

Hans Diefenbacher

Roland Zieschank

In cooperation with Dorothee Rodenhäuser

Measuring Welfare in Germany.

A suggestion for a new welfare index.

Final report on the Research Project FKZ 3707 11 101/01

– A time series calculation for welfare indicators –

sponsored with funds of the German Federal Environment Agency¹

Heidelberg/Berlin, October 2009

Research Centre of the
Evangelischen Studiengemeinschaft (FEST)
– Institute for interdisciplinary research –
Schmeilweg 5 • 69118 Heidelberg
hans.diefenbacher@fest-heidelberg.de

Research Centre for Environmental Policy
Faculty of Political - and Social Sciences
Freie Universität Berlin
Ihnestr. 22 • 14195 Berlin
zieschan@zedat.fu-berlin.de

¹ The Federal Environment Agency (Umweltbundesamt) is Germany's central federal authority on environmental matters. Its key statutory mandates are: Providing scientific support to the Federal Government (e.g. the Federal Ministries for Environment, Health and others); implementation of environmental laws; information of the public about environmental protection.

IMPRESSUM

This publication can be downloaded from

www.uba.de

www.fest-heidelberg.de

www.fu-berlin.de/ffu

Views and opinions of the authors expressed in this study are not necessarily in accordance with those of the editors.

© Editor: Umweltbundesamt / German Federal Environment Agency
– Sections I 1.1 and I 1.4 –
Postfach 1406
06813 Dessau-Roßlau
Tel. 0340-2103-0
Fax 0340-2103-2285
E-Mail: info@umweltbundesamt.de
Internet: <http://www.umweltbundesamt.de>

Authors:

Prof. Dr. Hans Diefenbacher (FEST)/Roland Zieschank (FFU)
in cooperation with Dorothee Rodenhäuser (FEST)

Forschungsstätte der
Evangelischen Studiengemeinschaft (FEST)
– Protestant Institute for Interdisciplinary Research –
Schmeilweg 5 • 69118 Heidelberg
hans.diefenbacher@fest-heidelberg.de
www.fest-heidelberg.de

Environmental Policy Research Centre (FFU)
Free University Berlin
Innestr. 22 • 14195 Berlin
zieschan@zedat.fu-berlin.de
www.fu-berlin.de/ffu

Translated by
Vincenzo Cortese, M.A.Sk.Sl., Dolm., in cooperation with Francesca Turi, M.A.Gesch.Rom.

Dessau-Roßlau/Heidelberg/Berlin, October 2009

Measuring Welfare in Germany - A suggestion for a new welfare index

Abstract

The social welfare debate has recently been rekindled both at the national and at the international level. There are signs that the costs of environmental change and of the maintenance of social cohesion are not adequately explicated by economic quantities like gross domestic product (GDP).

The adoption of this central indicator with a long tradition to measure the economic development of a country in the sustainability strategy of the Federal Republic of Germany shows the weaknesses of the concept of national product in such a normative context with a wider range of significance. The visible deficits are being revised and balanced in this project. The study analyses possible indicators complementary to GDP or, according to recent modifications of the traditional concept, to GNI (gross national income).

The assessment of empirical approaches from various countries shows that a first set of variables *complementary to GDP/GNI* can be developed starting from the „Index for Sustainable Economic Welfare“ (ISEW) as well as from the „Genuine Progress Indicators“ (GPI) from the United States, although it still needs improving and updating..

As a further result of this explorative study of feasibility a supplementary national welfare index (NWI) has been roughly calculated for Germany. In this context, the present study is continuing the discussion about the concepts of welfare and sustainability, already begun in previous experts' meetings.

Methodological improvements and particularly a broader basis of data, which will have to be available at regular time intervals, are still needed for scientific assessment and interpretation. Nevertheless the calculations undertaken here show a significant difference in the developments of GNI and NWI. Since 1996, NWI is falling compared to GNI. Given this difference it has to be discussed in detail whether Germany has approached the aim of accounting economic sustainability or whether economic results as shown by the GNI had to be interpreted in a different way.

The intensive debate carried out at OECD and EU level about the relation between economic growth and real welfare enhancements on the basis of these conceptual reflections and empirical results is becoming more and more important in Germany as well. Compared to the findings of the french Commission on the Measurement of Economic Performance and Social Progress the following publication presents for the first time the calculation of an aggregate indicator in contrast to GNI.

Contents

	Page
Figures	7
Abbreviations	9
1. Introduction	11
1.1. A new stimulus to the recalculation of gross domestic product as a sustainability indicator in Germany	11
1.2. Explanation of the technical terms used in the present study	13
1.2.1. GDP and its variants	13
1.2.2. Prosperity and welfare	14
1.2.3. Sustainability and welfare	15
2. Notes on the weaknesses of the concept of national product	17
2.1. Conceptual failures of GDP/GNI in the context of a national sustainability strategy	17
2.2. Growth rates as fixed points of economic and political action	20
3. Illusionary prosperity as a result?	23
4. Political reorientation – On the renaissance of the social welfare debate	24
4.1. International discussion lines	24
4.2. Climate change and its consequences for prosperity	27
4.3. The financial and economic crisis: the beginning of a new era?	27
4.4. Conceptual developments in Asia	28
4.5. Alternative approaches of economic accounting in France	29
5. Complementary reporting systems – Single topical aspects or a new index?	32
6. Criteria for the selection of variables to be included in a national welfare index for Germany	34
6.1. Original intentions	34
6.2. Criteria for the selection and inclusion of variables	35
6.3. Focus on ISEW and GPI	36
6.4. Additional explanation of existing indicator systems	38

7.	An outline of the recently suggested variables	41
8.	Specification sheets of the indicators	43
8.1	NWI variables 1 – 21	45
8.2	Suggestions to a further amendment to the NWI (variables 22 and 23)	96
9.	A first aggregation of the partial indicators: a rough plan of the welfare index	101
9.1.	Basic variant and modifications of the NWI	101
9.2.	Which variant of the NWI is the right one?	103
9.3.	Details about the scaling and interpretation of curve levels	105
9.4.	About the discussion of the curves	106
9.5.	Quantitative meaning of the variables	109
9.6.	Information variants: partial indicators provide autonomous informational potential	112
10.	Political potentials of complementary welfare measurements	112
11.	Institutionalisation: conceptual layout and ideas for establishing welfare indicators	115
12.	Conclusions and outlook	116
12.1.	The issue of qualitative economic growth as a frame for the further discussion on a national welfare index	116
12.2.	On using the NWI – a provisional outlook	120
	Appendix 1: A second, completed variant of the NWI	123
	Appendix 2: Data tables	127
	Appendix 3: Literature	132

Figures

	page
1 Economic Growth in Germany, change of GDP, adjusted for price	22
2 GDP growth in thousand million Euros, 1950 – 2005, with linear trend line	22
3 Complementary reporting systems	33
4 Set of core variables for the national welfare index (suggestion)	42
5 Gini Index (2000 = 100)	46
6 Real vs. weighted consumption	48
7 Real and weighted consumption and estimated working time in housework	51
8 Household production and voluntary work	54
9 Public health care and education expenditure	56
10 Consumer durable goods. costs and benefits	58
11 Travelling between home and workplace	61
12 Costs of traffic accidents	63
13 Cost of Crime	64
14 Cost of alcohol and drug abuse	67
15 Compensatory social expenses due to environmental impact	70
16 Cost of water pollution	74
17 Damage from soil pollution	76
18 Damage from air pollution	78
19 Damage from noise	81
20 Loss of wetland areas	83
21 Loss of agricultural areas	86
22 Replacement costs due to the exploitation of non renewable resources	88
23 Damage from greenhouse gas emissions	91
24 Net change in fixed capital	93
25 Capital account	94
26 Net new indebtedness	97
27 Public expenditure on ecological transformation	100
28 BNE (GNI) and NWI	102
29 BNE (GNI) and modified NWI	103
30 BNE (GNI) and modified NWI : 2000 = 100	107

31	Measure of distance A (1990 = 0)	108
32	Measure of distance B (2000 = 0)	108
33	Comparison BNE (GNI) – private consumption – private consumption weighted with income distribution)	110
34	Household labour and voluntary work (Var. 3 + 4)	110
35	Social variables (Var. 5 to 10)	111
36	Ecological variables (Var. 11 to 19)	111
37	Economic variables (Var. 20 + 21)	112
38	BNE (GNI) and NWI II	123
39	BNE (GNI) and modified NWI II	124
40	BNE (GNI) and modified NWI II (2000 = 100)	124
41	Measure of distance A (1990 = 0)	125
42	Measure of distance B (2000 = 0)	125

Abbreviations

BASt	Bundesanstalt für Straßenwesen		Welfare
BIP	Bruttoinlandsprodukt	LAWA	Länderarbeitsgemeinschaft Wasser
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit	MEA	Millennium Ecosystem Assessment
BNE	Bruttonationaleinkommen	mod	modifiziert
BOE	Barrels of Oil Equivalent	NEF	New Economics Foundation
BSP	Bruttosozialprodukt	NMVOC	Non-methane volatile organic compounds
BUND	Bund Umwelt- und Naturschutz Deutschland	NOx	nitrogenoxide
CEO	Chief Executive Officer	NWI	Nationaler Wohlfahrtsindex / National Welfare Index
CO	Carbonmonoxid	OECD	Organization for Economic Cooperation and Development
CO ₂	Carbondioxid	PKS	Polizeiliche Kriminalstatistik
db(A)	dezibel (A-Bewertung)	REITOX	European Information Network on Drugs and Drug Addiction
DIMDI	Deutsches Institut für medizinische Dokumentation und Information	RNE	Rat für Nachhaltige Entwicklung
DIW	Deutsches Institut für Wirtschaftsforschung	SEEA	Satellite System of Environmental Economic Accounting
DNR	Deutscher Naturschutzring	SEPA	State Environment Protection Administration (chinesische Umweltbehörde)
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction	SERIEE	European System for the Collection of Economic Information on the Environment
EPEA	Environmental Protection Encouragement Agency	SO ₂	Sulfurdioxid
EXIOPOL	Externality Data and Input- Output-Tools for Policy Analysis	SOEP	Sozio-ökonomisches Panel
EU	European Union	StBA	Statistisches Bundesamt
EUROSTAT	European Statistical Office	UBA	Umweltbundesamt
GDP	Gross Domestic Product	UFOPLAN	Umweltforschungsplan
GENESIS	Statistisches Informationssystem des Statistischen Bundesamts	UGR	Umweltökonomische Gesamtrechnung
GNH	Gross National Happiness	UNEP	United Nations Environment Programme
GNI	Gross National Income	URL	Uniform Resource Locator
GNP	Gross National Product	Var.	Variable
GPI	Genuine Progress Indicator	VGR	Volkwirtschaftliche Gesamtrechnung
GSI	Genuine Savings Index	WWF	World Wide Fund for Nature / World Wildlife Fund
ICD	International Classification of Diseases	ZEW	Zentrum für Europäische Wirtschaftsforschung
IfnE	Ingenieurbüro für neue Energien	ZUMA	Zentrum für Umfragen, Methoden und Analysen
IFOK	Institut für Organisationskommunikation		
IMSA	Instituut voor Nieuw- en Systeemanalyse		
ISCED	International Standard Classification of Education		
ISE	Institut für Solare Energiesysteme		
ISEW	Index of Sustainable Economic		

1. Introduction

1.1 A new stimulus to the recalculation of gross domestic product as a sustainability indicator in Germany

Gross domestic product (GDP) is traditionally regarded as a key indicator for western national economies; all over the world politics and public opinion take it as their compass to evaluate the economic development of a state as well as the degree of success or failure in the respective economic policies.

GDP accomplishes not only the task of a leading indicator in national account systems. No other economic indicator achieved such a central role in giving orientation in politics, economics, mass media and, as a consequence, in public opinion as well. This may also explain why GDP was also adopted from the beginning in the German federal sustainability strategy, not only as an independent target quantity but also as a reference quantity in other indicators such as the productivity of energy or resources and in the domain of traffic (German federal government 2002, 2008). After the first critical evaluations of the '80s, the recent debate on the informational value of GDP as a key indicator arose in the very context of its positioning in the set of indicators of the German federal sustainability strategy, because national strategies of sustainable development have an immanently much broader content and also a much stronger political and normative impact than statistical reporting systems.² Therefore, on the background of the meanwhile very differentiated sustainability debate, the question arises as to whether GDP can still maintain its traditional outstanding importance as a parameter and a reference quantity. On one hand, corresponding stimuli already arose in the context of the participative process accompanying the further development of the national sustainability strategy in Germany.³ On the other hand, sustainability strategies in OECD countries usually broach the issues of social justice, ecologic compatibility and an economic development able to be carried on in future. These basic points alone are enough to indicate that a turnover oriented parameter, connected with the goal of continuous growth, will inevitably enter an area of conflict.

² This does not, in turn, allow the opposite conclusion according to which economic statistics parameters should be scientific, neutral observation tools per se.

³ Already in the definition phase several participation processes were carried out, while at present some associations (such as B.U.N.D./DNR/NABBU 2008), consultative bodies (RNE 2008) and parliamentary bodies (parliamentary council for sustainable development 2007) regularly give their opinion in the updating, and the public were also explicitly solicited to express their opinion through the internet, too.

Historically, the growth rates of western industrial nations also played a central role,⁴ though, both in the USA after the world economy crisis and in Western Europe, where not only were they related to the economic reconstruction after the war, but they also had to, and were ultimately able to, perform a signalling task in the fight between political systems in the East and the West in symbolising economic superiority.⁵ The message of the concept of growth is based on the following arguments:

- GDP measures the market value of all goods and services produced inside the country in a report year; therefore it is possible to calculate *growth numbers* from a time series of GDP.
- Growth opens more economic options and thereby enhances *economic wealth*.
- Among the population, this process enhances *social welfare* according to individual preferences in personal expense.

-

This idea of balancing economic development turned out to be quite successful in the long run: the prioritizing of the solution of economic and social problems above economic development has given birth, not only in economics but also in politics and in society, to the fundamental conviction that the chosen strategy could be maintained in the long term. In this way, in the perception of public opinion and politics the improvement of welfare has been very strongly linked with quantitative economic growth for many years; only slowly the idea that there might be economic growth without any improvement of welfare (which is the case when the negative external effects of growth use up the whole improvement of welfare), became more and more accepted, at least theoretically. And the opposite is also possible: an improvement in the quality of life occurring without any economic growth. But in Germany the conceptual conclusion that the concept of social welfare should be largely detached from the growth paradigm still seems to be scarcely imaginable, if not even revolutionary.

Considering the background sketched here above, it may seem surprising that already nearly twenty years ago in scientific circles there was scepticism about the strong political fixation on the GNP (then in use) and on the corresponding growth rates, as the following comment by Leipert (1989, 171) reminds us:

“The starting point of the discussion in the workshop (...) was the opinion shared by all participants, that the present day system of national accounts largely based on the calculation of gross national product is not any longer up to the needs of our time (...) On the whole, the workshop became an exciting exchange of opinions among

⁴ For a more detailed outlook see Diefenbacher 2001 (chapter 7).

⁵ In this context one should not forget that economies in state socialism developed their own balance system in the framework of national accounts, the so called system of material production, the indicators of which are very difficult to compare with GDP; for exhaustive information see Wagenführ (1973).

scientists, administration workers, politicians and representatives of associations and action groups about the scientific and political implications of the subject (...)“

Since then scepticism has been related to *included factual costs* and *neglected consequential costs* in the context of production and consumption which do not contribute to an improvement of social welfare.

The present study aims, among other things, at identifying possible inconsistencies and often quite neglected side effects of the traditional quantitative accounting of economic activities and to start a debate on thinkable possibilities to find solutions, at least in the context of sustainable development.

Before providing a more detailed analysis of the weaknesses of the concept of social product, a brief excursus is being presented to allow a better understanding of some central terms, such as GDP, economic growth and prosperity as well as some directives of sustainable development. Experience leads us to think that the representatives of other economic, sociologic and political disciplines will not fully agree. The next chapter tries to take this assumption into account while giving some definitions to which the following part of the study will make reference wherever necessary.

1.2. Explanation of the technical terms used in the present study

1.2.1 GDP and its variants

The central quantity of national accounts is GDP with its variants. It has been modified again and again in the course of time. In public debate GDP replaced gross national product (GNP) in the 1990s. While in the last few years statistic discussions among experts have been prone to adopt gross national income (GNI) which differs from GDP only through the balance of primary incomes with the rest of the world, this change has not yet reached public opinion. This study also adopted the term GNI. Whether you take GDP or GNI, the basic idea always lies in the fact that an overall figure for the economic value creation of a country is derived by a statistical analysis of circulation, whereas owing to the “balance mechanics” of national accounts this figure can be identified on the production side (output), on the consumption side (consumption and investments) and as distribution calculation. Transactions of private households, companies and

the state are included; also the rest of the world is taken into account with imports and exports, insofar as these transactions affect the economy of the country under consideration.⁶

1.2.2 Prosperity and welfare

The line of arguments discussed in the first subchapter regarding GDP / GNI, (growing) economic prosperity and the resulting individual and social welfare already alluded to the essential concepts of the debate being carried on at national and, as will be shown later, at international level.

During the last two centuries in the history of dogmas of political economy a large amount of different definitions have emerged, as expressions of different ideas and understandings of individually and socially desirable situations. There is a certain degree of agreement on the fact that prosperity includes not only the provision with material goods and financial means, which is often referred to as standard of living, but also, in a broader meaning of the word, some immaterial components; however, there are still many definitions describing the concept of prosperity exclusively as the condition of a person or a household, of a group or a society, having economic goods at their disposal. *Individually*, prosperity is perceived in different ways, so that surveys might well show that even the same income, or the same level of equipment with goods, may lead to subjectively different assessments of one's prosperity (more in details and also with international comparisons, see Jackson 2009, 31-33) .

As already shown in the context of the concept of "welfare state", which was long cherished in Germany, this does not only concern individual prosperity (like in the US American way), but also a system of services in the public environment as well as at the collective level of the common good, which is important at the level of individuals for the stability of living conditions and of the ongoing personal development.

Under prosperity we understand the material basis of the more broadly understood social welfare, which includes some immaterial components as well. In economics, the concept of welfare designates the aggregation of the utility of single individuals or of social groups and constitutes, in this way, an abstract construct describing the economic and social prosperity of the population. In neoclassical welfare economics, welfare enhancements can only be achieved in

⁶ As an introduction to the systematics of national accounts and the calculation of GDP and GNI, see among others Frenkel/John (2006) or Nissen (2004).

imperfect markets, since in perfect markets the maximum of welfare has already been achieved per definition. Vice versa, this means, however, that in imperfect markets there might arise negative and positive external effects, which can not be represented in market transactions, whereas only the latter are recorded by GNI.

1.2.3 Sustainability and welfare

A large (and ultimately only apparent) consensus on the meaning of the word “sustainability” is only given as long as the latter is defined at a very general level. Those who do not use this word only as a source of inspiration but want to work with it in practice have to explain their own position through a definition and, in the aftermath, to operationalise the word in such a way as to be able to define measurable partial goals and to identify political strategies.

