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SUMMARY

This paper reports the results of a four country project (GARPII) on aspects of green accounting, namely the estimation of damages to air and water. The countries covered are Germany, Italy, Netherlands and the United Kingdom. It follows an earlier project covering the same countries, which was a first attempt to provide national level damage estimates on a spatially disaggregated basis for key air pollutants (GARPI). GARPII covers more pollutants and also attributes the damages to sources – industry, power generation transport etc. This paper reports the key results of the project and compares the methodology used with that of an alternative methodology – the GREENSTAMP approach .

Non Technical Summary

As countries become richer, a heightened interest in the environment comes from two sources. Individuals have a greater concern for the quality of the ambient environment, as more pressing needs are satisfied. At the same time the pressures on that ambient environment increase, with a higher loading of pollution from transport, power, industry and household consumption.

Most work on environmental accounting to date has been carried out almost exclusively in physical units, with little attention paid to the economic implications of the environmental changes. At the same time, it is clear that there is an economic dimension to the changes. The environment provides an economic function and it is at our peril that we ignore that function. But, in drawing up traditional measures of economic activity, such as Gross Domestic Product, that is precisely what we do. We do not take account of damages done to the stock of natural capital, nor of the losses of welfare that economic activities cause through increased pollution.

In response to these concerns, a literature has developed on the monetary value of environmental changes caused by economic activity. This literature has several strands. One looks at the depletion in mineral ad renewable resources and asks whether conventional measures of GDP have paid enough attention to this depletion (references here). If a country is maintaining its level of economic activity by running down its mineral resources but is not fully replacing them with alternative income generating assets, then its present level of welfare may be unsustainable. A second examines the expenditures undertaken by citizens in protecting themselves from the consequences of increased pollution. These so-called 'defensive expenditures' are subject to some controversy. Should we deduct them from measures of national income? Some argue that if money is spent on such items, and it used to be spent on things that directly gave welfare, then society is indeed worse off. The problems lie in knowing what the relevant point of comparison is, and identifying and measuring these expenditures. Nevertheless this is an important area of work and much remains to be done to achieve satisfactory systems of accounting for defensive expenditures. The third area of work relates to the damages caused by the pollution. Can that damage be measured in money terms? If so, how much is it worth? And how do the values of the damages compare to other measures of economic activity, such as GDP or National Wealth?

This paper reports on a project book that focuses on the second and third issues raised above, specially the third. Its point of departure is a study by researchers in Germany, Italy, the Netherlands and the UK, and published as a book (Markandya and Pavan, 1999)[1]. This research attempted was to use spatially disaggregated data on measures of pollution to derive economic damage estimates for those pollutants. The objective was to see what could (credibly) be done at a national level, what was the degree of uncertainty in the estimates and whether it was possible to make inter-country comparisons of damages within the European Union. The project also looked at whether these measures could be constructed on a routine basis, so that the task of preparing them could be handed over to statistical offices.

GARPI considered only airborne pollutants, where a spatially disaggregated analysis was undertaken focusing on different *receptors* (such as human health, crops, the built and natural environment). Inevitably, the coverage and approach were not fully consistent. The degree of spatial disaggregation varied by country, as did the availability of data on pollution concentrations and estimates of stocks at risk. In spite of these difficulties, the experience of the first phase confirmed that it is possible to make monetary estimates of the impacts of pollutants on human health, materials and crops with some credibility, although considerable further work is required before these tasks can be carried out routinely and in a comparable format for all countries. Health impacts accounted for the greatest damages, particularly chronic mortality from exposure to particulate pollution. Assessing damages incurred by forests and ecosystems proved much more difficult due to both a lack of appropriate data and the underlying complexity of the natural systems. Some estimates

[1] This earlier project was titled the Green Accounting Research Project I (GARPI) and was supported financially by the European Commission. The project presented here is GARPII that builds on the previous work in ways that are elaborated in this paper.

of global warming damages were presented that reflected the limited consensus among certain sections of the scientific research community. The full set of initial estimates were presented in numerous academic and policymaking fora and stimulated considerable discussion.

