development:

4 Lessons learned from practical experience

The difficulties in policy design are evident; policies still need to deliver effective environmental protection but also need to consider distributional inequalities and policy impacts, both key aspects of environmental justice. A key part of the analysis was to assess a range of case studies across Europe and consider, at the local level, how policy could be better integrated to reflect both environmental and social goals – and potentially avoid the negative distributional effects described earlier.

Twenty three 'good practice' case studies[27] from Germany, Sweden, Spain, Bulgaria, the Czech Republic and the UK were assessed. These were projects or programmes that either explicitly or implicitly aimed to deliver mutually reinforcing social and environmental benefits. In particular, the case studies focused on how policy design and implementation that benefited socially excluded groups could be achieved, whilst at the same time positively impacting the environment.

The research found that integrating social and environmental objectives is possible, and that local level initiatives can directly or indirectly, consciously or accidentally deliver an improved environment as well as reducing social exclusion. The recognition that objectives had the potential to be mutually reinforcing was rarely an explicit aim of the initiatives in question. Most were designed to achieve either a social or environmental objective and in so doing were able to deliver ancillary benefits in terms of environmental improvement, greater social inclusion or a more equitable distribution of environmental quality.

It is clear that it is at the local level where synergies can be best achieved; a systematic approach to identifying the potential synergies (and avoiding conflicts) can also ensure that mutual recognition of both social and environmental objectives is not accidental but is a core requirement built into the assessment process. As stated earlier, policy development at the national and European level has a role to play in raising the profile of such issues, and building them into wider impact assessment.

A key point is that the local institutional context matters a great deal to the success of integrating social and environmental objectives. Different administrative structures prevent lessons learned in one Member State from being transferred directly to another, due to different competencies and control from local authorities. Likewise, social capital and the activity of civil society actors, who can be crucial actors in both social and environmental improvement projects, differs to a significant degree between countries. The success of projects that have the potential to integrate social and environmental considerations will therefore often depend on the support and leadership displayed by these non-state actors.

Finally, the degree of integration between social and environmental policy objectives will be a function of the policy goals shaped by local priorities. It will not always be possible to achieve full integration of objectives through changes to policy or programme design and implementation; however, an important starting point is that such issues are recognised and considered as far as possible.

The case studies were classified under different types of initiative; below are the key findings from four key ones.

Ecological Tax Reform (ETR)

Whereas the relative distribution of environmental tax burdens has been examined already in this report, case studies were analysed to identify whether the specific policy reforms themselves had a beneficial environmental or social impact.

Ecological tax reforms (ETR) were looked at in two countries where they have been most comprehensively implemented in recent years, namely Germany and Sweden. While there have been environmental tax reforms in other countries, for example in the UK with respect to transport and a comprehensive ETR begun in the Czech Republic in January 2008, these have been comparatively

[27] CfSD & University of Westminster, Work Package 3: Policy Analysis –Identifying the synergies between social inclusion and sustainable development.

limited or recent[28]. ETR typically involves the (often revenue-neutral) re-balancing of net taxation burdens in ways which incentivise 'greener' consumption, whilst dis-incentivising pollution. ETR may also have more explicit socio-economic objectives, such as to stimulate employment. ETR therefore has the potential to contribute to both environmental and social objectives of sustainable development.

Integrating social and environmental sustainability
The overall distributional effects of ETR are complex and depend to a large extent on how the specific scheme is designed[29]. In the German and Swedish case studies, specific measures were taken to address the regressive impacts of the ETR. In Germany, most of the tax revenues generated were used to reduce pension insurance contributions; a small percentage used to finance environmental renewable energy projects, and since 2003, a percentage of annual eco-tax revenue has been used for the consolidation of the general budget. Importantly, to prevent a competitive disadvantage for German industry, to ensure environmental effectiveness, and to avoid negative social impacts, the eco-tax scheme provides for a number of exemptions.