In order to turn the word “sustainability” into a “working concept” in this sense, different paths have been taken also in economics. First of all, in the discussion in the field of economic sciences it is the economic dimension of the word to be emphasised, at first, and it is postulated that a sustainable style of economic activity is only given when the economy is organised in a way, that is compatible with the environment and socially sustainable in the long run. A wide spread method of stepwise operationalisation consists here in formulating so called “management rules” or “fundamental postulates” concerning sustainability. A standard formulation of such management rules is mainly related to the domains of renewable and non renewable resources, at least, as well as to the absorption capacity of the environment for pollutants.⁷ In 1998, the Enquête Commission “Protection of Human Beings and of the Environment”⁸ completed the basic frame of the sustainability postulates by Daly and El Sarafy and formulated, on the whole, five management rules for sustainable development:⁹

- (1) The degradation rate of renewable resources should not overcome their regeneration rate. This rule requires the maintenance of ecological productivity.
- (2) Non renewable resources should only be used to the extent to which a physically and functionally equivalent replacement in form of renewable resources or of higher

⁷ As one of the oldest and most often quoted variants see Daly, Herman (1990): „Sustainable Growth – an Impossible Theorem“, in: *Development*, No. 3/4, 45 – 47; nearly the same in El Sarafy, Salah (1991): „Sustainability, Income Measurement and Growth“, in: Goodland, Robert et al. (Ed.): *Environmentally Sustainable Economic Development: Building on Brundtland*, Paris 1991, 69 et sqq.; the rules of the latter correspond to the rules n° 1 – 3 of the Enquête Commission quoted here.

⁸ German original name: Schutz des Menschen und der Umwelt.

⁹ Enquête Commission „Schutz des Menschen und der Umwelt“ (Ed.) (1998): *Abschlussbericht*. Bonn: Deutscher Bundestag (Eng.: Final report. Bonn: German Federal Parliament).

productivity of renewable as well as of non renewable resources is achieved.

- (3) Element inputs into the environment should not overcome the absorption capacity of the environmental medium, considering all functions of the environmental medium.
- (4) The period of time in which anthropogenic inputs or interferences into the environment occur must be in a balanced relation with the period of time needed by the natural processes related to the reaction capacity of the environment.
- (5) Dangers and unjustifiable risks for human health due to anthropogenic interferences have to be avoided.

A complementary possibility for operationalising the concept of sustainability consists in defining not only the dimensions to which the concept should be related, but, after that, also a number of partial goals for sustainable development related to the respective dimensions. This task consists precisely of two steps: firstly, choosing of the partial goals as such; secondly, establishing a degree of achievement of the goals which can be seen as satisfactory. According to the kind of partial goal such a degree of achievement can assume very different forms, varying from maximal consumption levels to limit values of emissions or even to certain social distribution norms. Incidentally, in a second step, partial goals of sustainable development defined in this way can be measured through suitable indicators.¹⁰

In this perspective, the model of sustainable development can be understood as a combination of intragenerational and intergenerational welfare, since the concept of sustainability precisely focuses the consequences of present day economic activity on different social levels of the population and on future generations, which is not the case for the traditional concept of welfare.¹¹ However, social welfare and sustainable development must not be seen in opposition to each other or as limiting each other for the reason above, in fact our suggestion would rather be to reasonably include the national welfare index exposed as follows into the German federal sustainability indicator.

¹⁰ Nonetheless, a summary of similar indicators in one index conceals important methodological problems: not only the problem of weighting the single indicators must be solved, but also the problem of normalizing different scales, since certain indicators are expressed in money units and others in physical units. The normalization through so called "sustainability failures" implies fixing target values for each indicator. Also the provisional final report of the Commission sur la mesure de la performance économique et du progrès social (2009) is very critical regarding the methodology of the so called "composite index".

¹¹ See to this respect also the reflections of Offer, according to whom today's excessive consumption is undermining future welfare: "True prosperity is a good balance between short-term arousal and long-term security".

2. Notes on the weaknesses of the concept of national product

2.1 Conceptual failures of GDP/GNI in the context of a national sustainability strategy

The following lines of argument are not primarily related to the composition of GDP/GNI as an indicator in the field of national accounts. As a comprehensive parameter of all economic activities of a country it still plays an important role as always.

However, a) a whole series of deficits with regards to content and b) political fixation on merely turnover based growth numbers seem to be quite worrying, if GDP/GNI is understood as an inherent prerequisite of social welfare and an essential integral part of an ecologically and socially sustainable development. The political orientation capacity attributed to this traditional economic indicator would finally no longer be justifiable.

The negative side effects in terms of environmental, working and living conditions in a society in a phase of economic growth are now well known in broader circles of the public opinion, mostly through illustrating details recurring again and again in media and headlines; among many others they include:

- the impact of agriculture on the soil, ground water and the sea;
- the loss of species richness as a consequence of various changes in natural habitats;
- dangerous working conditions;
- consequences of alcohol and drug abuse
- the loss of spare time as well as
- social marginalisation for those who cannot keep pace with the pressure to perform.

Therefore an economic system does not produce only “goods” but also “bads”.

The issue of how to deal with this discovery in social reporting systems is very challenging. The titles of the following publications are just some examples of the beginnings of scientific discussions:

- National Income and Economic Welfare (Kuznets 1954);
- In Place of GNP (Tsuru 1972);
- Is Growth Obsolete? (Nordhaus/Tobin 1972);

- How the industrial system takes advantage of its evils (Jänicke 1979);¹²
- The secret costs of progress. How the destruction of the environment boosts economic growth (Leipert 1989).¹³

The production of “bads” makes certain measures necessary, that could be called „anti-bads“ and include:

- Expenses for environmental protection, for repairing environmental damage, as well as expenses to prevent the creation of new environmental damage
- Expenses for the fight against crime
- Repair of accidents (accidents in the workplace, in traffic).

As a matter of fact all of these are *compensatory expenses* only intended to reproduce the previous level of welfare. For these expenses aiming at maintaining the existing standard the term “defensive expenses” has entered common use. Economic resources are used up in order to permanently assure an already attained level against an erosion of welfare. In the calculation of GDP/GNI such expenses go into the accounting with a strongly positive weight.

In the last few decades it became clearer and clearer that these expenses for the maintenance of the attained level are probably *not* enough to really assure a sustainable standard of social development. The necessary „anti-bads“ are only the tip of the iceberg; there is a whole series of other processes which are not considered in GDP/GNI. The following pages contain a more systematic deficit analysis, corroborated from case to case. Such an analysis includes a large number of different categories:

(A) Resource depletion:

The overexploitation of the environment and of finite as well as of renewable resources; mineral resources and fish populations are often underlined: 90% of the original fish populations in the oceans have been used. The depletion of important resources, beyond the well-known discussion about mineral and fossil raw materials, is also affecting soil erosion or the worsening of soil fertility due to intensive agriculture.

→ Result: amortisation on natural capital consumption

¹² Original title: „Wie das Industriesystem von seinen Missständen profitiert“

¹³ Original title: „Die heimlichen Kosten des Fortschritts. Wie Umweltzerstörung das Wirtschaftswachstum fördert“

(B) Environmental damage in spite of measures of environmental protection:

An example is represented by the yearly reports of the German federal government on damage to the forest; more monetisation of damage is carried out in the „Green accounting“ projects at EU level.¹⁴

→ Result: damage costs vs. “external costs”

(C) Environmental damage caused by natural disasters of anthropogenic origin to some degree:

Among these floods, fires, crop failures. Hurricane Katrina even functions as an example of a catalyst of an intensive welfare debate in the USA.

→ Result: damage costs – as a part of the definition of welfare, in the sense that no real improvement of the living conditions can be achieved in this way.

(D) Immaterial damage to nature and landscape:

Urban sprawl, destruction of landscapes, monocultures as well as the loss of animal and vegetal species inevitably lead to degradation, not only in the quality of nature but also in terms of quality of life. The consequences of economic activity resulted up to now in the desertification of landscapes and habitats.

→ Result: among other things psychological costs of economic growth

(E) Avoidance of damage and consequential costs in future:

Flood protection measures, re-socialisation of offenders, wellness activities sponsored by companies or the reduction of gases with an impact on climate, according to EU or Kyoto objectives, all belong to this category.

→ Result: costs of avoidance; under the postulate of sustainable development the question whether future generations and/or other countries will have the same options always has to be asked.

(F) Degree of indebtedness

In the socioeconomic field there is a tendency to ignore, at least partially, that a high state indebtedness reduces economic prosperity, since it leads to a loss in options as regards the allocation of taxpayers' money. Therefore a high indebtedness of public budgets is no sustainable

¹⁴ Noteworthy are the Initiative „The Economics of Ecosystems and Biodiversity“, sponsored by UNEP and also by the EU-Commission, as well as the research project EXIOPOL, trying to estimate the external costs of economic sectors for the member states of the EU: URL <http://www.feem-project.net/exiopol/>.

policy in the long run.

→ Result: due consideration of the indebtedness of public households.

(G) Income distribution

GDP/GNI as an aggregated measure does not say anything about the way in which value creation inside the social system is distributed or whether situations of inequality are generated and lead surreptitiously to an undermining of common welfare.

→ Result: due consideration of income justice as a lacking aspect of social development.

(H) Activities deprived of a market as a part of economic value creation

Moreover, there is a whole series of economic activities not entering GDP/GNI but enhancing social welfare: two important examples are housework and voluntary work. New index calculations such as Sustainable Economic Welfare (ISEW) or Genuine Progress Index (GPI) take them into better consideration; (see also Dahm/Scherhorn 2008).

→ Besides ignoring the secret costs of progress, GDP/GNI conceals, at the same time, wide ranging activities immediately contributing to welfare.

For the upcoming reflections on a possible alternative welfare calculation it is therefore particularly important to consider that the calculation of GDP/GNI does not express some important goals formulated in the model of sustainable development. As a consequence, one can definitely think of two national economies with an identical GDP/GNI, one of which is much more strongly managed according to the principles of sustainable development, while the other one shows clearly higher sustainability deficits.

2.2 Growth rates as fixed points of economic and political action

The concentration on GDP/GNI as an indicator conceals the danger of a problematic policy orientation out of a second reason, apart from the conceptual failures mentioned above. This would be the case if the *growth* of GDP/GNI, at present strongly prioritized on account of the economic crisis, were not linked with an increase in social welfare. Some background information on this point.

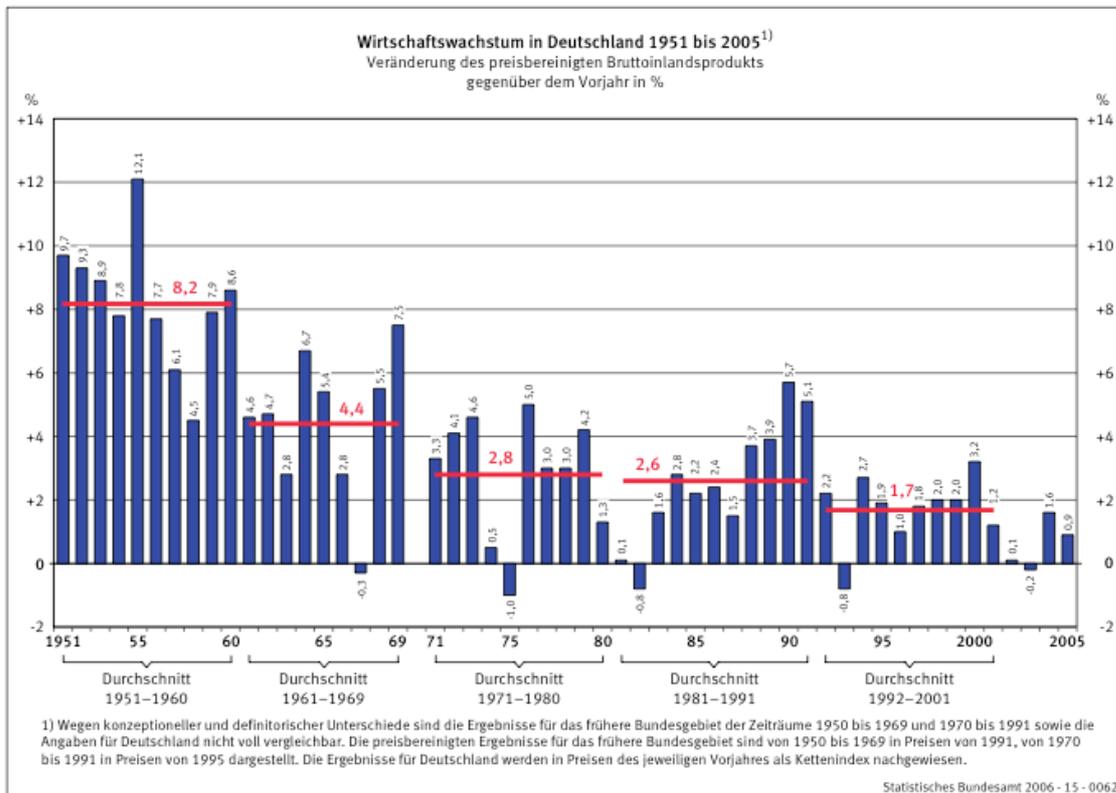
In the Federal Republic of Germany, GNI grew by a factor of seven between the beginning of the Fifties and 1972 and then doubled again by the end of the century. A mere representation of

growth rates leads to a situation in which, in the case of constant increases in the starting quantities, i.e. of constantly growing economic performance on a yearly basis, there will be constantly decreasing results in terms of the relative growth rate of economic performance. The goal of constant growth rate usually associated with such a representation conveys the idea that such a goal requires increases of the economic performance, becoming higher and higher from year to year and thus growing exponentially.

This context is made clear by both of the following graphs. The first one shows economic growth in Germany in a long time series from 1951 to 2005. It is easy to remark that the average level of the achieved growth rates goes down from year to year. The optical impression changes completely if one looks at the second graph, reporting the amounts in thousand million euro corresponding to the respective growths. During the whole period, the trend line has changed very little only, the *average growth* of the economic performance per year, measured in euro and adjusted for prices, remains nearly the same.

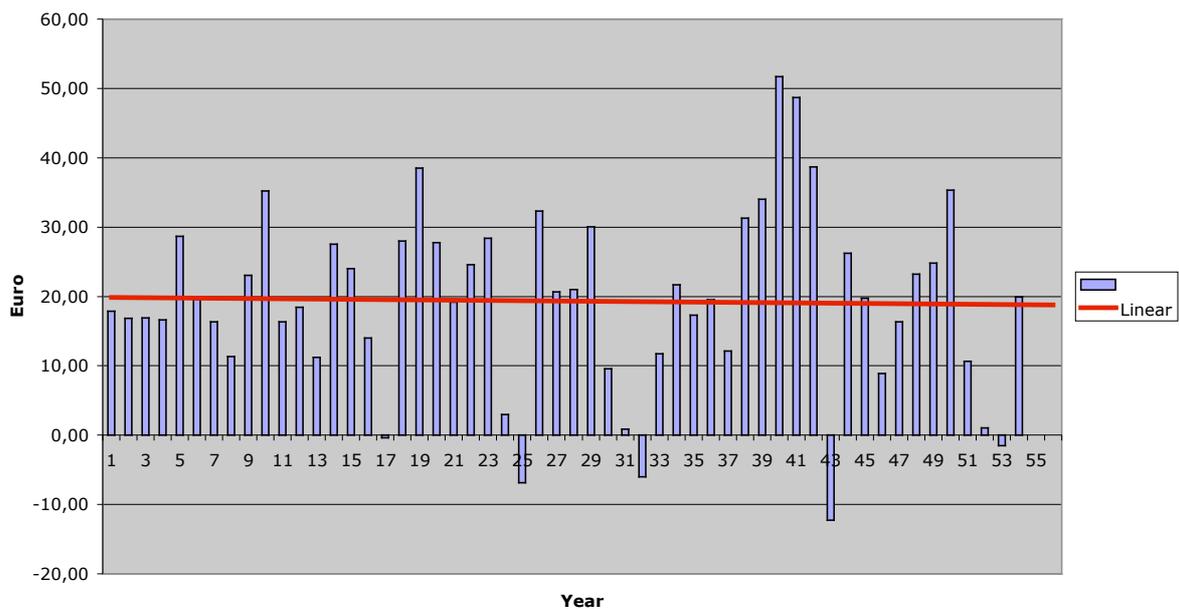
As a consequence, not only the desired constant growth rate ultimately overstrains the economy and policies, but the constraint to reach a positive GDP/GNI in relation to the previous quarter leads to a cognitive eclipse of negative processes: the degradation of ecosystems as well as erosion phenomena of social welfare. The next chapter will deal with all this in a more detailed manner.

- Figure 1: Economic Growth in Germany: change of GNP, adjusted for price, compared to the year before in %¹⁵



- Figure 2 -

GDP growth in thousand million Euros 1950 - 2005 with linear trend line



¹⁵ Source: Statistisches Bundesamt. The results for the former Federal Republic between 1950 and 1959 and between 1970 and 1991 and for Germany since 1992 are not fully comparable because of changes in concepts and definitions.

3. Illusionary prosperity as a result?

The mere fact of calculating *defensive* costs, i.e. the costs which must be incurred in order to maintain the same prosperity level as in the previous report period of the current year, would be enough to relativise the disclosures of GDP/GNI: the first calculations of defensive costs done by Leipert (1989, 198) led to the result that about 20 per cent of GDP/GNI growth in Germany was used up, already in those days, for the compensation of damage and of the worsening of living, working and environmental conditions. In 1985 Tinbergen already spoke of „counter-production“ in this context.

Binswanger et al. (1978) saw the danger of an “idle course of the civilization machine”. Nowadays, especially emerging countries like the People’s Republic of China are faced with this situation since, according to some estimations, that country practically loses its yearly growth rate of GDP/GNI through environmental damage and the consequent environmental and health care costs. In the old industrial countries, however, new defensive costs are looming at the horizon.¹⁶ Such an idle course turns up above all in countries showing high growth rates in GDP/GNI for several years or already having a high GDP/GNI level, measured per capita.