To develop the research further it was recognised that the coverage of existing impacts should be extended as far as possible across the study countries. This is important for policy-making within the EU, where cross-country resource allocation and regulatory decisions have to be taken. Second, **damages need to be attributed to sources**, since this is an essential linkage if the approach is to have real policy relevance. Third, other forms of pollution media need to be investigated such as damages to water and land.

Progress has been made in all of these areas and it is the purpose of this paper to report the main results and to compare this methodology with an alternative that is also popular, namely the GREENSTAMP approach.

Introduction

The GARPII project extends the research agenda developed under a previous stage (GARPI) that was supported by the JOULE programme of the European Commission during 1994-1996 (JOU2-CT93-0316). The GARP project itself arose from the application of a methodology developed in the ongoing EC ExternE project that quantifies the environmental externalities associated with energy and transport. GARPII was initiated with the objective of developing a consistent methodology for the evaluation of environmental accounts in the EU, by examining the impacts of economic activity on other aspects of the economy. The full version of GARPI was published in 1999 (Markandya and Pavan, 1999). The GARPII report is in press (Markandya and Tamborra, 2000) but the report is also available on the web (http://www.bath.ac.uk/~hssam/garpii.zip).

OBJECTIVES

The main objectives of the work programme were:

- To review the credibility of monetary valuation of environmental damage, as well as that of other indicators of environmental impacts and pressure.

- To fill the gaps contained in earlier work as much as possible and obtain valuations of environmental damages that are both credible and comparable .

- To extend the range of pollutants covered by the analysis. In particular, careful consideration is needed of the relationship between primary and secondary pollutants. The effects of heavy metals on human health, water pollution and land contamination are investigated in greater depth than has been the case previously.

- To attribute the spatially disaggregated damages to different sources of pollution using a 'multi-source' version of the ECOSENSE model developed by IER, University of Stuttgart. This allows damages to be assigned to countries and economic
  sectors, identifying crucial trans-boundary impacts.

- To assess the levels of defensive expenditure on each stressor. The main methodological approaches are critically reviewed together with any estimates that are available.

- To evaluate the replicability of the methodology to other countries in the EU and consider the feasibility of preparing such estimates on a regular basis so as to form an impression of the changing state of the environment over time.

METHODOLOGY

GARPII, like GARPI, mainly focused on the impacts of air pollution. Airborne pollutants can be distinguished as either primary or secondary, depending on whether they are directly emitted or formed by chemical reactions in the air respectively. Data on these can either be measures or modelled using computer dispersion models.

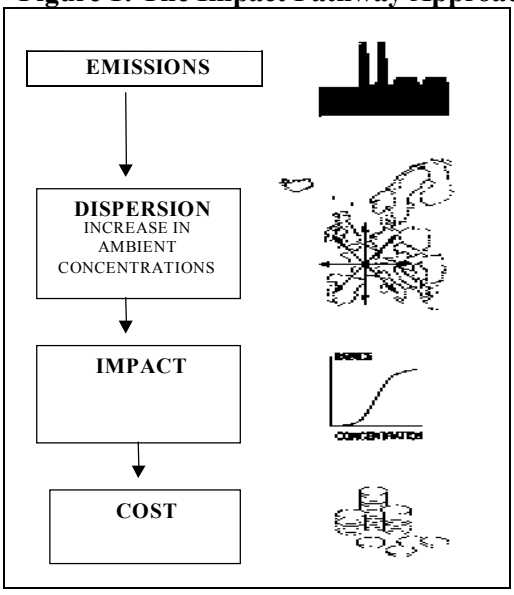
There are two main elements to the analysis; damage calculation and damage attribution. Damage calculation involves combining pollutant concentration and population maps in order to calculate the value of damage caused by the pollution. Damage attribution allows emissions to be allocated by economic sector. This was done using the ECOSENSE model, a computer model which combines data on technology, emissions, damages caused by exposure to pollutants and valuation data. Both sets of calculations have been undertaken for impacts on human health, crops and building materials.