The 'Green Tax Shift' in Sweden was a 10-year programme that started in 2001 with the aim of shifting 30 billion SEK (c. 3.3 billion EUR) in tax revenues from labour and income taxes to environmental taxes, primarily energy and CO_2 taxes. The Green Tax Shift altered a number of tax rates, such as cuts in income tax, whilst some new (environmental) tax bases were introduced, in a revenue-neutral way.

Lessons Learned
ETR can have both environmental and social benefits, although it is difficult to design ETR reforms to completely eliminate any regressive impact. In this context, it is important to monitor the impact of any reform and introduce amendments to control the distribution of costs.

Area-based Renewal Programmes

Projects aimed at achieving urban neighbourhood renewal were identified in all but one of the case study countries. The popularity of such area-based renewal schemes highlights the importance of local programmes as potential tools with which to deliver socially and environmentally sustainable development. Given the local context of each scheme, significant differences exist between case studies and the factors that determine success or failure; however, general lessons regarding the potential for such schemes have been identified.

The common aim of area-based renewal (ABR) projects is to improve disadvantaged neighbourhoods. However defined, these neighbourhoods typically display a mix of social and environmental decay: high unemployment, de-population, poor quality housing, deficient infrastructure and environmental degradation.

Generally, ABR programmes are about building a sense of responsibility towards shared space and social environments. It therefore does not represent a significant shift away from this guiding philosophy to include sustainability goals within an ABR framework; sustainability, as with urban renewal, depends to some extent on developing a sense of responsibility towards shared spaces and environments.

Integrating social and environmental sustainability
Whilst the focus of ABR schemes will always be to improve quality of life in deprived areas, it is considered that environmental sustainability can offer an additional means of achieving this goal, rather than a new, potentially conflicting goal. This is based on the assumption that environmental degradation and pollution are both causes as well as symptoms of social exclusion. Improving deprived urban environments is a way to improve environmental quality, stimulate improvements in quality of life and therefore reduce social exclusion. The benefit of integrating social and environmental sustainability in frameworks such as ABR is that the two are considered to be frequently re-enforcing.

ABR programmes frequently involve a range of stakeholder groups and service providers within a local area, such as social services, health services, community groups, faith groups etc. Therefore the

[28] See the final report on Work Package 1 for more information on environmental taxes.
[29] For example, see McNally & Mabey (1999) The Distributional Impacts of Ecological Tax Reform, WWF-UK, http://www.wwf.org.uk/filelibrary/pdf/distimpetr.pdf

structure of many area-based renewal programmes is easily adaptable to include environmental groups and stakeholders. It is therefore theoretically possible to integrate environmental sustainability into programmes whose core objective is to achieve social sustainability.

Some ABR programmes aim to integrate relevant policies, as well as improve physical and organisational structures in deprived areas, for example the Social Cities Programme in Germany. The policies that are considered worth integrating in this respect, however, are exclusively social policies, for example infrastructure planning, economic policy, labour market policy, social policy, youth policy and educational policy, in the German case. The real potential for integrating social and environmental objectives into ABR programmes lies in the ability of such schemes to consider environmental or SD policies within this list.

Many of the case studies considered in this research occurred under a national framework of ABR programmes. This further highlights the scope for extending ABR to incorporate the three elements of sustainable development; if national ABR frameworks recognise the linkages between social and environmental sustainability, locally-based project are more likely to integrate the two pillars 'on the ground'.

Lessons Learned
Many of the area-based renewal programmes have resulted in tangible, and in some cases more intangible, benefits to urban communities. However, most environmental impacts are evident in terms of improvement to the immediate local environment, e.g. reduction of litter and graffiti or more green space, rather than contributing to wider environmental objectives. However, it should be noted that some of the schemes did include the introduction of renewable energy generation, and other built infrastructure that will help to reduce greenhouse gas emissions.