As a result, the hitherto dominating fixation on GDP/GNI leads to political risks:

- The market failure concerning the social and ecological costs of the present day economic model and consumption orientation are not sufficiently recognised.
- The focusing on yearly GDP/GNI figures and their growth rates gives partially wrong signals for political decision making in the context of sustainable development.
- As a consequence, this focusing contributes to a disorientation of social actors who therefore pursue, under certain circumstances, political strategies for stimulating growth which, as already mentioned, do not cause any further welfare enhancement.
- A chance of social identification with GDP/GNI as an economic and political model seems to be scarcely given: the “figures of statistics” (Mr. Sarkozy) are less and less suitable to reflect the real life of many people.
- The clear orientation on material goods and generally on consumption as a basis for welfare and wellbeing is reinforced by GDP/GNI and remains unchanged in spite of the worldwide proclamation of the necessity of an ecological turn. In a time of accumulating

¹⁶ For an up-to-date interpretation of the „idle course“, the costs of internal security in the USA in terms of defense against terrorist attacks represent an example particularly worthy of discussion: the risk of a substantial growth of “defensive costs” in the truest meaning of the word, intended to maintain the existing welfare, is not seen, per se, as a danger for this goal and for social progress in general.

environmental damage and depleting natural resources, however, this prioritisation can no longer be a durable model for the management of the economy.¹⁷

4. Political reorientation – On the renaissance of the social welfare debate

4.1. International discussion lines

Already before the financial and economic crisis of the years from 2007 to 2009 there arose the question of the adequacy of economic reporting systems in the context of national sustainability strategies that, in the meantime, have been put in place by most OECD countries. Social progress and real welfare enhancement must be assessed with concepts going beyond a merely turnover-orientated balancing of economic value creation. A certain malaise was visible among political and economic decision makers, too, since there is a discrepancy between official information obtained through statistics and the evaluation of the same facts given by the population, whose perception of reality and related experience are in open contradiction with official information. An example of this was the declared inflation rate of the Federal Office of Statistics after the introduction of the Euro and the sometimes clearly divergent perception of an “experienced”, significantly much higher inflation; this discrepancy in the perception was mainly due to the fact that the prices of goods and services quite often bought by individual consumers rose much more strongly than the prices of those more expensive goods and services, which are seldom used in everyday life.

An indication of this can also be found in the statement of the Parliamentary Council for Sustainable Development on the occasion of the first report on indicators of the Federal Office of Statistics in 2006, in which they wrote:

“The Sustainability Council already pointed out, in its report in the previous legislation term, that GDP is not sufficient as a sole parameter for economic prosperity” (November 30th, 2007, p. 7).

At the second World Forum about „Measuring and Fostering the Progress of Society“ the OECD also took a leading part in the discussion on how social progress should be understood in terms of methods and meaning. The activities are part of the „Global Project on Measuring the

¹⁷ In the USA about 70% of GDP is due to private consumption.

Progress of Societies“, which sees itself as a worldwide reference point to this respect. The support of social progress is explicitly the unifying objective of these efforts. A certain distance from the orientation on GDP is recognisable and intended, as the ‚Istanbul Declaration‘ makes clear:¹⁸

„We are encouraged that initiatives to measure societal progress through statistical indicators have been launched in several countries and on all continents. Although these initiatives are based on different methodologies, cultural and intellectual paradigms, and degrees of involvement of key stakeholders, they reveal an emerging consensus on the need to undertake the measurement of societal progress in every country, going beyond conventional economic measures such as GDP per capita.“

In 2007 as well, the EU gave the impulse to start a more intensive political debate about the issue of what criteria and approaches are sensible beyond an orientation on GDP. The conference “Beyond GDP“ was held in autumn 2007 with high level support on the part of representatives of important international communities and organisations. These include, besides the EU Commission and the European Parliament, the Club of Rome, the WWF, die World Bank, the OECD, the United Nations and also, with active contributions, some important statistics institutes at international and national level such as EUROSTAT and EEA.

There seemed to be much stronger scepticism addressing the welfare measurements used thus far in the contributions to this conference, and the call for alternative reporting systems was formulated in a more drastic way than it had been the case in Germany beforehand. Climate disaster, the ongoing loss of species richness and the fact that in the meantime two thousand million people fell below the threshold of poverty (already at the beginning of the economic crisis) were seen as a failure of markets in spite of worldwide growing economic performance. The continuous orientation on a “productivistic approach” actually implies an acceleration, in what it encourages economic routines, which are not of any help but make the crisis situation even worse on the whole: according to data of the World Bank about 6 per cent of China’s yearly GDP gets lost because of social and ecological deteriorations, whereas the Chinese environmental authority SEPA sees even up to 10 per cent as corresponding to “idle growth”.

The representative of WWF (Mr. Stuart Bond, UK) expected a “market transformation” with the need for deep going changes in the stocks and fluxes of money, energy and materials, linked

¹⁸ Named after the place where the meeting took place, late June 2007

with a change in the field of political monitoring and ruling. France's representatives also saw a surplus in fluxes of money and merchandise, which is no longer in connection with the available human and natural capital. The contributions of the President of the EU Commission Mr. Barroso and of the President of the European Parliament, Mr. Pöttering, conveyed the idea that politics had concentrated too much on economic growth, that Europe cannot build its future with the same instruments as in the past, but that we should rather change our way of understanding the world, too. In the final summary of the results of the meeting, EU Environment Commissioner Mr. Dimas started from the view that the conference would lead to a turning point in the judgment of a kind of assessment and evaluation of the economy based on GDP, in favour of an innovative breakthrough to be achieved in the monitoring of social developments: "Perhaps the main achievement of this conference has been to clearly demonstrate the political consensus of the need to go beyond GDP" (Mr. Dimas 2007).

Nowadays, the research lines should be kept open, accounting approaches aiming at including ecological and social aspects into the national accounts, EU indicators for sustainable development or also sustainability parameters aggregated to form an index, the so called "composite indicators", seem to be, in principles, interesting variants for the elaboration of new and alternative reporting systems.

The EU-Commission underlines its position to this respect in the form of a communication to the Council and the European Parliament of August 2009: „GDP and beyond – Measuring progress in a changing world“ (COM 2009 433 final).

In 2009 the OECD is holding its third world forum on "Statistics, Knowledge and Policy" with the sponsorship of the South Korean government. The theme "Charting Progress, Building Visions, Improving Life" should leave room for dealing with central issues such as the meaning of progress for different societies or the theme of new paradigms for measuring this progress (see www.oecd.org/progress).

4.2. Climate change and its consequences for prosperity

Differently from the first controversial debate on GDP about 20 years ago, nowadays climate change emerges as a further risk factor with its foreseen consequential costs for society, which are estimated to rise as long as contrasting measures are postponed, as stated e.g. in the report by Nicholas Stern (2006). In this way, the discussion on the real utility of the achieved wealth enhancement is implicitly caused to cross the boundaries of the scientific circles and to reach out to large sectors of society. The calculations of the expenses that would be necessary to limit climate change at a growth in the average yearly temperature below 2 Celsius degrees vary from Stern's optimistic statement of 1-2 per cent of GDP to a level of 15-20 per cent of GDP according to others (for up-to-date model calculations see also Edenhofer/Stern 2009, 45 et sqq.). This calculation does not include the elimination of the other negative external effects listed in the previous chapter.

4.3. The financial and economic crisis: the beginning of a new era?

The challenge of an adequate assessment of the economic development is now becoming more topical. New state initiatives and financial programmes of an unprecedented size should help overcoming the financial and economic crisis which manifested itself from 2007 onwards. On one hand, the economic, social and political significance of the traditional parameters of national accounts is high, but on the other hand the vulnerability of a conception of the economy which is mainly orientated on GNI growth rates becomes evident again, showing also in the perception of the supporters of this parameter, that it is not suitable as a measure of welfare, although it is used as such in parts of the public opinion and of the political world. At least in the USA and in Great Britain, GNI growth has been linked year after year with a very strong increase of private and public indebtedness and, in the aftermath, with the generation of ultimately virtual financial products, which led neither to sustainable development nor to an improvement of social welfare,¹⁹ but rather prepared the ground for one the worst economic crises ever seen, now extending its negative consequences to many aspects of the life of the population of all continents. To all of this one should add the preoccupations, already expressed in previous

¹⁹ See to this respect the evaluation of the situation given by J. Stiglitz in Financial Times on January 27th 2009: „This crisis has shown that the GDP numbers for the US were totally erroneous. Growth was based on a mirage.”

critical studies on an adequate reporting system for the economy, above all concerning the mere quantitative assessment of private, entrepreneurial and state activities, in which qualitative aspects can not be sufficiently taken into account.

Together with political decisions and state measure programmes of an unprecedented size aiming at stabilizing the world economy, the issue of the factual shaping of a sustainable or non sustainable economy is coming forward in the political agenda: this is already shown both by the absolute height of the stimulus package overcoming 2.8 thousand million US dollars worldwide, which will necessarily fence the development paths of the affected countries for several years, and by the terminology: for instance, they speak of Green Recovery“ in the U.K und Japan, of „Green New Deal“ (UNEP, Ban Ki Moon), of „Low Carbon Economy“ (Nicholas Stern), of Progressive Growth (USA), or of “Prosperity without Growth” (Great Britain, Sustainable Development Commission).

The overcoming of ecological problems is now often seen as a chance to overcome a recession, too, through suitable innovations and investments thus achieving a double problem solving effect (see e.g. the Environmental economic report of the German Federal Environment Ministry 2008, The American Solar Energy Society 2008, UNEP 2009, Worldwatch Institute 2009).

Thanks to this recent stimulus reinforcing the reflections undertaken thus far, the debate on the orientation and action effect of GDP has entered a phase of high political sensitivity that will be commented on later in this paper.

4.4 Conceptual developments in Asia

Above all in Asian countries, as a part of the debate, beside some approaches for the calculation of ISEW and of the “idle driving costs” of economic growth in China, a slightly modified trend has come about, which, starting from Bhutan, suggests a conceptual replacement of GDP through a further development of “GNH” aimed at measuring social progress. The 3rd international conference on „Gross National Happiness” took place in Bangkok in November 2007.²⁰

²⁰ For more information on this point: www.gnh-movement.org

A year later another conference followed in Thimphu, Bhutan's capital. In this context it is noteworthy that GNH is not only understood as a complementary index, but at least in Bhutan, this concept is rather taken as a basis for the further social construction, pointing even beyond democracy as a model. The following nine categories have a central meaning: standard of living, health, psychic wellbeing, education, ecology, intensity of community life, time use, culture and good governance.²¹

The idea of a wellbeing, which is not only material, but also intellectual, if not even spiritual, seems to have very broad contents. The loss of religious reference systems is seen in relation to a secularised orientation, ultimately no longer recognizing much else than economic growth (only) as its highest purpose.²²

This new discussion on the substantial goals and on the essence of social welfare, now carried out in its several aspects also internationally, is leading to a conceptually differentiated kaleidoscope of reporting systems, which are complementary and sometimes also alternative to GDP. Only at the beginning there is a question implicitly connected to it: it must be clarified if the economic components included in the new tools for measuring welfare should *equally show growth*, or if this direction of the management of economy, undoubtedly dominating up to date, should be questioned as well. You will find more about this in the last chapter.

4.5. Alternative approaches of economic accounting in France

The conclusions drawn by a commission appointed by the French President Mr. Nicolas Sarkozy a year ago were awaited with particular interest. Under the lead of Nobel Prize winners Mr. Joseph E. Stiglitz and Mr. Amartya Sen the commission is supposed to analyze, once more, the limits of the informational value of GDP and to make suggestions to broaden the information basis, in order to allow a better evaluation of the economic and social development of a country.²³ After the final report of the commission was announced, at first, for April 2009, a

²¹ For more details see www.grossnationalhappiness.com.

²² As the following quotation from the words of a leading executive of an "alternative" banking group illustrates: „In prewar times, the daily lives of Japanese people were controlled by Shinto and Buddhism, and people felt reverence for nature. Once such feelings were detached from our lives, however, we came to seek only economic growth, which has led to severe environmental destruction.” Mizue Tsukushi, CEO Good Bankers Co. (Japan for Sustainability Newsletter 065, 31. Januar 2008).

²³ This was the task of the 'Commission on the Measurement of Economic Performance and Social Progress', see

“Draft Summary” was published in internet on June the 2nd, 2009 with the additional remark “provisional and incomplete”.²⁴ The final report of the commission was presented only on the 14th of September, 2009 in Paris.²⁵

At first, the commission summarized some technical problems of GDP, which, in part, have been under discussion for decades: the valuation of products that show changes in quality over time, health care and education, research, financial services, the lacking consideration for structural changes due to inflation. Also the theme of lacking consideration for housework, voluntary work and leisure in GDP was approached, just like the problem of lacking recording of income distribution. The “Draft Summary” concluded to this respect: “Measurement difficulties should not prevent us from pursuing the objective of getting a more comprehensive picture of the distribution of income and wealth.”²⁶

At this stage, the commission in its final report does not suggest an autonomously conceived new welfare index, but it has analyzed already existing approaches. Surveys about the concepts of quality of life based on polls are seen as definitely important complements to the indexes of national accounts, but, according to the point of view of the commission, they can not replace objective measurement systems.²⁷ The commission limits the use of the expression “Composite Indicators“ only to indexes summing up, in their calculation, various indicators measured in different units, such as the Environmental Performance Index; these Composite Indicators are evaluated very critically.²⁸ Adjusted GDPs are observed, at first, only in a descriptive way; Nordhaus and Tobin, ISEW and GPI as well as SEEA with the possible result of a “Green GDP“ are also covered in the report.²⁹

In this category of alternative welfare measurements, to which the National Welfare Index presented in this paper also belongs, the main problem is not seen as lying in the choice and evaluation of the variables; up to now the commission has not contributed an essentially new approach to discussion either. Criticism on, among others, ISEW and GPI concentrates rather on their not giving any information about the distance from a sustainable situation: a measure

<http://www.stiglitz-sen-fitoussi.fr/en/index.htm>

²⁴ See ibidem under „draft summary“.

²⁵ Stiglitz, J./Sen, A./Fitoussi, J.-P. (2009): Rapport de la commission sur la mesure des performances économiques et du progrès social, Paris. Auch im Internet unter <http://www.stiglitz-sen-fitoussi.fr/fr/index.htm>

²⁶ Ibid. 65.

²⁷ Ibid. 67 et sqq.; for the calculation of the NWI, see chapters 6.2, 7 and 9.

²⁸ Ibid., 138 et sqq.

²⁹ „deviating in an increasing fashion from accounting consistency“; ibid., 151.

for overconsumption or under-investment is needed. However, the Adjusted Net Savings Concept of the World Bank, preferred by the commission up to now, has a series of serious conception deficits, which make it look unsuitable as an approach to adopt. The report of the Commission contains a “Twelve-point programme” of recommendations, the implementation of which would lead to a very deep-going change in the systems used in national accounting.³⁰ The Commission itself does not suggest a method of calculation of its own for changing or complementing GDP/GNI, the twelve recommendations that the “Stiglitz-Commission” published in September 2009 show a high level of accordance with the themes that have been treated already within the status report³¹ from November 2008 foregoing the present NWI final report:

- The Stiglitz-Commission suggested to accentuate income and consumption more strongly than production during the assessment of the material welfare (recommendation 1); the calculation of the NWI starts from private consumption as its basis.
- The Stiglitz-Commission wants to account private households in a better way; it wants to include non market activities (recommendations 2 and 5); the calculation of the NWI includes household labour and voluntary work.
- The Stiglitz-Commission wants to stress the distribution of income, consumption and wealth and suggests additional indicators of distribution (recommendation 4 and 7); the calculation of the NWI is weighting private consumption by the income distribution.
- The Stiglitz-Commission, too, highlights health, education and environment as core issues of welfare calculation (recommendation 6 and 12). Currently however, the Stiglitz-Commission leaves it at recommending to develop improved indicators to analyze those issues separately, while the NWI incorporates them into the calculation via some paradigmatic variables.
- The Stiglitz-Commission recommends the further development of some ambitious indicators: to capture the connection between different segments of individual quality of life (recommendation 8), to consider the subjective dimension of welfare (recommendation 10), the improvement of physical indicators of the state of the environment (recommendation 12) and a “dashboard” of well defined sustainability indicators (recommendation 11). Within such a dashboard, the Commission wants to place a monetary index of sustainability, but such an index should be – according to the Commission – limited to economic aspects of sustainability. The NWI can be seen as a

³⁰ Stiglitz, J./Sen, A./Fitoussi, J.-P. (2009), 12 et sqq..

³¹ See Diefenbacher/Zieschank (2008).

realization of such an index, but it exceeds the claim of the Stiglitz-Commission.

- Furthermore, the Stiglitz-Commission is demanding from statistical offices to present the necessary data more timely (recommendation 9).

5. Complementary reporting systems – Single topical aspects or a new index?

In the last few years some progress was clearly achieved concerning the elimination of the blind spots of GDP in the sense of a broader understanding of welfare. A whole series of reporting systems and indicators were published; all together, they can cover many of the spots mentioned above in the measuring of welfare, although they were not always specifically designed to this purpose. The variants of reporting systems presented in figure 3 are now available.

With an innovation in the field of social monitoring, Germany's national sustainability strategy aims explicitly at measuring ecological viability, sustainable economic development and social peace in an *all-encompassing context*. Therefore, in principle there are two alternatives available to set up a reporting system taking account of a broader understanding of welfare in Germany:

Alternative 1 – Consistency. It aims at an appropriate mutual complementation of the approaches sketched in the table above and the indicators for the measuring of social welfare introduced as examples in the same table. The result to be pursued would be a *set of partial indicators* helping to record the aspects which get lost or are ignored by the parameter “gross domestic product” or, in a time series observation, by economic growth. This set could cover the field of social welfare and, at the same time, provide background information for a more comprehensive sustainability reporting in a given country.

Alternative 2 – Index building. It aims at the development of a new, aggregated index made up of several indicators, which can be seen as complementary to GDP. So the result to be pursued would not be an amount of supplementary specific indicators, but a central parameter, which would be considered as a monetary quantity or a non-dimensional index and could claim validity as a welfare index in the sense of the principle of sustainability.

– Figure 3 –

Environmental reporting	Environmental economic accounts	Social reporting	Assessment of the quality of life
Depletion of natural resources + emissions and waste materials	Environmental expenses of industry and the State	Development of crime; development of life expectancy	Health aspects; neighbourhood aspects; social participation; economic security
Quality of nature, ecosystems and landscape	Utilization of the environment through industry and private households	Education, social equality	Satisfaction, happiness
Ecological footprint; Environmental barometer; EEA: Core Set of Indicators OECD: Environmental indicators	Environmental economic accounts of the German Federal Statistical Office; SEEA / Eurostat: Environmental Accounting; Greened Economy Green GDP	Human Development Index; Socio-economic Panel (DIW); EU Statistics on Income and Living Conditions	Welfare survey D. Happy Planet Index; Canadian Index of Well-Being; Swiss Federal Statistical Office; sustainability strategy in GB
Environmental indicators/ models	Accounting approaches / models	Social indicators	Statistical and subjective indicators

Source: our own compilation

Both alternatives are thinkable as complements of Germany's sustainability reporting; they do not exclude each other. The answer to the question as to which of the two alternatives should be given a preference also depends on the administrative context and the criteria underlying the research project introduced in this paper. The following chapter is going to deepen the issue of the combination of specific indicators vs. the development of an index; the variables introduced therein can be introduced and interpreted as specific indicators, but they will also be brought together to form a monetary overall index seen as a new welfare index.

It will largely depend on the social resonance given to these complementary pieces of information whether an aggregated index should be developed or whether specific partial indicators in the sense of alternative 1 will represent the better solution.