The analysis allows both physical and monetary indicators of damage to be generated. Where possible one of a number of valuation techniques have been applied to yield estimates for specific endpoints that are closely related to human health. These estimates have been calculated on the theoretical basis of 'willingness-to-pay' (WTP) or 'willingness-to-accept'(WTA). This analysis is done using the 'impact pathway approach', which is contained in Figure 1.

Essentially, the level of emissions and their dispersion is calculated. Then the impact on economic activity is evaluated using exposure response functions (the impact on various media of the pollutants). This is then converted into a costs figure, using WTP/WTA estimates obtained from surveys.

For forest and ecosystem impacts the critical load approach was used, with nitrogen being the main pollutant considered. Forest assessment identifies three main types of damage from air pollution: loss of timber, reduced recreational benefits and decreased existence value. All these categories present methodological difficulties, although the situation has improved considerably since the first GARP study. As noted previously, the complexity of these systems does not permit a comprehensive valuation exercise. It has been possible to make some sample valuations, (e.g. for specific biotopes) or obtain some implicit values from related studies.

Figure 1: The Impact Pathway Approach



In the case of water pollution, the approach used involved linking data-sets on river water quality, recreational activities and monetary values that exist for these activities to provide estimates of recreational damage costs. The analysis has been undertaken, in the first instance, for the UK. Land contamination issues are likely to be very specific. In accordance with the approach taken in the rest of the project, the ideal approach would be to create 'flow' accounts to assess the change in the value of contaminated land over time. However, initial investigations of the data indicated that this would not be possible. Hence, data on the stock of contaminated land together with illustrative figures on the costs of remediation were collected. For both these types of impacts it has only been possible, at this stage, to make some sample valuations. It is hoped, particularly in the case of water impacts, that the methodology could be expanded to become more comprehensive – expanding the quantification of the impact pathway so that the analysis is more in line with that for air pollution.

Global warming impacts were also evaluated. The debate on appropriate quantification of these impacts has advanced considerably in recent years. In GARPI the estimates were made of the present value of future

climate change damages in the study countries as a result of global CO_2 emissions in 1990. This was undertaken on the basis of the results of published studies. A revised approach has now been developed which reviews the more recent literature on regional impacts and provides up-dated national damage estimates.

Research such as that undertaken by the "Green Stamp" project funded by DGXII[2], has complemented the GARP work by concerning itself with the concepts and empirical estimation methods for environmentally adjusted national income. The "Green Stamp" project has concentrated on the issue of using supply side (cost) measures for defining the performance potential for a "greened" national economy – avoidance costs in effect being used to monetise environmental effects. Whilst the Green Stamp Approach is useful to policy makers, it does not obviate the need for damage estimation. This issue is examined in greater depth in Box 1. (See also GREENSTAMP, 1997).

BOX 1: GARPII and GREENSTAMP

The "GREENSTAMP" project funded by DGXII makes the methodological choice to place emphasis on the question of "supply" of improved environmental performance in order to define feasible future economic performance while respecting specified environmental performance standards. This cost-side approach evidently presumes that environmental performance goals are established somehow, and that the benefits of improved environmental performance are demanded by the society. The GARPII methodology is one accepted way for furnishing this "demand side" information. Therefore, in deriving monetary values for the environment the two techniques may be regarded as complementary as outlined below:

- The costs of meeting specified standards do not tell the policy maker whether those standards should be met. That requires a comparison of the costs of avoidance as well as the environmental damages reduced.
- The costs of meeting standards that are set by policy makers, but that are not met, are only an indication of what society would have to pay to achieve certain environmental goals. If society is not paying this price, it, (or sections of society) may be suffering more, or less than the cost. Again, damage and benefit estimation methods will provide information allowing assessment of the relative importance of various environmental goals.
- In the GREENSTAMP approach, sustainability norms are considered as an expression of social demand. However, the setting of performance targets for making economic activity "more sustainable", as proposed by the GREENSTAMP approach, inevitably involves trade-offs between different specific goals. This negotiated demand may be laid open to influence by relatively strong pressure groups which may lead to a misrepresentation of the interests of some groups relative to others and to citizens within society as a whole. So mechanisms must be devised which assure transparency and legitimacy in policy target setting. The GARPII methods for benefit and damage estimation provide highly valuable policy inputs to this process[3].

[2] Contract No. EV5V-CT94-0363

[3] See further discussion in "From Research to Implementation: Policy-Driven Methods for Evaluating Macro-Economic Performance", DG XII, European Commission, EUR 18845, ISBN 92-828-5864-2 (March 1999)

MAIN RESULTS

Summary of Results - All Countries

Table 1: Environmental Damages in 4 EU states

Damages (as % of GDP)	DE	IT	NL	UK
Health	2.73%	4.41%	1.90%	1.75%
Crops	0.10%	2 e-4%	0.06%	0.08%
Material	0.01%	4.00e-02	3.80e-0.5	0.14%
Total	2.80%	4.40%	3.90%	2.00%
Cost per Inhabitant (ECU)	554	778	662	306

Table 1 shows, ordered by the impact categories mortality, morbidity, crops, and material, the damage costs estimated for the countries of study, Germany, Italy, the Netherlands, and the United Kingdom. Base years for the calculations are 1994 for Germany, Italy, and the Netherlands and 1996 for the UK.

The pollutants which were taken into account were SO_2, PM_{10}, and O_3 with some exceptions. For some pollutants exceedances of critical levels could be assessed.

The health damages represent by far the largest share of damage costs in each country. The major contribution is estimated for three impacts caused by PM_{10}, namely chronic mortality, chronic bronchitis, and restricted activity days

The results show that damage costs amount to 2.8% of GDP for Germany, 4.4% of GDP for Italy, 3.9% for the Netherlands and 2.0% for the UK in 1994. GARPI estimated that the damages in 1990 were 4.1% of GDP for Italy, 5% for the Netherlands and 3.3% for the UK. These are not directly comparable as changes in the damage costs to these countries, due to changes in the exposure response functions and valuation methods. They do, however, give a broad indication of the different results given by the two projects, showing that on the whole the damages indicated in GARPI were of a higher order than those in GARPII, Italy being the exception. For Germany, such comparisons are not useful in that the GARPI study focused only on West Germany, and the results obtained in GARPI were incomplete owing to the difficulty of data collection.

Attribution of the Damages to Countries and Economic Sectors of Origin

The damage costs caused by the individual economic sectors of the four countries, were estimated and classified by impact categories. The main contributors to the damage costs for German emissions were found to be the sectors ‘Public Power’(0.82% of GDP), ‘Commercial, Combustion Plants’(0.82% of GDP), ‘Road Transport’(0.62% of GDP) and ‘Agriculture’(0.63% of GDP). Similar situations are observed for the emissions of the other countries examined. The public power, co-generation and district heating plants produce the highest level of damages compared to GDP for three nations, the Netherlands being the only exception, with agriculture being the most damaging sector in that country.

It was also found that O_3 related damages were not very significant in terms of the total damage costs.

Attribution of Impacts and Damage Costs to Source Countries within the European Union
Table 2 shows the estimated attributions of damages caused within the EU-15 states. It can be seen that most of the approximately 130 billion EURO/a damage costs that occur within the EU are received and caused by Germany, France, UK, and Italy.

'Net imports' of damages are calculated by diminishing the damage costs occurring within one country (grey row) by the corresponding damage costs effected by the same country within the EU (first grey column). The country identifiers for net importers are highlighted in the table, while the background for net exporters is darkened.