Where they include environmental training and re-skilling within socially deprived areas, as was the case in the Swedish Rosengård Project, or the creation of jobs related to environmental protection, as in the case of Bulgaria, renewal programmes can successfully integrate social and environmental sustainability.

Renewal programmes that include a focus on environmental quality also have the added benefit of developing awareness and agency within communities to participate in environmental and social decision-making, and thereby to work towards achieving environmental justice.

A sample of non-renewal focused projects was considered in the project research. These included small-scale community-based projects and sustainable tourism initiatives. In many ways the key themes of ABR apply to these projects: local social improvements can be reinforced by considering environmental sustainability; the local or grassroots scale is likely to be most appropriate for integrating the pillars of SD; and the environmental benefits are often considered secondary to socio-economic objectives.

The European Commission could have a role in promoting greater integration of social and environmental objectives in such schemes by requiring that integration issues are considered in applications for funding, for example for structural funds.

Local Air Quality Strategies

As the analysis of environmental inequalities showed, lower income groups are often disproportionately exposed to poor air quality. Policies aimed at improving air quality (AQ) are therefore likely to have a progressive effect, in terms of improving environmental sustainability (reducing pollution at source) and social sustainability (reducing social inequalities) at the same time.

Integrating social and environmental sustainability
Projects to address local air quality-related issues were examined in both the UK and Sweden, mostly in urban areas. In the former the measures introduced to address air pollution have been primarily structural, i.e. linked to layout changes and creation of more green spaces, although many UK cities are now considering measures such as low emission zones and congestion charging. In the Swedish case, the instrument adopted was economic, through a congestion tax.

Since 1997, UK Air Quality Strategies have underscored the importance of local authorities in promoting and improving air quality at the local level. *Local Air Quality Management* (LAQM) can be implemented through a wide variety of both 'hard' and 'soft' measures, which may include for example, road layout or traffic signalling changes to reduce congestion, development of parks and green spaces in areas adjacent to trafficked roads, pedestrianisation, the introduction of cycle routes, etc.

The specific interest in LAQM areas as a case study for this project is the tendency for a significant quota of low cost housing in the UK to be located alongside busy roads in many inner city areas thus allowing the greater exposure of low income and vulnerable groups to occur with negative health and safety consequences.

If wider social (as well as non-AQ environmental) benefits were considered when designing AQ measures, options that support the integration of social and environmental sustainability may be seen more favourably. This would increase the chances of AQ measures that promote environmental and social sustainability being implemented. Whereas many AQ measures involve economic instruments such as congestion taxes, which are likely to have at least small regressive impacts, the wider social-environmental benefits of alternative measures may tip the balance if decision-makers were to consider the sustainability synergies inherent to various policy options.

Lessons Learned
Policies introduced to improve air quality have resulted in environmental improvements. The social benefits of such policies, in terms of health benefits, are often taken as a given; it is assumed that such benefits will naturally result from better air quality, given the disproportionate exposure to air pollution suffered by vulnerable social groups.

However, this is only part of the issue; recognition needs to be given to vulnerable communities and their location within an LAQM area, for more effective targeting of measures and development of necessary mitigation strategies.

Fuel Poverty Programmes

Policies addressing fuel poverty aim to reduce the proportion of household income spent on maintaining a satisfactory heating regime (typically to below 10%). This is usually done by improving the efficiency of energy use within a home, thereby reducing energy consumption. Where energy is derived from fossil fuels, this implies a reduction in greenhouse gas emissions. Any progress in reducing fuel poverty has an inherent environmental benefit if it also results in the more efficient use of energy and therefore represents an (albeit non-intentional) integration of socio-environmental sustainability.

Integrating social and environmental sustainability
In both Germany and the UK, good practice examples were selected where fuel-poor households receive financial assistance to reduce their fuel poverty, however, the two countries employ very different methods in this sense.