6. Criteria for the selection of variables to be included in a national welfare index for Germany

6.1. Original intentions

Without selection criteria, besides a reproach of arbitrariness, there is a threat of long lasting methodological and maybe also political fight about the “correct” components of a national welfare index. The following criteria were, at first, formulated in the project by the researchers involved in it, and then coordinated and refined with the participation of employees of the German Federal Environment Agency and of the Environment Ministry:

For the development of a new national welfare index it was decisive to start from a long-lasting unease, deriving from the criticism on the construction of GDP. Four conclusions can be drawn out of this circumstance:

- Firstly, at this point it is only possible to calculate an *economic quantity*, which means that only variables expressed or that may be expressed in monetary form can be taken into consideration. To this extent, the modernisation debate always becomes a monetarisation or an evaluation debate as well.
- Secondly, the new national welfare index still contains flow figures related to a certain financial year. Stock figures, such as natural assets and capital assets, do not go into the calculations directly, but only in the form of a corresponding change in these asset entries in the relevant financial year. A mixture of flow and stock figures is not possible owing to systematic reasons. Therefore, an overall analysis should complement the welfare index suggested in the present study with an alternative capital asset budget.
- Thirdly, the goal to be achieved is an assessment at national level, for which macroeconomic and overall social trends must be worked out and represented.³²

³² The calculations recently undertaken in Italy in this context show, among other things, that regionalisation is definitely possible. See Pulselli/Bastianoni/Marchettini/Tiezzi (2008).

- Fourthly, it seemed reasonable to try to develop an aggregated index first. Specific partial indicators alone lack the communicative strength that a new index would have.

As a matter of fact, the new national welfare index should build the informative counterpart of the GDP, the parameter dominating until now. The purpose is not replacing it, but rather completing it and filling gaps in information, also in order to support the formation of an opinion on the aims of social progress. In so doing, in the long run, political problem handling skills concerning risk-entailing side effects of economic market processes and growth goals will be reinforced.

6.2. Criteria for the selection and inclusion of variables

- The most important criterion is the selection of variables promising a solution of the “classical” deficits of GDP: the relevant fields are social justice, socially relevant unpaid work, damage to the environment, consumption of resources or natural capital.
- The starting point was the orientation on ISEW-variables (“Index for Sustainable Economic Welfare”) in different countries as well as on the GPI-variables (“Genuine Progress Indicator”) in the USA (see chapter 6.3). This means that the basic quantity for the new index is *not* GDP or GNI, but *private consumption*, which is also a subset of GDP/GNI. This lies on the assumption that private consumption – meaning also the consumption of goods and services on the part of households – creates positive utility. The universal validity of this assumption is disputable, since there is also something like “over-consumption”, where the presence of a positive utility can be put into serious doubt, e.g. in the case of addictions or also of unhealthy eating habits. Nevertheless, this procedure is chosen, since no normative evaluation of consumption strategies is required in our context.
- Vice versa, this means that certain subsets of other components of national accounts related to the *state sector* (see variable 5) must also be re-added in the overall index as welfare-creating, as they are not included in the category “private consumption”. To this respect, it must be noted that the NWI, as a welfare index, can not provide an exact reproduction of the categories of the national accounts. So consumer spending, for example, is weighted as an item on the *expenditure side* of GDP/GNI with income distribution, a quantity stemming from distribution calculation; some of the adjustment items, such as costs of carbon dioxide emissions, must be partially added to the *production*

side of GDP/GNI.

- As a complement, more variables stemming from national or international reporting systems were verified, particularly those that are now being discussed at EU-level. Additional relevant reporting systems are SEEA (Satellite System of Environmental Economic Accounting), OECD-Core-Indicators and the EU indicators of Sustainable Development. Anyway, the prerequisite is the presence of a monetary quantity or the theoretical possibility to monetarise the given variable.
- Consideration was given to variables which could really play a role in the political discourse under pursuit about the welfare development in western industrial countries (relevance and susceptibility to political influence)
- Relatively few variables were chosen and preference was accorded to those which are basically not contended, do not offer unnecessary opportunities of “methodological attacks” or can easily be suggested as innovations. The chances of a general political consensus in Germany should be maintained through the selection of „core indicators“. For supplementary conceptual reflections and potential lines of further development, there is a second round of variables which it will be possible to integrate into the NWI when the respective database is available (e.g. aspects of biodiversity).³³
- The variables chosen here were compared with the 21 indicators and sub-indicators of the German sustainability strategy: it should be visible whether monetary variables of the welfare indicators have any relationship with the existing indicators or variables, for example in the field of the use of resources or crime.
- Preference was accorded to those variables for which empirical data series are already available and which allow, wherever possible, a retrospective calculation back to 1990.

6.3. Focus on ISEW and GPI

For a first version of the German national welfare index it seems convenient to assess already existing statistics and calculations, as far as they can be conceptually connected to the matter under discussion and have the systematic of a reporting system. For this reason, this paper will continue following the double track of data and of a theoretical-conceptual part, on the basis of the reflections exposed above.

³³ As far as subjective indicators are concerned, these could probably be better included in a new (independent) indicator. Moreover, the monetarising of happiness indicators, besides being difficult, even seems to contradict the intention of this kind of indicator.

The following country case studies based on the ISEW approach and the north-American GPI can be taken, also to this extent, as a starting point and a good ground for this paper.

The variables for a first version and the calculation of a time course of ISEW for the United States of America were published for the first time in 1989 (Cobb 1989). According to discussions with the working group around Cobb the overall international comparability of ISEW should be tested on the calculation of an index for the Federal Republic of Germany. In 1991 a first time series study was presented during a meeting at the Protestant Academy in Loccum.³⁴

In autumn 1993 plans were made for an updating of the calculation of ISEW for the Federal Republic of Germany. Several reasons led to that decision. On one hand, it seemed interesting to deal with the question of how the ISEW developed in comparison with GNP in the years before the German reunification and which methodological problems and leaps the reunification of both German states would imply for the index. On the other hand, a publication by Clifford and Cobb contains a second calculation variant of ISEW which it was possible to calculate back to 1990.

In the meantime, more publications concerning the US-American situation led to a new index, the Genuine Progress Indicator.³⁵ Figures are now available until 2006 (Talberth, J./Cobb, C./Slattery, N. (2006).

Besides, in the last few years a series of case studies were elaborated for other countries, reflecting more or less the original ISEW approach: an English case study came out in spring 1994.³⁶ A case study for Austria carried out a very exhaustive reflection on the theoretic principles of the index with an empiric methodological discussion, see Hochreiter/Obermayr/Steiner/Stockhammer (1995). For Denmark there is a comparative calculation of a welfare index oriented on the ISEW calculation method (Jespersen 1994). The Institut voor Milieu- en Systemanalyse in Amsterdam presented a first version of a case study on the Netherlands in May 1995. Further studies were carried out for Sweden, Chile, Italy, Korea and Taiwan.³⁷ The most recent

³⁴ The first results of a comparative calculation were elaborated with the cooperation of S. Habicht-Erenler, Th. Baumgartner (Zurich) und F. Küppers (Hannover); see Diefenbacher 1991 as well as Diefenbacher & Ratsch 1992. The exhaustive recording of the calculation procedures of the German study could be published only three years later because of editorial problems (Diefenbacher 1994); erroneously a version of the ISEW table still containing mistakes was printed in that publication (p. 233 – 236).

³⁵ See Cobb/Halstead 1994 as well as Rowe/Anielski 1999. Also for GPI more country case studies have been elaborated by now; see Hamilton/Saddler 1997 a. o.

³⁶ Jackson/Marks (1994); for a summarised version see New Economics Foundation (ed.) (1994).

³⁷ Jackson/Stymne (1996); Castañeda (1997); Guenno/Tiezzi,(1998); Won/Hong (1998); Zaipu/Shieh (1999).

applications of the ISEW idea come from Belgium and Finland, whereas the concepts for the Netherlands and Italy have been reviewed and presented in a form that was partially updated, also methodologically. Also regionalisations are available, as mentioned above, for Italy and Scotland.

This overview shows that the ISEW idea has been used for over 20 years now by a slowly but constantly growing scientific community and adapted to the various national situations. There is good reason to claim that the construction principle of ISEW and GPI has proved its worth and has been internationally accepted by a large group of experts, although not yet by “mainstream” official statistics. Furthermore, it has become evident that the construction principle of ISEW and GPI leaves room for updating and modernisation and is therefore flexible enough.

6.4. Additional explanation of existing indicator systems³⁸

The information purpose of a national welfare index implies that prominent Indicator systems, such as, above all, the Ecological Footprint approach, cannot be included or even integrated, since such approaches are centred on *physical parameters* (WWF 2007): at the core there is the surface which each person of a country occupies, in order to satisfy his or her consumption and needs. The Ecological Footprint also focuses, not surprisingly, only on the ecological dimension in the sense of the claims made to nature, including its capacity of receiving waste. Ecological aspects are more or less reduced to CO₂-emissions, so that it would be more appropriate to consider this as a “carbon footprint”. The representation of the yearly average environmental impact of a country primarily works on the basis of consumption parameters (flows) and of the cleverly “staged” exploitation of a “supplementary planet” needed in the aftermath. However, resource depletion or the denaturation of ecological capacities and their economic costs are not included. In 2009, a further development of the carbon footprint approach was presented by the Norwegian university for science and technology; the internet-based tool uses data for a worldwide comparison of CO₂-burdens of states, even by accounting for foreign trade.³⁹

³⁸ In a previous project of the Federal Environment Agency a whole series of complementary indicator approaches was discussed, partly in experts’ roundtables (see the scientific paper of IFOK 2008). The variants sketched in the following text are representative of whole „clusters“ of concepts, which seem to be interesting for a further development of the German federal sets of indicators, consistently with the goal of this workshop, but in view of building an alternative to GDP should be kept with good reason only in the field of sight.

³⁹ See <http://www.carbonfootprintofnations.com/index.php> allowing for a quick interactive balance sheet and further informations.

The comparison between the GDP curve, the present day footprint and a postulated bio-capacity in the sense of a possible sustainable supply for the satisfaction of human needs clearly shows also the area of conflict between traditional economic growth-oriented and ecological principles. The huge difference in the western industrial nations is called „overshooting“.

Qualitative growth and satisfaction is a further concept in the reflections about new indicator systems going beyond GDP. The happiness debate, influenced by the works by Richard Layards (2005) and the innovative approach of the Himalaya state Bhutan is experiencing a strong impulse, together with the accompanying issue of “subjective“ indicators. Prominent examples are:

- The works of the British New Economics Foundation with the suggestion of a „Happy Planet Index“, connecting the Ecological-Footprint approach with life satisfaction and life expectancy in order to allow international comparisons, too.⁴⁰ In 2009, a further development of the methodology led to system of national reporting on life satisfaction, allowing to separate between individual and social well-being of the population (Nef 2009).
- The works towards the Second Millennium Ecosystem Assessment Report about the correlation between the functions and performances of ecosystems on one side and human wellbeing on the other side (MEA 2005).
- Reflections of the British Government aiming at representing the dimensions of the citizens’ wellbeing more strongly (see Dolan/Peasgood/White 2006).
- Inquiries of the Swiss Federal Statistical Office about aspects of happiness in the official statistics (see Federal Statistical Office / Federal Office for the Environment, Forest and Landscape / Federal Office for Territorial Development 2003).
- The Canadian Index of Wellbeing, also working on the basis of physical parameters but centred on social dimensions and following the Bhutan model (Atkinson Foundation 2008).
- The Welfare Survey of ZUMA, a periodical representative survey about individual welfare and the evaluation of the quality of life.
- More recently, the example of France, since it was asked by the economists and Nobel Prize winners Joseph Stiglitz and Amartya Sen to include some aspects of the quality of life and wellbeing in its traditional economic reporting (see chapter 4.5).

⁴⁰ <http://www.happyplanetindex.org>

As a common ground, these works refer to a postulate by the King of Bhutan: „Progress should be people-oriented“.⁴¹

Differently from the approach chosen in the present study, the last reflections exposed above are centred on the assessment of the subjective *wellbeing* of the citizens of a country. Their background is the visible discrepancy between the further growing economic performance of a state, again only in the context of advanced industrial nations and of countries catching them up with a strong development like the People’s Republic of China, on one side, and the private citizens’ situation which, at a certain point, is disconnected from it, on the other side. Moreover, international comparisons show that, in various countries, the subjective perception of happiness of the citizens can be connected in quite different ways with the respective level of material wealth. In other words, being happy is not a condition one can buy through economic growth and growing material wealth can not make up for social deficits. Nonetheless, at least in Germany, one can find that there is also an economic disconnection of wide circles of the population from actually positive development phases of the economy, reaching well into the middle classes and undermining the thesis of participation in wealth itself through „trickle-down“-effects.

The difference between “welfare” and “wealth” or “prosperity” lies in the fact that the wellness of a country in the sense of sustainable development cannot be measured to the same extent on the basis of subjective evaluations: the questions of the common good or of possible conflicts between subjective satisfaction and ecological denaturation, according to the thesis, are not included automatically in the happiness reporting systems; on the contrary: the areas of conflict are maybe a little idealised.⁴²

For the sake of completeness, about 120 sustainability indicators of EUROSTAT should also be mentioned. They reflect both the level of the socio-political debate and the available, qualitatively sufficient data sets. They include both physical and economic quantities.⁴³ However, the essential difference from the National Welfare Index preferred in this report is, firstly, that they consider a much wider kaleidoscope of themes, problems, political fields and, secondly, that no *integration* in

⁴¹ King Wangchuck, 2004, on the occasion of the first International Conference on „Gross National Happiness“, in Thimpu (Japan for Sustainability Newsletter 063, Oktober 2007).

⁴² „Ultimate Wellbeing is Happiness. Happiness is Peace“ (Ringu Tulku Rinpoche). There are visible efforts, anyway, also in other contexts such as the European survey about the citizens’ ecological awareness.

⁴³ EUROSTAT (Hrsg.) (2007): Measuring progress towards a more sustainable Europe – 2007 monitoring report of the EU sustainable development strategy. Luxembourg: Office for official publications of the European Community; in internet under www.insee.fr/fr/publications-et-services/dossiers_web/dev_durable/eurostat_report2007.pdf

the sense of a combination of all partial indicators or variables seems to be possible or sensible. Nonetheless, ISEW, GPI and the new welfare index introduced in this paper generate their respective information contents on the basis of all partial indicators, which are aggregated to form one index.

The reflections above make clear that already the welfare debate and, even more, the social progress debate, are processes in continuous development, which it would be very difficult to recognize in all their aspects or even to fix through indicators. Either an aspect will always be lacking, in the present index it is maybe corruption, or it will happen that the set of partial variables keeps extending itself into new fields until ultimately the border to arbitrariness and, at the same time, to unhandiness is crossed in some grey area.

7. An outline of the actually suggested variables

The evaluations undertaken thus far, selection criteria and, above all, favourable conceptual or empirical references to ISEW and GPI led to a first set of variables, which, all together, should make up the planned national welfare index.

Moreover, in the choice and the elaboration of the variables due consideration was given to stimuli from both the workshops in the frame of the experts' dialogue of 2007 and from a workshop held at the beginning of 2009 at the German Federal Ministry for Environment.⁴⁴ The choice of variables could be verified through more stakeholder dialogues and through the integration of further scientific and political positions on the basis of this project report. A third, complementary possibility would consist in the inclusion of opinions from civil society and the economy, collected through the internet, to the extent to which the new welfare index and its partial variables are presented to the public opinion also with this medium.

The following synopsis allows a quick identification of the single variables flowing into the index but, independently from this, they can also be used individually in the context of an assessment of single aspect of social welfare.

⁴⁴ The workshop on the "National Welfare Index (NWI), held on January 22nd 2009, made reference to the contents of the UFOPLAN-Projekt "National Sustainability Strategy - experts' dialogue towards its further development", that had organised two dialogues on the subject of growth measurement and welfare measurement in 2007.

In chapter 8 more detailed explanations are to be found about each variable on the basis of a formalised specifications sheet.

Figure 4: Set of core variables for the national welfare index (a suggestion)

	Variables (Basic variant)	Value	ISEW	GPI	Taiwan	Belg.	NL	Poland
1	Index of income distribution		X	X		X		X
2	Weighted consumption expenses	+	X	X		X		X
3	Value of housework	+	X	X	X	X	X	X
4	Value of voluntary work	+			X			
5	Public expenditure on health care and education	+	X	X		X	X	X
6	Consumer durable goods Costs / Benefits	+ / -	X	X	X	X		X
7	Travelling between home and workplace	-	X	X		X	X	X
8	Costs of traffic accidents	-	X	X	X	X		X
9	Costs of crime	-						
10	Costs of alcohol and drug abuse	-			X			
11	Compensatory social expenses due to environmental impact	-		X	X	X		
12	Damage from water pollution	-	X	X		X	X	X
13	Damage from soil pollution	-						
14	Damage from air pollution	-	X	X	X	X	X	X
15	Damage from noise	-	X	X		X		X
16	Loss and profit from changes in wetland areas	-	X	X				X
17	Damage from the loss of agricultural areas	-	X	X	X	X		X
18	Replacement costs due to the exploitation of non renewable resources	-	X	X	X	X	X	X
19	Damage from CO ₂ emissions	-		X	X	X	X	
20	Net change in fixed capital (without premises)	+ / -	X	X		X	X	X
21	Change in capital account	+ / -	X	X		X	X	X
	Complementary variables of the second variant of NWI (in appendix 1)							
22	Net new indebtedness	-						
23	Public expenditure on ecological transformation	+						

Further planned complementary variables

Costs of anthropogenically caused or favoured natural disasters	--							
Costs of the loss of species	--							

Note: The plus or minus sign in the column „Value“ indicates the function of the variable regarding its contribution to the enhancement or reduction of national welfare

8. Specification sheets of the indicators

In this chapter you will find a description of the characteristics of each partial variable included in the synoptic outline of chapter 7.

On one hand, this should guarantee, that the procedure chosen in this paper be verifiable, that methodological problems be recognized and that, on the whole, transparency in the composition of the overall index be maintained. On the other hand, the single description cards should contribute to an easier updating and continuation in the writing of the ground structure, particularly as far as the respective, single time series are concerned. Graphs and pictures reproduce the state-of-the-art knowledge now available for each given partial indicator.

The “construction” of the welfare index for Germany will be subjected to experts’ discussions in the next months also internationally. Reaching a consensus, as broad as possible, on the form given to the indicator is equally important; only with this consensus there are chances to be perceived in public environments as a platform for a more intensive discussion on “real” welfare enhancement.

In the following pages all variables included in the National welfare index will be introduced. Graphs with blue or dark bars show relatively reliable data, while the data of graphs with yellow or light bars must be checked and improved.

The “construction” is designed as follows:

- At first the basis of the index is defined with private consumption weighted with an index of income distribution; like in the case of the following variables, the price level of 2000 was taken as reference value.

- Afterwards, the variables expressing aspects of welfare which are not included in private consumption are added to this basis or subtracted from it. Most variables always contain figures which must be added or subtracted; the variables 20, 21 and 22 may have positive or negative values.