The results show that often less than fifty percent of the damages which occur in the country are effected by its own emissions. This is especially the case for small countries with many EU member states in the neighbourhood (e.g. the Netherlands) while in large countries and countries with less EU neighbours most of the damages inside the countries are caused by their own emissions (e.g. Germany, Greece).

Table 2 Attribution of damage costs within the EU in 1990.

		Receptor Countries																
		AT	BE	DE	DK	ES	FI	FR	GR	IE	IT	LU	NL	PT	SE	UK	EU	Non EU
		Damage Costs caused by the Source Countries within the Receptor Countries [billion ECU/a]																
Source Countries	EU	**2.8**	**4.5**	**40.9**	**2.3**	**8.9**	**0.4**	**21.4**	**2.0**	**0.4**	**15.3**	**0.1**	**7.0**	**1.2**	**2.1**	**19.4**	**128.8**	**34.9**
		Percentage of Damage Costs Caused in the Receptor Countries [%]															[bn ECU/a]	
	AT	**12.2**	0.2	0.9	0.6	0.2	0.9	0.2	0.9	0.1	2.2	0.3	0.2	0.0	0.8	0.1	**1.2**	**1.8**
	BE	1.1	**12.3**	3.7	3.8	1.2	1.4	3.7	0.0	1.4	0.7	4.8	13.0	0.4	2.6	1.1	**4.4**	**0.4**
	DE	47.0	14.2	**53.8**	43.7	4.8	38.7	13.4	2.0	6.9	15.6	33.3	15.6	0.9	49.6	6.7	**34.4**	**17.0**
	DK	0.6	1.0	0.9	**9.2**	0.1	4.6	0.5	0.0	0.6	0.1	0.8	1.0	0.0	8.9	0.8	**1.2**	**0.4**
	ES	1.7	8.6	3.8	1.8	**51.8**	0.0	16.3	0.0	16.1	5.6	8.9	6.1	50.4	1.0	7.3	**13.5**	**0.4**
	FI	0.1	0.1	0.1	0.4	0.0	**29.5**	0.0	0.0	0.1	0.0	0.0	0.1	0.0	1.9	0.1	**0.3**	**0.1**
	FR	8.7	33.5	15.3	7.2	16.8	2.1	**36.2**	0.1	11.2	10.3	31.9	23.8	5.9	5.4	11.4	**23.2**	**2.0**
	GR	1.1	0.0	0.1	0.2	0.1	0.0	0.1	**78.0**	0.1	2.3	0.1	0.0	0.0	0.2	0.0	**2.1**	**3.7**
	IE	0.0	0.3	0.2	0.5	0.4	0.1	0.4	0.0	**18.8**	0.0	0.2	0.4	0.3	0.2	2.1	**0.7**	**0.0**
	IT	23.3	3.0	6.9	2.5	8.8	1.6	5.9	18.9	2.8	**60.1**	4.1	2.4	2.6	2.8	1.2	**15.8**	**6.8**
	LU	0.2	0.3	0.4	0.2	0.1	0.1	0.2	0.0	0.1	0.1	**1.6**	0.4	0.0	0.1	0.0	**0.3**	**0.0**
	NL	1.2	8.0	4.6	7.1	1.0	2.3	3.8	0.0	1.4	0.6	5.6	**13.8**	0.3	5.0	1.8	**4.9**	**0.5**
	PT	0.0	0.6	0.2	0.1	6.8	0.0	1.1	0.0	2.4	0.1	0.6	0.4	**36.0**	0.0	0.7	**1.6**	**0.0**
	SE	0.2	0.3	0.4	1.5	0.0	11.7	0.1	0.0	0.2	0.0	0.2	0.3	0.0	**8.1**	0.3	**0.5**	**0.3**
	UK	2.6	17.5	8.6	21.2	8.0	7.0	18.1	0.0	37.8	2.0	7.7	22.4	3.3	13.4	**66.5**	**24.7**	**1.2**

Water Pollution and Industry
The effects of different industrial sectors on water pollutant levels in Italy and Germany have been estimated. For the Netherlands and the UK data were limited.