In Germany, action on fuel poverty has been part of a reform of the welfare system. Under this reform, basic security benefits - including payment of rent, heating and electricity - are provided to entitled job-seekers. The provision does not stipulate an explicit ceiling for heating expenditure, however it ensures that heating costs are only covered as "adequate" (for a specific apartment). Similar provisions apply to welfare recipients, i.e. people on low income and unable to work.

The Warm Front Program in the UK works primarily as a grant scheme, providing funds directly to households to improve energy efficiency and insulation (see case study below).

Lessons Learned
Measures designed to reduce fuel poverty have the potential to provide environmental benefits, but these are not necessarily recognised when the policy is initially designed and implemented. Instead, the environmental benefits (in terms of CO2 emissions) from increasing efficiency and insulation are considered ancillary bonuses instead of core objectives of fuel poverty programmes.

Explicit recognition of environmental benefits may improve the overall sustainability of fuel poverty schemes.

Selected case studies

Below is a selection of three case studies from the original 23, which elaborate on some of the key findings of the research.

Case Study 1: Ecological Tax Reform in Germany

In 1999, Germany introduced one of the most extensive Ecological Tax Reforms in the EU. Its aim was to change patterns of energy consumption towards greater efficiency, and to slow down the increase of non-wage labour costs (i.e. social insurance contributions) that had widely been seen as contributing to high unemployment rates in Germany. The reform included the introduction of a new tax on electricity, a raise in tax rates on transport and heating fuels, and reductions in social security contributions.

Environmental impacts

Positive environmental impacts have been noted from the ETR. The available evidence suggests that the 1999 environmental tax reform has had tangible effects on people's behaviour and has led to considerable environmental improvements, in particular due to reductions in fuel consumption in the transport sector. Since the introduction of the reform, fuel consumption and CO_2 emissions in the transport sector fell for five years in a row (2000-2005), whereas prior to the tax it had increased every year without exception. Since 1999, the number of passengers using public transport has also increased.

Social impacts

Despite the precautions taken to prevent increased social disadvantage arising from the introduction of these new environmental taxes, some regressive effects have been demonstrated, with the lowest income households bearing a disproportionate burden.

The social impacts of the German eco-tax have been mixed: on the one hand it has contributed significantly to the reduction of personal pension contributions, thus decreasing the social security burden and providing favourable conditions for job creation. On the other hand, it has shifted the tax burden from industry to the household sector and has exhibited some regressive effects within the household sector itself. However, for the poorest households adjustment mechanisms are in place, such as a means-tested benefit for heating costs, so that part of the increases in the costs for domestic heating are automatically compensated. In addition, the reduced tax rate for public transportation is an element that reduces the relative burden for poorer households, on average. In terms of job creation, it has been estimated that the tax reform has the potential to exercise significant positive influence.

In addition, it should be noted that the environmental benefits brought about by the environmental tax reform may benefit lower-income segments of society more than wealthier ones and thus provide for some progressive effects. For example, as poorer households in Berlin are usually more exposed to road traffic pollution and thus to health risks from pollution, a tax would result in a progressive distribution of benefits in terms of health risk reductions (Luhmann et al. 1998).

Lessons Learned

Because the (social) distributional effects of the ETR were considered in the implementation of the policy, and as such it can be understood that social and environmental objectives were integrated to some extent, positive environmental impacts were achieved whilst mitigating the worst social effects of the policy.

This positive environmental impact also helped to address one aspect of EJ, namely the un-just distribution of environmental quality between groups within society.

Case Study 2: Area-based Renewal in Spain and the Czech Republic

Spain

'URBAN Pamplona' is a four-year urban regeneration programme, part-funded by the European Union. The programme focused on two of Pamplona's most deprived areas, which are characterised by ongoing depopulation, a deteriorating urban environment, and social and economic exclusion. The programme's seven key themes address a range of issues such as environmental degradation, social inclusion and access to employment. Community participation has been central to the design and implementation of the programme, and at each stage the local population participated in defining and developing the scope of the project. These participatory processes have allowed the city council to place the needs and desires of its citizens at the centre of the regeneration programme.