The formula for the calculation of the overall welfare index is to be found in chapter 9.

8.1 NWI variables 1 – 21

Variable 1: Index of Income Distribution

Definition:

The Gini index of equivalently weighted household incomes (after tax and with transfer income); the year 2000 was taken as reference (value=100). An “equivalence weighting“ of net household income is chosen in order to take account of the number and age of the persons living in a household in relation with the household income; each person is weighted with a factor corresponding to her or his needs in the household. The total income of the household is divided by the sum of the weighting factors. So, for example, the first adult gets the factor 1.0; other adults get the factor 0.8 (in this way it is possible to take into account that certain goods such as washing machine or household appliances can be used in common); children have weighting factors ranging from 0.6 to 0.9 depending on their age.

Data situation / Data sources

The data used for the Gini index stem from the Sozio-Ökonomischen Panel (SOEP - Socio-economic Panel); the calculation of the Gini indexes for the Federal Republic of Germany is carried out by different institutes and researchers' teams. In this context a problem is represented by the fact that different definitions of income are applied. The Deutsche Institut für Wirtschaftsforschung (DIW – German Institute of Economic Research) calculates a Gini index based on real market income, i.e. on income before tax and without transfer income. Instead, the Zentrum für Umfragen, Methoden und Analysen (ZUMA – Centre for Surveys, Methods and Analyses) in Mannheim bases its time series on net household incomes, thus considering tax and transfer payments. Since SOEP asks about monthly net household income there are other, differing Gini index time series, because different methods are applied in the calculation of yearly net household income on the basis of SOEP values.

The Gini index time series by ZUMA is included in the ZUMA-System Social Indicators and available in the internet under

http://www.gesis.org/Sozialindikatoren/Daten/System_Sozialer_Indikatoren/#download

Information on the DIW calculation is to be found in DIW weekly paper: DIW-Wochenbericht, 72. Jg., N° 10, 9th of March, 2005, p.175 – 179, as well as in other publications.

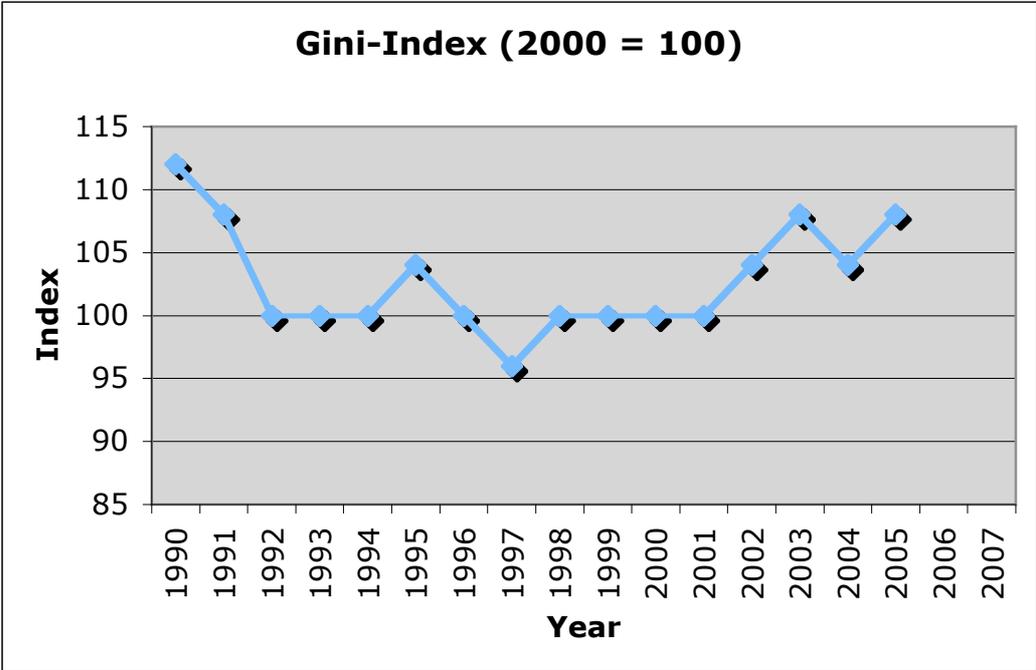
Method of calculation:

The Gini index for the year 2000 was given the value = 100. If income is distributed in more equal parts the change is evaluated as an improvement; a more unequal distribution is evaluated as a worsening and changes are expressed in relation to the index value 100. The lower the value, the “better” the distribution of income.

Methodological problems:

The Gini index of the equivalence weighted household incomes is applied in the present calculation, since this index can be related to private consumption; private consumption, in turn, is referred to the income available in households (after tax and with transfer payments).

– Figure 5 –



Relevance, Interpretation:

Income distribution is shown, because it should be taken as a weighted factor for the welfare index conceived in this project. This decision is based on the reflection of welfare theory, according to which an additional income for a poor household means higher additional welfare than an additional income of the same amount for a rich household (Keyword: Diminishing marginal utility of income).

Progression and goals:

Movements in the direction of a more equal distribution are usually evaluated positively. This statement is not strictly valid for all cases of income distribution; in a very equal distribution there

might be a situation in which, on account of the individually very different marginal utility of income enhancements, a further movement in the direction of equal distribution does not cause any wealth growth. In the present day situation of the Federal Republic of Germany (and not only) one can be sure that such a condition is still very far away.

Field of application of the variable:

A measure for income distribution is included in all country studies of alternative welfare measuring considered in this paper. Some countries, though, work with quintile measures. Because of the bad data situation the ISEW study for the Federal Republic of Germany (1995) used the adjusted wage ratio. Due to the availability of Gini indexes throughout Europe, by now guaranteed by EUROSTAT, this index was chosen here as well.

Variable 2: Weighted private consumption

Definition:

Private consumption in prices of the year 2000, weighted with the Gini index of the equivalence weighted household incomes (for an explanation see variable 1), referred to the year 2000 = 100

Data situation / Data sources

The data stem from the national accounts of the German Federal Statistical Office.

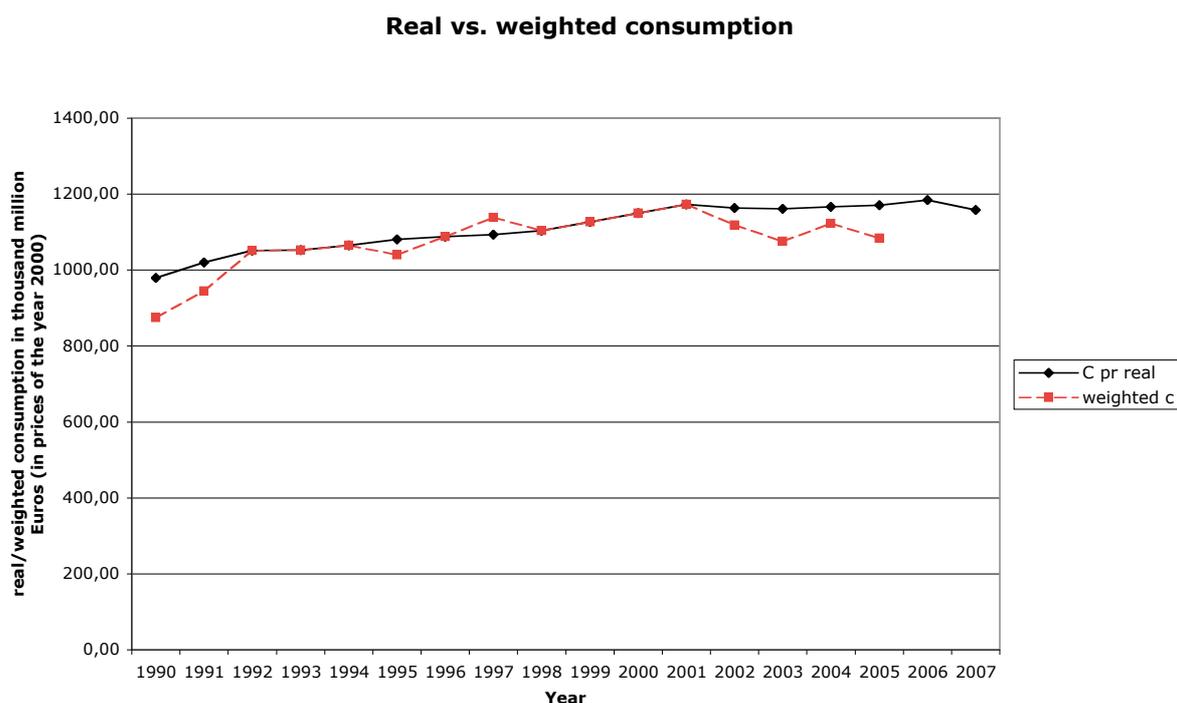
Method of calculation:

The variable “weighted private consumption” is calculated as
 $(\text{private consumption} / \text{variable 1}) * 100$

Methodological problems:

If only one of the two variables takes a positive development there might result an increase even when the positive development of a given variable, in its effects, overcomes the negative development of the other one. In other words: in weighted private consumption, a “more just” income distribution might be, on the whole, outweighed by a strong growth in private consumption.

– Figure 6 –



Relevance, Interpretation:

As one can recognize in the explanation of variable 2, the value of weighted private consumption always lies below real private consumption, when, in the year under consideration, the Gini index shows a more unequal income distribution than in the reference year 2000.

Progression and goals:

It becomes clear that an increase always results when income distribution develops in the direction of equality and real private consumption increases.

Field of application of the variable:

The calculation “private consumption weighted with the index value of income distribution” is made in all case studies based on ISEW or on GPI.

Variable 3: Value of housework

Definition:

The value of household production in prices of the year 2000

Data situation / Data sources

The data about the value of household production stem from the so called household satellite system for the national accounts of the German Federal Statistical Office; back to 1990 the data of the “long sequences” are used; the system is thoroughly explained, also regarding methods of calculation and methodological problems in Schäfer, Dieter (2004): „Unbezahlte Arbeit und Brutto-Inlandsprodukt 1992 und 2001 – Neuberechnung des Haushalts-Satellitensystems“. ⁴⁵ In: *Wirtschaft und Statistik*,⁴⁶ Issue 9, 2004, 960 – 978. See also Statistisches Bundesamt - German Federal Statistical Office (ed.) (2004): *Alltag in Deutschland. Analysen zur Zeitverwendung – Beiträge zur Ergebniskonferenz der Zeitbudgeterhebung 2001/02*⁴⁷ on the 16th and 17th of February 2004 in Wiesbaden. Wiesbaden: German Federal Statistical Office.

Method of calculation:

The data about the value of household production are based, at first, on the determination of the yearly volume of unpaid work for the whole population over 12 years of age. According to the periods of time chosen for the time budget studies of the German Federal Statistical Office (1991/1992 und 2001/2002), these values are derived for the years 1992 and 2001. The monetary estimation of the time devoted to household production is done on the basis of the so called “generalist approach”, i.e. assuming the employment of a domestic worker fully responsible for the various activities that she or he performs; this employment is given a value on the basis of net wages without calculating time off. Insofar, the approach chosen is a prudent one, leading to an estimate in which the real value is rather underestimated than overestimated.

Methodological problems:

In the estimation of the value of household production three different methodological problems arise:

- a) the delimitation of unpaid work or of household production from other activities; here the “third-person criterion” is applied. This means that the occupations to be considered are

⁴⁵ Eng.: Unpaid work and gross domestic product 1992 and 2001 – Recalculation of the household satellite system

⁴⁶ Eng.: Economics and Statistics

⁴⁷ Eng.: Everyday life in Germany. Analyses of time use – Contributions to the results conference of the budget statistics 2001/02

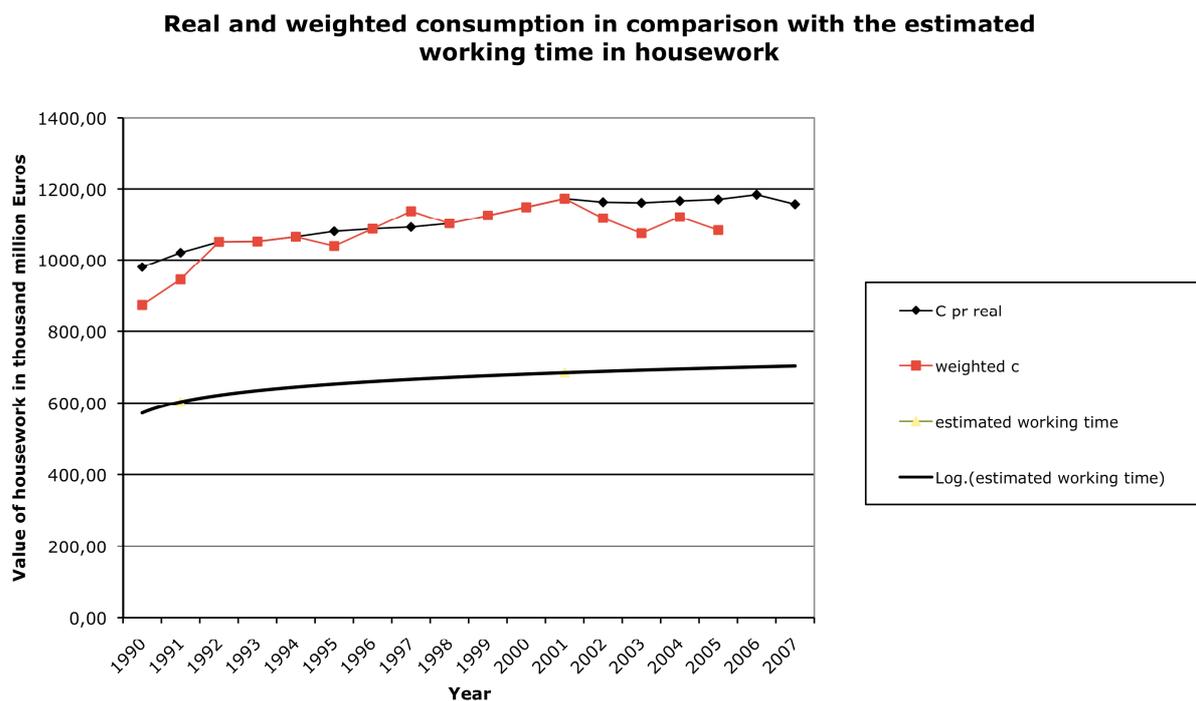
those activities in an economic sense (and therefore unpaid work as far as they do not represent gainful work), which could also be taken over by a third person who would be paid for her or his work in the household domain. Activities in the personal domain not fulfilling the third-person criterion mentioned above (sleeping, eating, personal hygiene) and leisure activities do not belong to this category.

b) Various, theoretically grounded estimation approaches are available and a choice must be made among them: generalist methods, specialist methods, the average wage approach and the opportunity cost approach.

c) At last, hourly wages must be determined for the estimation. Here, in principle, one can choose between a net and a gross wages concept, and in both cases with or without inclusion of time off.

The differences in the result of the calculation depending on the decisions made under paragraphs b) und c) amount to over 100 per cent.

– Figure 7 –



Relevance, Interpretation:

Household production is a part of the economic value creation of a country. The fact that it is not included in GDP is a consequence of a normative decision of the committees which carried on the standardisation of national accounts. Work is only taken into consideration as gainful

work (keyword “formal market economy”).

The ignoring of household production leads to systematic depreciation of the work done in this domain, which is mostly performed by women, in the calculations of the overall economic value creation. This aspect of social welfare is given consideration through the positive inclusion in an alternative indicator, since housework is a part of economic value creation of a country (keyword “care economy”).

In the period of time under consideration exact statistical data about time use are available only for two years (1992 and 2001). The other values of the time series must be estimated with appropriate methods of extrapolation or intrapolation.

Progression and goals:

An increase in household production is evaluated as positive, i.e. as an enhancement of welfare. Like in all production activities there might be a “too much” also here.

At this point, it should only be reminded that the issue of the estimation of possible upper limits for consumption and production, beyond which a positive evaluation of further increase is at least questionable from the point of view of welfare aspects, has to be generally taken into account in the estimation of consumption. More discussion and research are needed on this issue. To this respect, the new welfare index suggested in this paper stays inside the traditional economic domain, since the comparison with the development of gross national income was intended as a framework of reference.

Field of application of the variable:

The value of housework is used in all the ISEW and GPI calculations, too, in the form chosen here.

Variable 4: Value of voluntary work

Definition:

Value of voluntary work in prices of the year 2000

Data situation / Data sources

The data about the value of voluntary work also stem from the so called household satellite system for the national accounts of the German Federal Statistical Office. See also Biesecker, A. (2002): *Bürgerschaftliches Engagement – (k)ein Allheilmittel für Nachhaltigkeit?*⁴⁸ In: Brand, K.-W. (Ed.) (2002): *Politik der Nachhaltigkeit. Voraussetzungen, Probleme, Chancen – eine kritische Diskussion.*⁴⁹ Berlin, S. 131-144.

Method of calculation:

The data are determined with the same method as for the value of household production. In most scientific publications these two variables are summed up in one single quantity from the beginning.

The umbrella term “voluntary work” usually designates voluntary work in the real sense of the phrase (except for households) and informal help for other households (i.e. for examples in the neighbourhood).

Methodological problems:

The methodological problems are again the same as in the case of household production. An estimation following the same principle as in the case of household production definitely leads to an underestimation of the overall value of voluntary work. As a matter of fact, if the estimation of informal help for other households can be made following the principle of household production without any problems, in the case of voluntary work in the real sense of the phrase the specialist approach would be much more suitable. Because of the degree of complexity of the necessary data ascertainment, however, this approach will probably not be followed any longer.

Relevance, Interpretation:

Voluntary work is also a part of the economic value creation of a country. Like in the case of household production, the fact that it is not included in GDP is a consequence of a normative decision of the committees which carried on the standardisation of national accounts. Work is

⁴⁸ Eng.: Civil engagement – a panacea for sustainability or not?