In both Germany and Italy approximately 62% of organic water pollution is generated by industrial sectors, the remaining 38% being due to civil water discharges. Among the industrial sectors, the most polluting is food and beverages (30% and 24% of the total in Germany and Italy respectively), followed by chemical industry (16% and 11%) and paper industry (8% and 7%). In Italy the textile sector is also quite important, accounting for 5% of the total organic pollution. In the Netherlands, figures of 15,382, 12,625 and 5,630 people-equivalent are reported for consumers, producers and other polluters' pollution loads respectively.

Water Pollution and Angling
A preliminary estimate was made of the effects of poor water quality on angling recreation values for the UK, covering both coarse and game fishing. The total damages to UK angling from poor water quality (and, by assumption, poor fish stocks, were valued at 27.8 million EURO (June 1997 prices), or 0.003% of GDP.

Effect of Waterfront Location on Amenity Values
For the UK, the amenity value of waterfront properties it was estimated that the annualised value was between 3.2 million EURO and 24.2 million EURO[4], depending on the premium applied to the house price. This suggests that the effect on house prices of water frontage is quite substantial. It must be noted, however, that the values given here are not an indicator of the level of price premium applied to houses by water quality, rather they simply indicate the presence of water. Further research is needed in this area in order to estimate the damages attributable to water pollution, although this may be seen as an upper bound.

Expenditures on Contaminated Land
Following a survey, it was found that current remediation expenditure is 0.09% of GDP in the UK and 0.07% of GDP for the Netherlands. Data for Italy and Germany were not available.

Global Warming Damages
The damages caused by CO2 and other gases were estimated based on a methodology proposed for the ExternE project, but the uncertainty around these estimates is still of such an order of magnitude that they are not well comparable with the other presented estimates. If future research reduces the uncertainty around CO2 damage estimates there is no methodological problem of inclusion of such estimates in the GARP accounting framework.

POLICY RELEVANCE

The purpose of the GARP exercise is to investigate the scope and applicability of the impact-pathway and damage cost methodology to the development of environmental accounting. This is useful for policy makers in that GARP provides for a more complete estimation of the damages caused by emissions, meaning that policies can be more effectively targeted towards those pollutants with the greatest damages.

The attribution of damages by economic sector and country of origin is also of great relevance to policy. Identifying polluting industries will facilitate the easier internalisation of pollution costs in production, leading to the establishment of incentives to move away from heavily polluting industry. The establishment of the country of origin of pollution will enable greater cross-border co-operation in reducing emissions to levels where the full cost of production is taken into consideration.

Policy makers should also take note of the water pollution damages attributable to industry. This is of particular relevance when setting targets for reducing pollution levels and when constructing instruments to achieve these targets. It must be noted that further research in this area is needed.

The GARP exercise has developed a number of methodologies that can and do help decision makers to be more confident that policy initiatives will be targeted on the basis of pollutant attribution and in correct measure. This is most advanced in the case of air pollution where the modelling work undertaken has had wide application in the design of air quality strategy. The results obtained for water and land, whilst being preliminary, also provide a useful indication as to how priorities should develop in these areas.

Applications to environmental accounting are more straightforward than in many other policy contexts for air and water due to the fact that temporal changes in environmental impacts are likely to have greater robustness than absolute damages. This is partly because willingness to pay valuations and physical

[4] based on a 25 year period and a 6% discount rate

measures of environmental impact are, at present, most easily defined over more incremental-type changes whereas absolute damages from human activity are difficult to isolate accurately. It should be possible to establish a core European monitoring team to undertake periodic reporting of damage costs in the form of satellite accounts. This could come into effect immediately.