Environmental Impacts

The URBAN Pamplona programme has overseen the regeneration of the city centre's green spaces, and by the end of 2006, more than 20,000m^2 had been restored (UP, 2007). There have also been positive changes in public transport through the creation of a new low emission bus service, and the construction of special lanes and parking for cyclists. To demonstrate the potential of solar thermal energy, photovoltaic panels have been installed on two of the programme's restored buildings, which now provide the buildings with heat and hot water.

Social Impacts
A socio-economic analysis was carried out prior to the project's inception, which revealed several negative trends, including ongoing depopulation, a degraded urban environment, and social and economic exclusion. Through a variety of measures, URBAN Pamplona has sought to reverse the negative social trends, to tackle unemployment and to promote social cohesion. Since its inception, more than 300 jobs have been created, either directly or indirectly, through support and assistance to small and medium enterprises or jobs within the advisory and job centres created under the programme. A further social impact has been increased accessibility for disabled people through the removal of physical barriers and improved public transport (UP, 2007).

Lesson Learned
By explicitly setting environmental improvement as a key objective of the socially-focused URBAN Pamplona project, positive environmental and social sustainability impacts were achieved.

In terms of EJ, the project was most successful in improving the disproportionate expose of low-income groups in Pamplona to poor environmental quality, by improving the local area and by upgrading transport links without adding to environmental pollution (sustainable transport).

The Czech Republic

In the Czech Republic a Governmental Decree determined the conditions for interventions from the State budget to support the renewal of prefabricated housing estates, including the improvement of technical and transport infrastructures and arrangements to improve the appearance of housing estates. In addition to this, the management of some towns succeeded in combining activities and funding from other sources so that they were able to realize projects of complex renewal, including the repairing and modernisation of the housing stock. One of the most successful projects supported from the program was realized in the Sivtay-Lany housing estate.

Environmental Impacts
The main positive environmental impacts of the Svitavy-Lany housing estate project lies in the general revitalisation of the environment surrounding the houses, including the regeneration and enlargement of green spaces, planting new trees and better conditions for waste management with newly-installed waste containers and construction improvements to waste collection areas. Indirect positive environmental impacts were also achieved through the introduction of insulation measures in flats, which resulted in energy savings and lower air emissions from heating combustion sources.

Social Impacts
The Svitavy-Lany housing estate project (and other similar projects) has brought about a number of positive social and related impacts, some of which were originally planned, whilst others have been un-intended side-effects. Road widening and changes in traffic organisation have mainly helped to ensure better access for emergency vehicles, whilst pedestrianisation and repair to side-walks has meant the safer movement of local people. Restored public spaces, including an open sports grounds, enable better social interaction and the new street lighting ensures better safety.

Indoor improvements to housing, for example the replacement of windows and plumbing repairs, have contributed to better living conditions and therefore higher resident satisfaction. One of the most positive aspects of the project, and an important pre-condition of its success, was the involvement of local residents through the initial information and awareness-raising campaign to the subsequent inquiry into residents' satisfaction with housing conditions. This was an important step for building mutual trust and good relations between the city planners and local residents, despite the fact that respondents have mostly raised criticisms rather then constructive suggestions and that their interest in later stages of the planning process has declined. However the inhabitants generally took a positive approach towards the project and brought it under their 'ownership', which was a positive social benefit.

Lesson Learned
The mixed environmental and social benefits of the project demonstrate the potential for integrating social and environmental sustainability into area-base renewable programmes. The Svitavy-Lany housing estate example also shows clearly the critical role of engaging local residents in order to achieve 'ownership' of such programmes. This is essential if sustainable (i.e. long term) benefits are to be realised and is an important factor in improving the process elements of EJ; social groups who suffer from poor environmental quality need to have access to the decision making and policy design stages, as well as implementation, in order to achieve more just outcomes from environmental and social policies. Close involvement in programmes such as this could feedback into socially excluded groups and improve their capacity to participate.