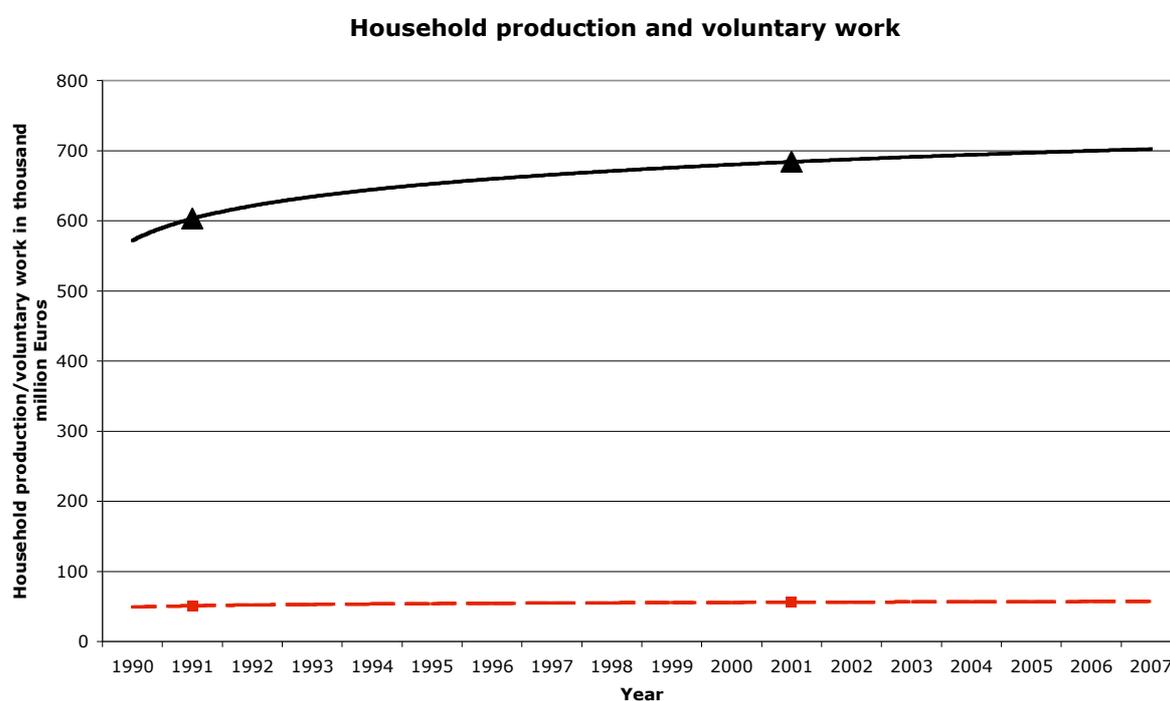
⁴⁹ Eng.: Sustainability policy. Prerequisites, problems, opportunities – a critical discussion.

only taken into consideration as gainful work (keyword “formal market economy”).

The ignoring of voluntary work leads to systematic depreciation of this kind of work in the calculations of the overall economic value creation, and therefore it needs correcting also from the point of view of a social, common-good oriented development of a country.

In the period of time under consideration exact statistical data about time use are available only for two years (1992 and 2001). The other values of the time series must be estimated with extrapolation or intrapolation methods.

– Figure 8 –



[household production: black line; voluntary work: red line]

Progression and goals:

An increase in voluntary work is usually evaluated as positive as a sign of social cohesion. In those cases in which social security services are shifted to the domain of voluntary work, such a development can also indicate a reduction in the field of welfare services.

Field of application of the variable:

Voluntary work is accounted separately only in Taiwan. In more recent ISEW calculations (e.g. in Belgium, Poland, the Netherlands) an evaluation of voluntary work is included in the value of household production. In the first version of the German ISEW voluntary work was not considered.

Variable 5: Public expenditure on health care and education

Definition:

50% of the public expenditure on health care and education is considered as a contribution to social welfare in prices of the year 2000.

This percentage is based on a very approximate estimation of a subdivision between purely defensive and welfare enhancing expenses (see subchapter „Interpretation“ below).

Data situation / Data sources:

The data stem from the statistical year books of the Federal Republic of Germany, table 5.15.1: Expenses on education: public preschools, schools, universities; starting from 2006 table 6.11.1: Expenses on education in public institutions as well as table 9.7.1: health care expenditure according to the paying institutions. Adjustment for prices is carried out with the procedure described with reference to variable 2.

Method of calculation:

The data can be taken from the surveys of the German Federal Statistical Office.

Methodological problems:

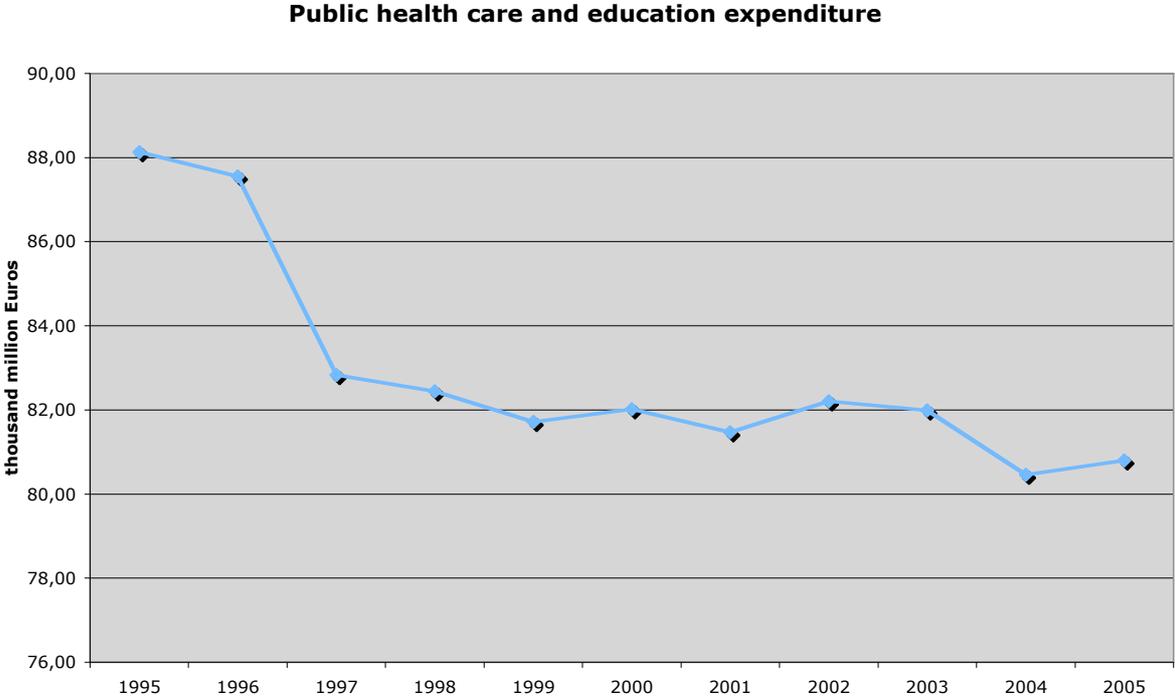
Starting from 2007 the education budget is exposed according to the posts of the International Standard Classification of Education (ISCED); in the statistical year book the same method is applied with reference to the previous years 2004 and 2005. In the statistical year book for 2006 the value is indicated according to the old survey systematic of the year 2004 with the provisional amount of 71.3 thousand million euros. This change in the survey systematic causes a leap from 71.3 to 86.6 thousand million euros. In order to avoid mistakes in the results as a consequence of the change in the systematic, here the values from 2004 onwards are corrected by means of an estimate.

Relevance, Interpretation:

A large amount of public expenses cannot be seen as welfare enhancing since it has defensive nature. They are made in order to avoid a worsening of the situation: for example to maintain security, to avoid environmental damage and so on. In the present welfare index, similarly to the methodology adopted for GPI and ISEW, at least a part of the public expenditure on health care and education is added as welfare enhancing. This happens on the basis of the assumption that a part of this expenditure has to be seen as defensive. The *non* defensive expenses, though, must be

added in the construction of the welfare index, since they are not included in private consumption, which represents the starting point of the indicator.

– Figure 9 –



Progression and goals:

Increases of these expenses are evaluated as positive. The purpose is a system of provision for the population without any discrimination, in which health care and education services are given according to the needs

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations available. Only in the USA, solely 50% of the expenses for “higher education“ are included in the calculations and not 50% of all education expenses. For better comparability we decided to adopt the variant chosen in European studies considering 50% of all public education expenses.

Variable 6: Costs and benefits of consumer durable goods

Definition:

This variable shows the difference between expenses for private durable assets and the monetarised yearly benefit of the stock of private durable assets, in prices of the year 2000. (The initial purchase of consumer durable goods is calculated as a cost; the services in the following years are balanced as benefits).

Data situation / Data sources:

In the Federal Republic of Germany, durable assets are included in statistics only with long time intervals. Therefore, the calculation adopted here tries to combine different sources available in order to achieve a time series as reliable as possible. The following texts were employed: Schäfer, Dieter/Bolleyer, Rita (1993): „Gebrauchsvermögen privater Haushalte“, in: *Wirtschaft und Statistik*,⁵⁰ issue 8. 1993, p. 527et sqq.; Bedau, Klaus Dieter (1999): „Geldvermögen und Vermögenseinkommen privater Haushalte“, in: *DIW Berlin Wochenbericht* 30/1999;⁵¹ Ammermüller, Andreas/Weber, Andrea/Westerheide, Peter (2005): *Die Entwicklung und Verteilung des Vermögens privater Haushalte unter besonderer Berücksichtigung des Produktivvermögens*. Mannheim: ZEW;⁵² Finke, Renate (2007): *Vermögen der privaten Haushalte in Deutschland*.⁵³ Frankfurt: Allianz Dresdner Economic Research.

Method of calculation:

In August 1993 the staff of the German Federal Statistical Office published a special estimation of additions, reductions and amortizations of durable assets in private households from 1970 on. The last time expenses on private durable assets were surveyed was in 1988, in the context of an income and consumption sample. It has been impossible thus far to find or estimate a sufficiently reliable time series for the period under consideration. Nevertheless, since estimated values are available for private durable assets, it must be verified if the desired time series for Germany can be constructed empirically. The method of calculation chosen here is based on the far-reaching assumption that expenses are composed by the amortization of private durables plus the net increase of their value.

⁵⁰ Eng.: „Durable assets in private households“ in: *Economics and Statistics*.

⁵¹ Eng.: „Financial assets and income on investment in private households“ in: *DIW Berlin weekly paper*.

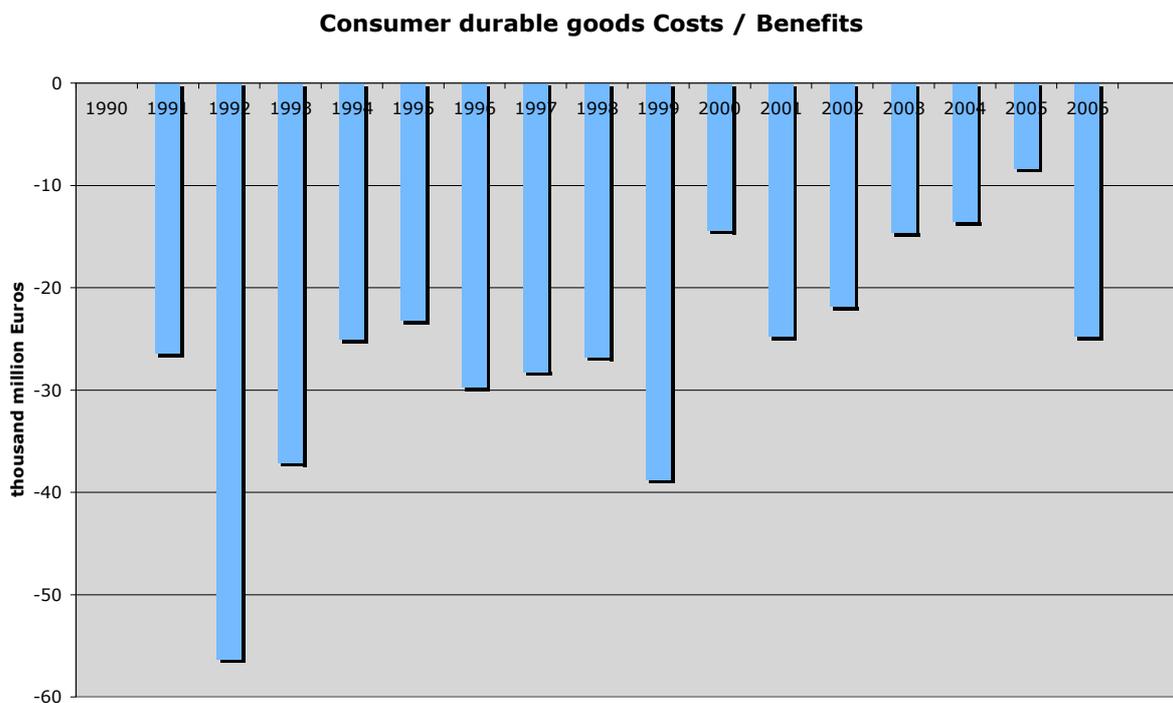
⁵² Eng.: „Development and distribution of the assets of private households with particular regard to productive assets.

⁵³ Eng.: „Assets of private households in Germany.

Methodological problems:

A further difficulty emerges in the definition of the yearly benefits that consumers derive from their equipment of consumer durables. Since there are no regular data about the total value of such assets, as it is the case in the United States of America, it is necessary, as a remedy, to assume an average useful life of these assets and to calculate the benefit value according to this assumption; the US-American value of 10% per year – corresponding to an average useful life of 10 years – is also adopted in this paper, although this value seems to be relatively high. Other European case studies also work with this value in the calculation of ISEW. For washing machines, tumble dryers etc. nowadays one can consider a useful life of 7 to 8 years, for cars the length of the period lies slightly over 10 years at present, but for entertainment electronics and PCs it is much shorter.

– Figure 10 –



Relevance, Interpretation:

This variable should record the divergence between the costs and benefits of an important economic activity with a long-term perspective in the course of time. For this reason, on one hand the expenses on consumer durables are subtracted from weighed private consumption, but on the other hand an estimated value for the yearly benefits deriving from the use of the consumer durables available is added again.

Progression and goals:

The preservation of the substance of purchases and/or the extension of the useful life of already purchased consumer goods are integral parts of a sustainable kind of economy, aiming at economic and social profits together. The longevity of consumer goods is, at the same time, an essential aim from the point of view of the protection of resources.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations available.

Variable 7: Travelling between home and workplace

Definition: This variable is related to the costs of travelling between home and workplace in prices of the year 2000.

Data situation / Data sources:

In the national accounts traffic costs of private household are reported in table 24.9 (consumption expenses of private household inside the country, according to their purpose. The percentage related to travelling between home and workplace on the roads on the whole is reported in the special survey “Environment and road traffic” by the Council of Experts on environmental issues (2005).

Method of calculation:

Traffic expenses are weighed with the percentage of travelling between home and workplace in comparison with road traffic on the whole; this amount is adjusted for price according to the usual procedure. There is no subtraction of tax-deductible income-related expenses, since these data are not available. Nonetheless, as on the other hand no costs for travelling time are considered, for example in terms of opportunity costs for commuters, the amount indicated here is certainly not too high.

Methodological problems:

The definitions of road traffic on the whole and of the percentage absorbed by travelling between home and workplace are based on extrapolations with an uncertain degree of preciseness. Only daily travelling between home and workplace is considered in the calculation and no weekly commuting; moreover travelling between different workplaces in the same working day is not considered. Travelling between home and training centres is not taken into consideration in this context either.

– Figure 11 –



Relevance, Interpretation:

The costs of travelling between home and workplace are subtracted because they are incurred as a condition for a certain work activity to be performed at all; insofar they are a part of private consumption expenses which can not be seen as directly welfare enhancing. The estimation of this cost is paradigmatic both for the commuters' "lost life time" and for the negative ecological consequences of commuting traffic.

Progression and goals:

The goal is a strong reduction in the costs of travelling between home and workplace in the very long term.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations available.

Variable 8: Costs of traffic accidents

Definition:

This variable shows the costs of traffic accidents in prices of the year 2000

Data situation / Data sources:

The Federal Highway Research Institute (BASt) assesses the costs of traffic accidents every year. The data can be taken from the BASt. A time series for the period between 1995 as 2004 can be found in

http://www.bast.de/cln_005/nn_40694/DE/Publikationen/Infos/2007-2006/02-2006.html.

Method of calculation:

The Federal Highway Research Institute provides the following explanations:

During updating of accident cost accounting procedures in 1995, the cost categories “reproduction costs” and “resource failure costs” were supplemented by “human costs”, “market-external costs” and other cost items.

Reproduction costs are incurred in order to reproduce situations similar to those before the accident through medical, legal, administrative and other measures. Resource failure costs record the reductions in economic value creation. They arise when accident victims and damaged equipment, such as vehicles, are temporarily or permanently not able to participate in the production process. This results in a decrease of national product.

Road accidents also result in losses beyond the scope of market value creation. Losses in the value creation of housework and the shadow economy are not reflected in official national product statistics. Human costs are the consequences of personal injury leading indirectly to a loss of resources. For instance, an accident can cause psychological damage to the victims and to their relatives. This can abate a person's capacity for work or even cause occupational invalidity.

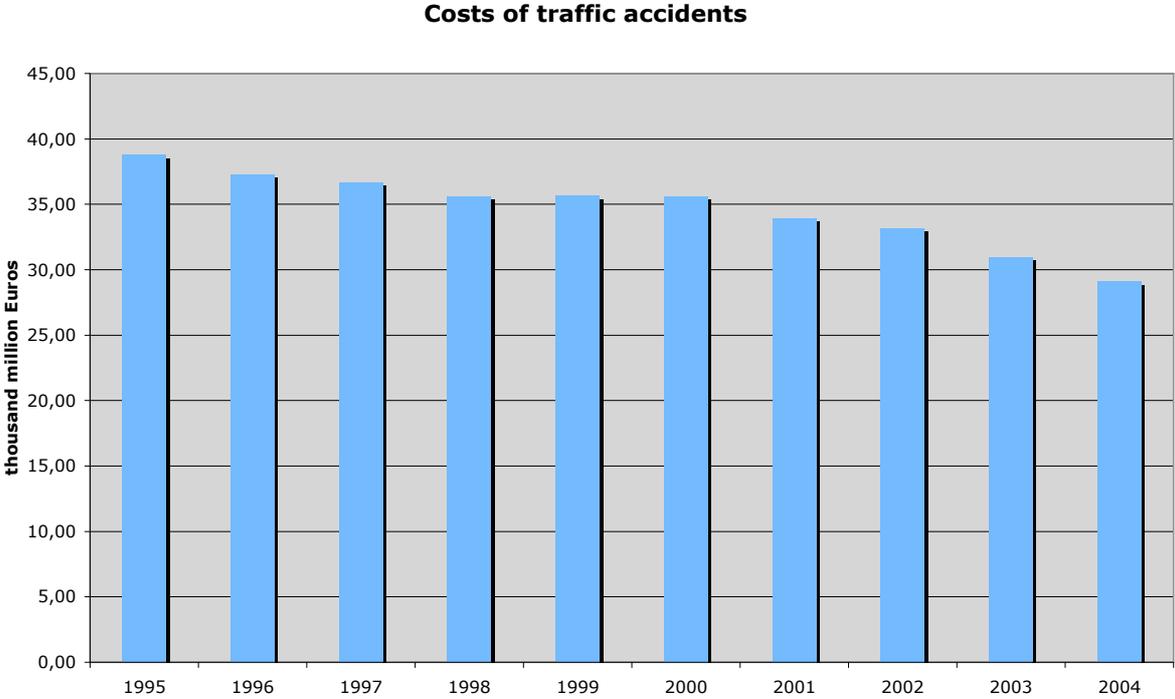
The Federal Highway Research Institute's calculation model can be used to determine accident costs categorized by the severity of bodily injury, that is to say casualties, persons with serious or light injuries.