Methodologies for the inclusion of water and land in an environmental accounting framework are not sufficiently developed at this stage to allow the recommendation of the adoption of satellite accounts at this point. In both cases there is a need for standardisation and centralisation of databases that would allow reporting procedures to be established. Further research will ensure that methodological developments could parallel and inform this data gathering exercise. In turn, this should allow the formation of satellite accounts.

The GARP exercise has attempted to apply welfare-theoretic willingness to pay valuation measures to the physical environmental impacts in order to present damages in monetary terms. Where possible, this is the most appropriate and meaningful way to express damage costs. It is clear that there remain significant problems in deriving values that reflect intra- or inter-generational concerns. Also, it may be useful, where damages are non-marginal or very complex in their effect, to present avoidance costs incurred as a minimum willingness-to-pay valuation. This is likely to be the case with some types of ecosystem damage and global warming impacts.

Avoidance costs are, of course, useful to policy makers in their own right. In the context of environmental accounting, however, these costs should only be used as a lower bound monetary indicator for WTP where other willingness to pay measures are clearly invalid due to methodological difficulties or insufficient data. Future developments in environmental accounting should recognise the strengths and weaknesses of these two monetary indicators, be explicit in stating their demand-side or supply-side origin, and adopt them according to the context.

The policy recommendations that stem from GARPII are contained in Box 2.

Box 2: Policy Recommendations

As a result of the GARPII project the following policy recommendations can be made:

- That efforts be redoubled to reduce $PM_{10,}$ SO_2, NO_X, and NH_3 emissions, to decrease PM_{10} concentrations, which are a major factor in health costs of pollution, by far the medium with the greatest share of the total damages.
- That efforts be made in the worst polluting industries to further reduce emissions. These sectors are: Public Power supply, industrial combustion, road transport and agriculture.
- That efforts be made to combine the Green Stamp Approach with the GARP methodology in order that EU policy makers be better informed regarding the costs and benefits of emission abatement.
- That further research be carried out in the areas of water pollution and land contamination to establish the causal linkages between pollution and environmental damages.

FUTURE DEVELOPMENTS

The possible applications of the technique used in GARPII are wide, as shown above in the discussion of the relevance of this work for policy. As the impact pathway between pollutants and the mediums of air, water and land become more advanced, so the techniques outlined here will yield more useful results. Hence, further research is needed into these impact pathways.

So far, the GARPII methodology has only been applied for Germany, Italy, the Netherlands and the UK. This technique could be applied across other countries within the EU in order to enable more informed policy making at the EU level.

The results presented here can not be directly linked to national accounts, because the technical nomenclature for economic activities of the CORINAIR database does not correspond to the nomenclature used in national accounts. An important issue for further investigations is therefore the transfer of the results to a more convenient nomenclature of economic sectors, for example, the European NACE nomenclature.

As green accounting techniques improve policy makers can use the results in order to decide on pollution abatement policies. The methodology applied in this project is transferable to other parts of the world, such as developing countries as long as the impact pathway has been established, and willingness to pay studies have been conducted.

Box 3: ABBREVIATIONS USED

CO	-	Carbon Monoxide	µg	-	Microgramme
d.r.	-	Discount rate	NH_3	-	Ammonia
EU	-	European Union	NMVOS	-	Non-Methane Volatile Organic Substances
EURO	-	EURO at 1995 prices	NOx	-	Nitrogen Oxide
GARP	-	Green Accounting Research Project	O3	-	Ozone
GDP	-	Gross Domestic Product	Person*a	-	Person per annum
Meq/m^2	-	Annual deposition (Per square metre) of acidity equivalents (Millions)	PM10	-	Particulate matter larger than 10 microns
			PpbV	-	Parts per billion by Volume
			SO2	-	Sulphur dioxide
			WTA	-	Willingness to Accept
			WTP	-	Willingness to Pay

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