Case Study 3: Fuel Poverty in the UK

The Warm Front Program in the UK works primarily as a grant scheme. It provides funds of up to £4,000 to improve heating systems and insulation in private dwellings. Its purpose is to help fuel-poor households save on their fuel bills by improving properties' energy efficiency in order to help reach the elimination of fuel poverty in vulnerable households by 2010. Packages are tailored to each property, and include a range of different insulation, heating system conversions, repairs and upgrades.

Crucial for the Warm Front success and delivery are also targeted information campaigns to reach fuel poor households. For example, the scheme works with local voluntary and community organizations to establish a trust-based relationship with target groups that may otherwise have been excluded or failed to take advantage of the scheme's benefits.

Environmental Impacts
Since 2000, 1.1 million households have received assistance under the Warm Front program. The latest Warm Front report states that from April 2006 to March 2007 a total of 253,079 households were assisted. CO_2 emissions in the average household were reduced from 6.97 tonnes per year to 6.16 tonnes per year, equalling total annual savings of 0.81 tonnes of CO_2 per year for those homes improved.

Annual reports on the Warm Front program underline quantitative dimensions of outcomes of the Warm Front program by stressing the reduction of carbon emission and energy consumption. Interviews with key stakeholders of the UK Warm Front programme, undertaken as part of the project research, revealed that the environmental gains in the Warm Front program are ancillary benefits to a social policy, rather than being an intended outcome of the program and are not directly monitored as part of the programme.

Social Impacts
In the UK, Warm Front reports indicate that since its inception in 2000 the programme, primarily conceived as a social policy, has managed to positively impact many fuel-poor households. From a financial point of view, each household that received Warm Front assistance in 2006/2007 has the potential to save £193.78 in energy running costs every year.

Lesson Learned
The Warm Front program is a good example of how environmental and social issues can be addressed synergistically. If seen as part of a wider energy efficiency strategy, it is an example of how the regressive effects of fiscal instruments such as energy taxes may be offset by integrating efficiency into a social policy. However, at the moment, energy efficiency of housing is still described as an instrumental measure to tackle fuel poverty; positive environmental impacts are considered as peripheral ancillary benefits. Further sustainability improvements may become accessible if environmental objectives were formally integrated into the programme.

Conclusions

A theoretical case can be made for the potential benefits of integrating environmental and social initiatives at the local level, with the objective of achieving more sustainable environmental and social policies. Our review of local case studies suggests that integration is possible. Where the goals of social improvement and environmental sustainability are considered to be synergistic, many previously "social" initiatives could be adjusted so as to achieve environmental, as well as their explicit social aims.

This is especially the case within defined, often urban, areas, where social problems and environmental degradation are interlinked in a complex causal relationship. By including environmental groups within the strategic management of "social" projects and programmes, and by formally considering environmental policies within the remit of such initiatives, improvements can be made at relatively low cost and without huge disruption to established project models.

Many other schemes, for example those focusing on fuel poverty and air quality, by their very nature, deliver complementary social and environmental benefits, to a limited extent. Naturally occurring ancillary benefits of environmental or social policies that contribute to wider sustainable development objectives must not be over-estimated. Simply expecting policies to have all-round positive effects during implementation is unlikely to maximise available opportunities. Instead, the distributional effects

of environmental policies and a consideration of environmental impacts and opportunities from social policy should be considered a matter of routine.

Currently, the potential for integration is not being realised. Even an examination of good practice examples from across a sample of EU member states does not provide evidence of widespread integration between the social and environmental pillars of sustainable development.

We recommend that there is:

- Wider sharing of good practice examples, and that the Commission encourages this.
- Use of funding mechanisms to deliver such integration, e.g. structural funds.
- Systematic assessment of the delivery of local initiatives so that social-environmental interactions can be identified and positive ones enhanced.
- Ensure informed participation by key stakeholders in the community.

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