Methodological problems:

The assessment of accident costs entails some methodological problems in the estimation, which should also be discussed from an ethical viewpoint, especially in the case of accidents with casualties. Since on the other hand for the Federal Republic of Germany a time series provided by an official source is available, out of pragmatic reasons it is advisable to use, experimentally,

the method applied therein and to consider this variable in the context of a realistic welfare development.

– Figure 12 –



Relevance, Interpretation:

The costs of traffic accidents are subtracted because they can never be seen as beneficial in the context of a sustainable social welfare development. Obviously, this is true of all accidents, such as work, sports or home accidents. This first version of the index begins with the undisputed inclusion of traffic accidents; further segments can be added eventually. Out of the same reason one could take into consideration the costs of professional diseases or of diseases caused by the abuse of drug, alcohol or tobacco; about the latter see the remarks on variable 10.

Progression and goals:

The long-term goal would be a strong reduction in traffic accidents and in the social costs they cause.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations available except for the new ISEW calculation for the Netherlands.

Variable 9: Costs of crime

Definition:

The damage caused by crime as recorded in prices of the year 2000.

Data situation / Data sources:

The data stem from the police recorded crime statistics (PKS), elaborated by the Federal Criminal Police Office and exposed in the table number 07.

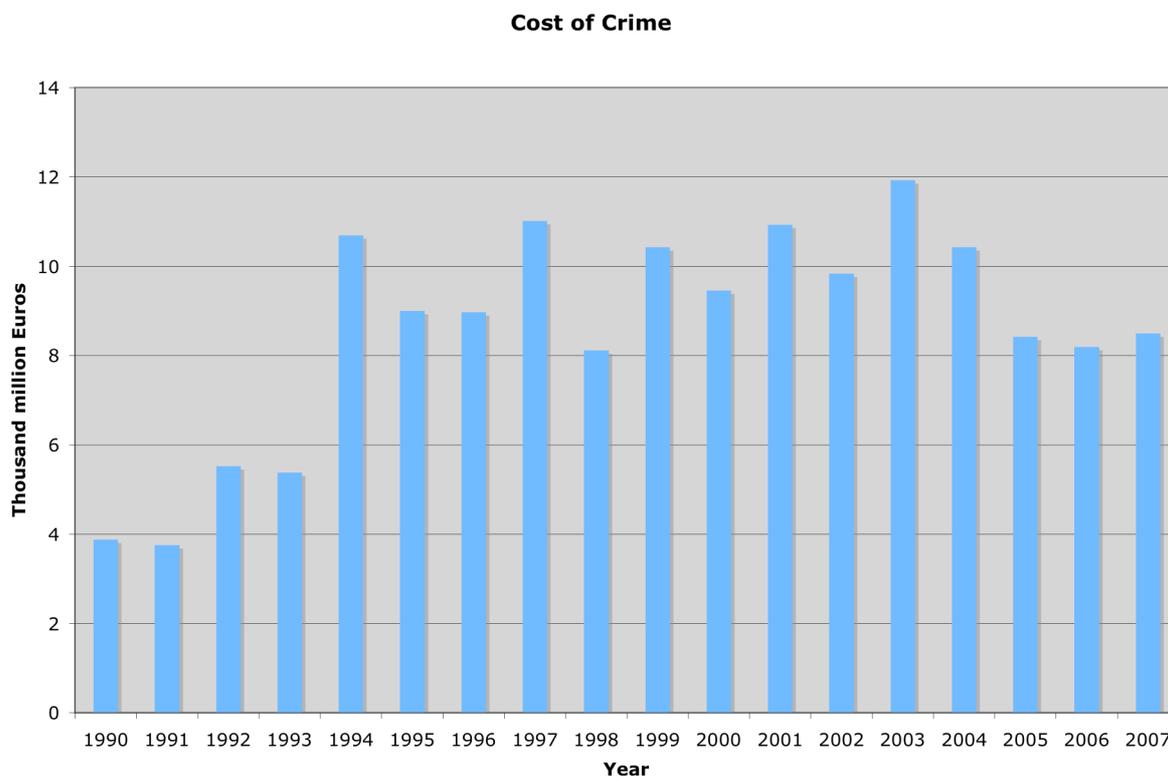
Method of calculation:

Before 1996 no total amount was indicated therein, so that the relevant single items have to be added up. For the year 1997 this method leads to the result of a divergence by little more than 5 per cent from the total amount indicated for the first time in that year.

Methodological problems:

In the case of a criminal offence with undetermined damage, a “symbolic damage” of 1 € is assumed in the calculations.

– Figure 13 –



Relevance, Interpretation:

Damage caused by criminal offences is undoubtedly welfare reducing; therefore it must be subtracted according to the logic of the alternative index.

Progression and goals:

The aim must be a sustainable reduction of the damage caused by criminal offences.

Field of application of the variable:

Neither in ISEW nor in GPI case studies has this variable been recorded thus far.

Variable 10: Costs of alcohol and drug abuse

Definition:

All costs caused by the deleterious abuse of addictive substances should be possibly recorded here. The Classification of Diseases can occur according to the standards of the International Classification of Diseases (ICD-10); see Deutsches Institut für Medizinische Dokumentation und Information (Ed.) (2003). In the present version of NWI alcohol and drug abuse are taken into account; the abuse of medication and tobacco consumption could be included in a later stage of elaboration.

Data situation / Data sources:

There is no regularly published time series about this variable (yet), but there is a series of studies about single consequential costs and about the quantity of alcohol consumed in the Federal Republic of Germany. The most exhaustive and detailed study undertaken thus far was carried out by Bergmann and Horch (2002): Bergmann, Eckardt/Horch, Kerstin (2002): *Kosten alkoholassoziierter Krankheiten*.⁵⁴ Berlin: Robert Koch Institut. A series of cost estimates, for example from the clinical environment, does not allow a clear distinction between the consequential costs of drug abuse and those of alcohol and medication abuse (see Pfeiffer-Gerschel, Tim/Kipke, Ingo et al. (2009)). A systematic analysis of the consequential costs linked to drug abuse in Germany is not available yet.

Method of calculation:

The estimation by Bergmann/Horch (2002) for the year 1995 suggested undiscounted total costs amounting to 20.1 thousand million €. Simon/Spegel (2002) estimate the costs of drug abuse for the year 1999 at, at least, thousand million 602.5 €. In Germany, solely disease costs for psychic and behavioural disturbances due to psychotropic substances (ICD-10 classification F10-F19) were estimated at 2.7 thousand million € for the year 2004. These estimations are adopted here and adjusted to the price level of the year 2000. Since a time series is not possible (yet), this variable is included as a constant “noted item”.

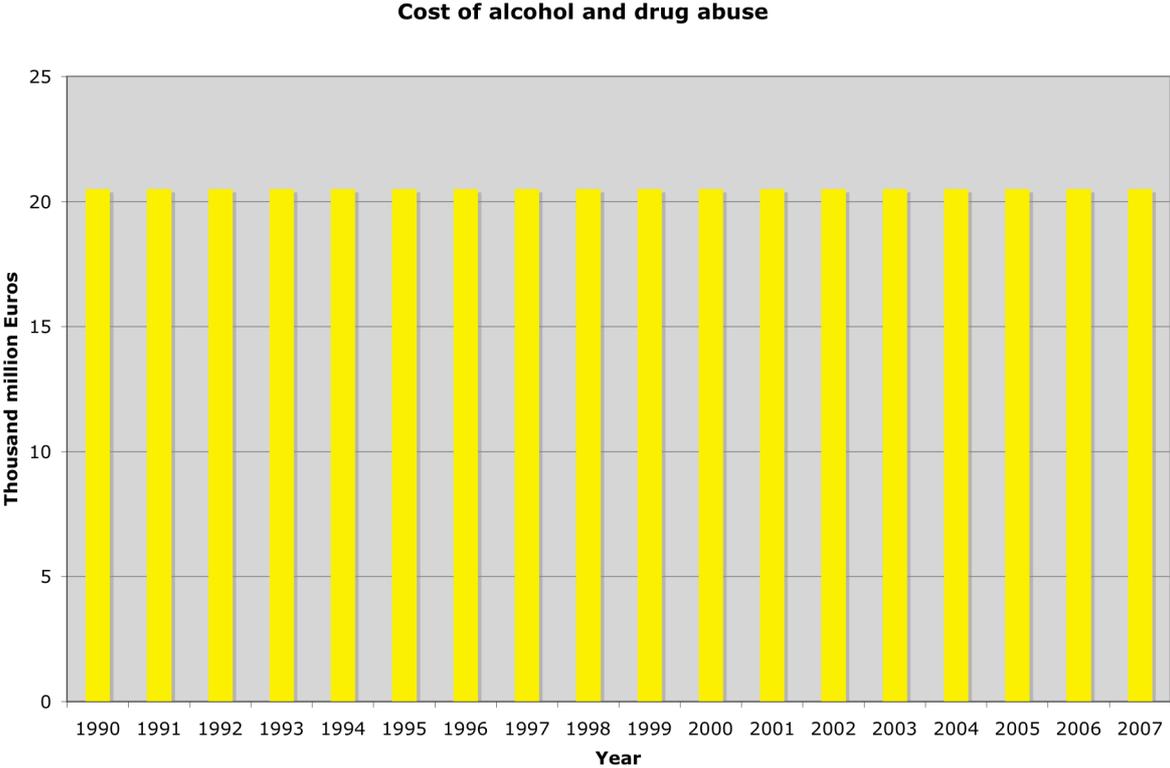
Methodological problems:

The field of fluctuations in the costs of diseases caused by alcohol abuse per year lies between 5 thousand million € and 40 thousand million €; therefore the most exhaustive calculation for 1995 ever done and adopted here lies more or less in the middle of the interval. A new study ought to

⁵⁴ Eng.: The costs of alcohol-related diseases.

perform the task of correlating the development of these costs with the quantity of alcohol consumed in the Federal Republic of Germany or with other relevant time series. In this context it would be necessary to discuss the current estimates for premature mortality once more and in a differentiated way.

– Figure 14 –



Relevance, Interpretation:

The social costs caused by the abuse of addictive substances directly reduce the welfare of the whole society (in their terminology experts use the drastic phrase “suicide by instalments”). Therefore it is justified to subtract these costs in an alternative welfare index. Nevertheless, the subject of alcohol and medication abuse as well as of drug abuse has been seldom dealt with in the context of the political debate on sustainable development thus far. Since in the German Federal government’s progress report other health problems were taken into consideration, for example overweight, considering this variable does not seem inappropriate from a systematic viewpoint. This variable is a first step towards a more systematic recording of the problem field of addictions, which, in future, may also include tobacco consumption and other forms of addiction, not related with the intake of substances, such as gambling addiction or internet addiction, which also lead to remarkable consequential costs in terms of therapy, as well as to the

loss of working time and to other direct economic external effects.

Progression and goals:

On one hand, the purpose is minimising the costs of alcohol-related diseases and of other forms of addiction-related diseases. On the other hand, political information about this partial variable also aims at reducing the destructive long-term consequences of addictive substances as such.

Field of application of the variable:

Neither in ISEW nor in GPI calculation has this variable been used thus far.

Variable 11: Compensatory social expenses due to environmental impact

Definition:

This variable includes private and public expenses on environmental protection.

Data situation / Data sources:

German Federal Statistical Office, vol. 19, series 6: Umweltökonomische Gesamtrechnungen – Ausgaben für Umweltschutz,⁵⁵ issue 2007.

Method of calculation:

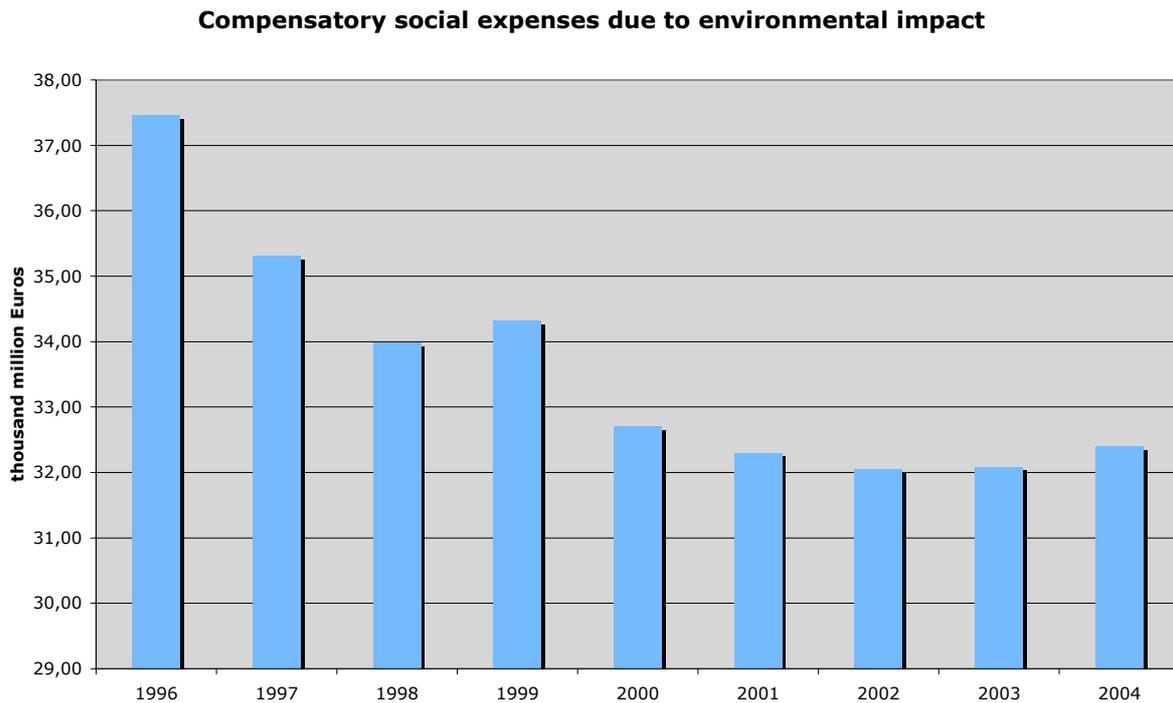
Starting from the calculation system for expenses on environmental protection developed by the European Communities (SERIEE-EPEA), the German Federal Statistical Office developed a more comprehensive reporting of environment-related monetary quantities for the years from 1995 to 2000, including, besides information about the production of environmental protection services, also information about the aspects of use and financing (see Lauber, Ursula 2005).

Methodological problems:

The definition of expenses on environmental protection entails methodological problems of a correct delimitation and reporting of the relevant expenses.

⁵⁵ Eng.: Environmental economic accounts, expenses on environmental protection.

– Figure 15 –



Relevance, Interpretation:

Expenses on environmental protection are subtracted, since they should compensate the negative external effects of economic as well as other human activities. This interpretation is plausible as long as there is no improvement in central indicators of the state of the environment (in the fields of material accumulation processes, greenhouse gases, the loss of biodiversity and the overexploitation of resources).

Progression and goals:

If human activities of economic or other nature were organised in such a way as to cause no negative external effects on the environment, then no repairing or avoidance costs would arise in the form of expenses on environmental protection. Repairing and avoidance costs should arise to the extent to which already existing environmental damage has to be eliminated or its occurrence has to be avoided. The amount of compensatory expenses should fall to the same extent to which environmental damage should be avoided or reduced.

Field of application of the variable:

Up to now, this variable has been used only in the Taiwanese ecological national product.

Introductory remarks to variables 12 to 19: environmental damage and long-term damage

Like in all other case studies about GPI or ISEW, also in the Federal Republic of Germany the costs of environmental damage and long-term damage are difficult to estimate.⁵⁶ Three problem fields are particularly important:

- There is no certain theoretical basis for selecting the kinds of damage and the ecological long-term consequences of economic activities which should be considered in the index and those which should not. The selection criterion used here is extremely simple: only those kinds of damage and those costs for which there can be no doubt that, in future, they would lead to higher costs or to a reduction in welfare, are taken into consideration.
- Often there is no certain method for the monetary estimation of damage. How can a worse quality of water or the inferior ecological and social value of a certain local recreation area be put into a balance sheet with a valuation in money at all? In the case of some kinds of costs there are well developed and recognized calculation methods; the literature in this special field has grown very strongly in the last ten years, and in the meantime it is even possible to refer to a kind of consensus in the form of a “methodological convention” about some single issues (German Federal Environment Agency 2007). Still: often only indirect methods such as the analysis of the willingness to pay are available. They are difficult to apply and provide a very vague idea only. In no case are there time series stemming from data surveys or empiric studies to be used directly.
- With regards to some problems the data situation is still so bad that it is just possible to vaguely indicate the scope of the costs to be considered. Nonetheless, in the Federal Republic of Germany the availability of environmental data has largely improved in the last ten years as was stated above. From the Fifties to the Eighties the lacking availability of data caused such a serious problem that it could often be compensated only through relatively uncertain assumptions.

⁵⁶ As a review of the related statistical problems see Dorow, Frank (1991): „Probleme der monetären Bewertung in einer Umweltökonomischen Gesamtrechnung“ (eng.: Problems of monetary estimation in environmental economic accounts) , in: Hölder, Egon u.a.: Wege zu einer Umweltökonomischen Gesamtrechnung (eng.: Ways towards environmental economic accounting. Stuttgart, S. 34 – 45.

Therefore, all values expressed in figures relatively to the following variables (12 to 19) may be put into doubt out of different reasons. The figures pretend a degree of preciseness in calculation which can not be achieved. In order to make the problem a little more tolerable, at least, some assumptions and methods of calculation were chosen which, with some degree of certainty, give “conservative” results. Accordingly, the *lower limits* of costs are usually indicated. This may lead to the fact that the actual long-term and ecological costs are underestimated. But it is hardly possible to dispute the fact that these costs will, *at least*, reach the indicated level.

In the ISEW study for Germany from 1995 (Diefenbacher 1995) the time series of ecological costs (i.e. water and air pollution, noise as well as the loss of wetlands and of agricultural areas) were derived from cost estimates done by Lutz Wicke for the year 1985 (Wicke 1986, chapter 1 – 6). In 1995 the cost estimate for air pollution was linked to an index combining the relative change in the emissions of NO_x, SO₂, CO and dust in an overall index. In this way, the problem of long-range transported air pollutants is neglected at first; damages caused abroad by pollutants emitted in Germany should otherwise be balanced against damages caused in Germany by pollutants emitted abroad. The loss of wetlands and the loss of agricultural areas were summed up in one time series that should also consider the erosion and the change in the quality of the soil.

By now, one can resort to a plethora of new surveys and estimations stemming from the Environmental economic accounts of the German Federal Statistical Office. Nonetheless, the data available therein need verifying and improving. It is also necessary to find ways to achieve reliable results in a widened reporting system at regular intervals.

Variable 12: Damage from water pollution

Definition:

Ideally all costs, both repairing and avoidance costs, necessary to assure a satisfactory quality of water should be included here. These costs include among others:

- pollution of rivers and lakes:
 - costs of drinking water treatment;
 - diminishing spare time and time for relaxing as well as
 - diminishing aesthetic utility for the residents;
- pollution of the seas:
 - tanker accidents;
 - degradation of the fauna through oil pollution and garbage in the seas;
 - costs of beach cleaning as well as
 - damage to tourism;
- impact on ground water:
 - nitrate impact as well as
 - chlorinated hydrocarbons and other poisonous chemical compounds.

Data situation / Data sources:

An overall index of water pollution or time series for cost development by single components are not available, either for the Federal Republic of Germany or for other countries. Temporarily we are using a transfer of cost estimates from Belgium and the Netherlands (following Bleys 2006 und 2007), adjusted according to the population numbers. The assumptions related to cost development in the field of water pollution need improving in a more advanced working phase of the national welfare index; the corresponding cost item is a kind of “aide mémoire” just to avoid that this field might be ignored because of the lacking of reliable data.

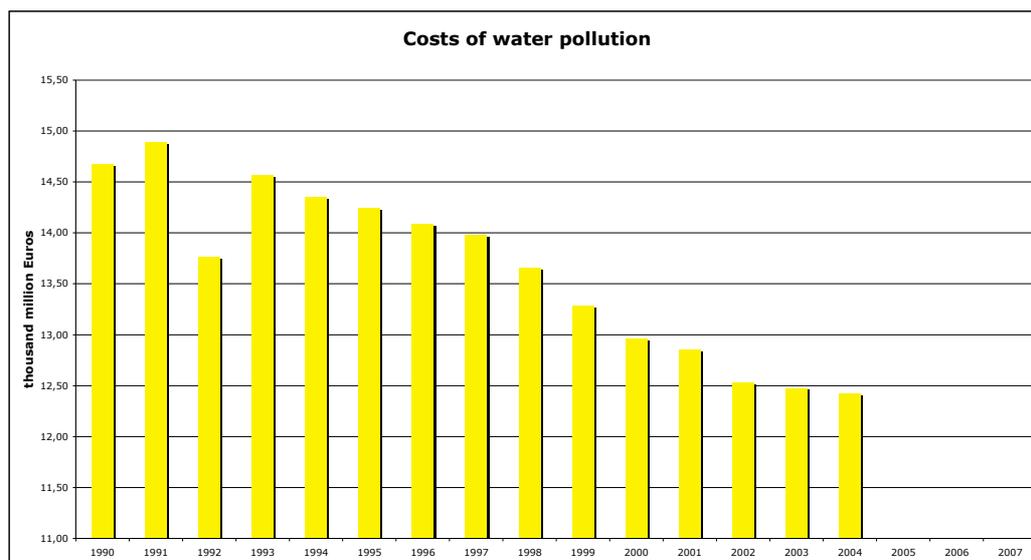
Method of calculation:

The quality of water is reproduced as an index made up of various quality rating indicators; cost estimates for water pollution is based, in turn, on assumptions about the costs of single components (drinking water treatment etc.)

Methodological problems:

The method of calculation can be disputed out of many reasons; it only provides a first approach to a general orientation.

– Figure 16 –



Relevance, Interpretation:

The pollution of water as an environmental resource is a welfare reducing process. Therefore a welfare index should include all costs incurred in order to eliminate this impact on the environment, as well as all costs arising just because no repairing action is carried out for this kind of environmental damage. Avoidance costs for the related environmental damage should be included, too.

Progression and goals:

The goal is a strong reduction of water pollution, at least in accordance with the objectives of the Water Framework Directive of the EU and of the working group on water of the Federal States (LAWA).⁵⁷

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations available.

⁵⁷ The LAWA is the German Working Group on water issues of the Federal States and the Federal Government represented by the Federal Environment Ministry.

Variable 13: Damage from soil pollution

Definition:

This variable should include the damage leading to the loss of biodiversity as a consequence of soil degradation and of changes in land use as well as the corresponding costs.

Data situation / Data sources:

Also for this variable there are neither reliable estimations nor time series, and also in this case we only include a “reminder item” in our calculation.

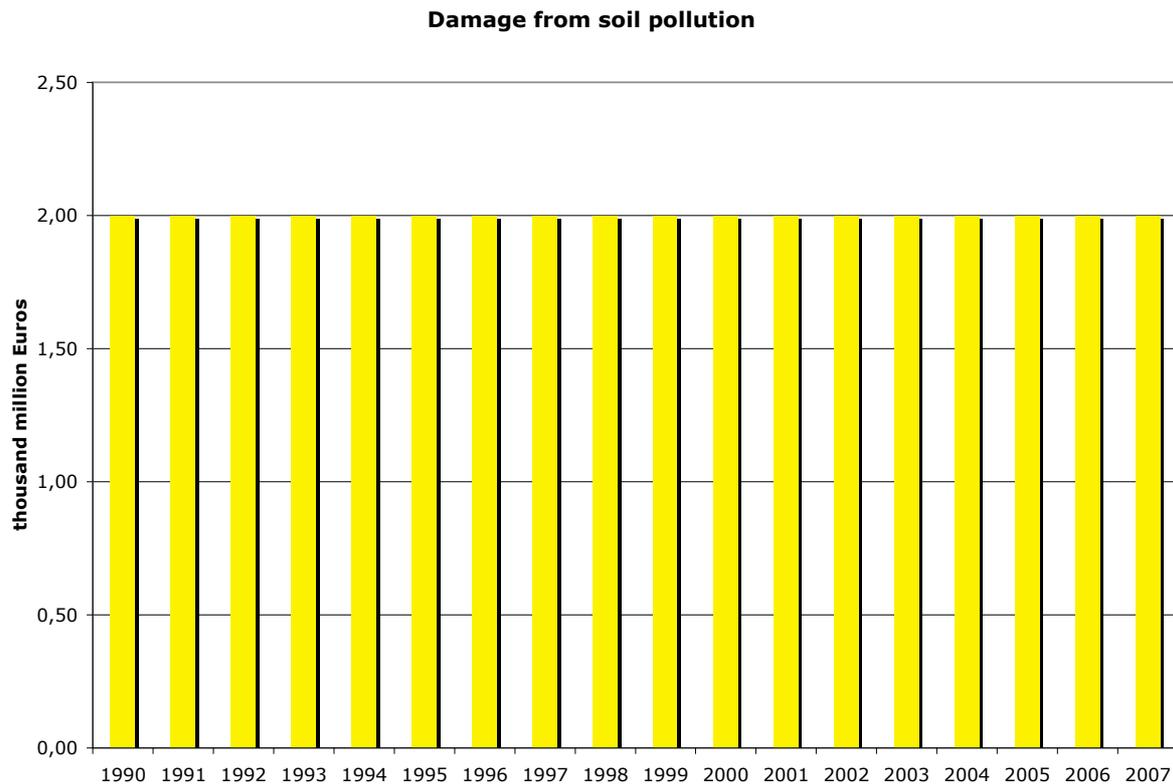
Method of calculation:

On the basis of a damage repairing approach, the interim report on the study “The economics of ecosystems and biodiversity“ (2008) assumes worldwide costs of at least 50 thousand million euros per year in the first years of the century only for terrestrial ecosystems; maritime ecosystems are not considered. If these losses were calculated for Germany according to Germany’s quota of the world national product of about 4 per cent, the result would be an amount of 2 thousand million euros. In the national welfare index this sum is temporarily subtracted as a constant, until better data will be available.

Methodological problems:

As it was mentioned above, this is a “reminder item”; the method of calculation as such is highly disputable and very probably, the values indicated are too low. It is necessary to include more economic damage assessments (alternatively to the biodiversity approach, also regarding the degradation of soil ecosystems and of ground water currents as a consequence of the achievement of critical deposition levels).

–Figure 17 –



Relevance, Interpretation:

The pollution of the soil as an environmental medium is a welfare reducing process. Therefore a welfare index should include all costs incurred in order to eliminate this impact on the environment, as well as all costs arising just because no repairing action is carried out for this kind of environmental damage. Avoidance costs for environmental damage of this kind should be included, too.

Progression and goals:

The goal is a strong reduction of the impact on soils. According to the type of soil and to the use of its areas, a reduction of the impact below levels of critical loads can be taken as an objective.

Field of application of the variable:

This variable has not been used in alternative welfare indicators thus far.

Variable 14: Damage from air pollution

Definition:

The cost item for damage from air pollution should contain the estimates of health care costs, material damage to buildings etc. and damage to vegetation including forest degradation and crop failures.

Data situation / Data sources:

For this variable there are no empirically verified time series either.

The index used in the ISEW study for Germany made in 1995 took as a parameter the emissions of NO_x, SO₂, CO and dust. The contraction in the index value was mainly due to the strong reduction of SO₂-emissions on the territory of the former Democratic Republic of Germany since 1987. Cost estimates were developed above all by means of a willingness-to-pay analysis. This calculation makes reference to studies presenting cost estimates of this kind, and particularly to the so called methodological convention of the German Federal Environment Agency (Federal Environment Agency – ed.- 2007: *Ökonomische Bewertung von Umweltschäden – Methodenkonvention zur Schätzung externer Kosten*.⁵⁸ Dessau). Other studies with similar items, for example Tellus (1991) and Pace (1990) adopted figures lying over or under the values of the methodological convention by a factor of up to 3. For reasons of uniformity, the values of the methodological convention were always applied here; for carbon monoxide we resorted to Tellus' value (1991), since the methodological convention did not provide any such value; the value adopted was then adjusted to the price level of 2007.

Method of calculation:

Based on other European ISEW calculation the following pollutants are considered and associated to specific damage costs:

<u>Pollutant</u>	<u>Damage cost in Euro/Ton</u>
Sulphur dioxide	5.200
Nitric oxide	3.600
Respirable dust	13.000
NMVOC	1.200
Carbon monoxide	1.170

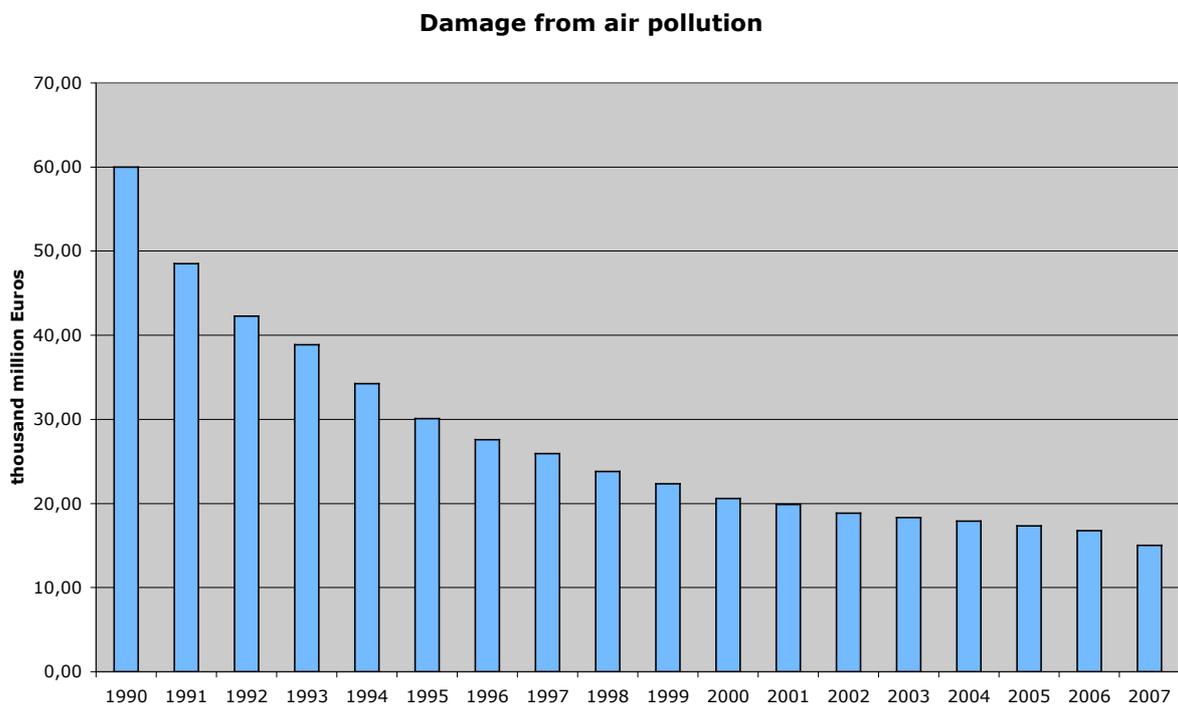
⁵⁸ Eng.: Economic evaluation of environmental damage - method convention for the estimation of external costs.

The emissions of the respective pollutants were multiplied by the average external damage cost; damage costs were adjusted for inflation at the price level of the respective year.

Methodological problems:

With this method only one estimated value for average external damage costs is available for the whole time series. The fact that this value might also develop differently from the average price level is not taken into consideration.

– Figure 18 –



Relevance, Interpretation:

Social costs resulting from air pollution are not seen as sustainable in the sense of a positive contribution to ecological, health care and economic development. The arising damage is therefore evaluated negatively. As a consequence, a welfare index should include all costs incurred in order to eliminate this impact on the environment, as well as all costs arising just because no repairing action is carried out for this kind of environmental damage. Avoidance costs for environmental damage of this kind should be included, too.

Progression and goals:

The goal is keeping air pollution as low as possible; a strong reduction in the emission values would also change the average external damage cost per ton of pollutant.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations.

Variable 15: Damage from noise

Definition:

The cost estimate for noise damage should include depreciations of buildings and estate through road noise, noise abatement measures such as noise barriers, reduced labour productivity due to high noise levels in the workplace, health care costs and, not least, payment of compensation on account of noise damage in the workplace.

Data situation / Data sources:

There is no overall cost estimate for noise in the Federal Republic of Germany. A study on the practical application of the methodological convention (Maibach, Markus/Sieber, Niklas et al. 2007, 153) contains a cost estimate in euros per exposed person and year, differentiated by noise level and mode of transport; the authors graded the quality of the estimate as “mediocre”.

<u>Noise</u>	<u>Road</u>	<u>Railway</u>	<u>Air traffic</u>
> 45	30	0	30
> 50	90	30	90
> 55	140	90	140
> 60	200	140	200
> 65	260	200	260
> 70	370	260	370
> 75	460	370	460

An estimate will be possible only when the quotas of the noise exposed population in the respective categories are known.

Alternatively, a Belgian study (Transport and Mobility Leuven 2002) estimated the costs of road noise at 0.03 eurocent per kilometre driven by a motor vehicle. This figure is referred only to road traffic but it allows building a time series. For the first years of this decade, the values of this time series amount to about 2 thousand million euros; nonetheless, this value seems to be too low as an estimate of the overall noise exposure; the estimates of the ISEW study for Germany amounted to about 21 thousand million euros (Diefenbacher 1995) for the years 1990 and 1991. Also for this time series, at present it only seems possible to include a “reminder item” in the calculation on the National Welfare Index, which we estimate as twice as much as the value calculated in the Belgian study.

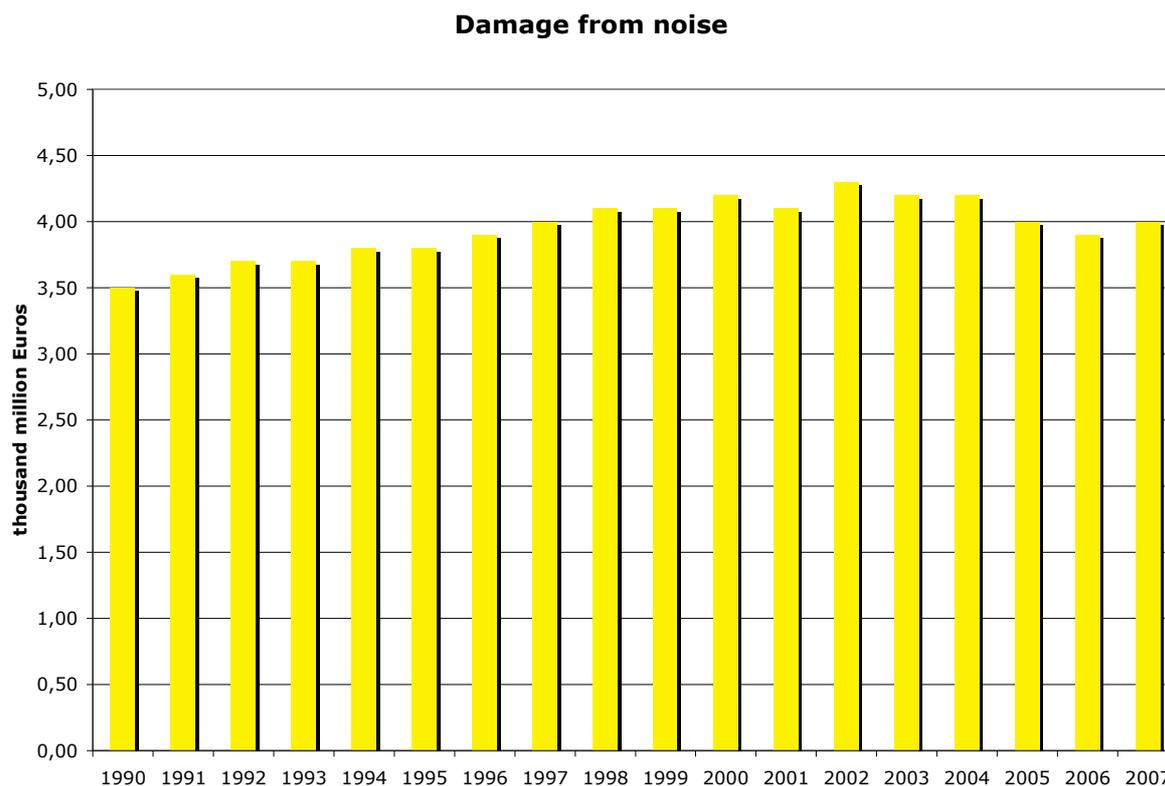
Method of calculation:

Depending on the choice between the two variants.

Methodological problems:

Depending on the choice between the two variants.

– Figure 19 –



Relevance, Interpretation:

The occurrence of noise exposure is a welfare reducing process; for this reason a welfare index should include all costs incurred in order to eliminate this impact on the environment, as well as all costs arising just because no repairing action is carried out for this kind of environmental damage. Avoidance costs for environmental damage of this kind should be included, too.

Progression and goals:

According to recent studies, noise exposure (middle noise level) should not overcome 50 dB(A) during the day and 45 dB(A) at night.

Field of application of the variable:

This variable is used in all the ISEW calculations, sometimes with very approximate estimates.

Variable 16: Loss and profit from changes in wetland areas

Definition:

Also for this variable an assessment of average external damage costs is needed; in the case of the loss of wetlands they are basically related to species richness and climate.

This variable can also be given a positive evaluation in the sense of welfare enhancement in the case of an increase in wetland areas.

Data situation / Data sources:

At present, Germany has only relatively few protected wetlands in the sense of the Ramsar Convention; 33 Ramsar areas are included for a total surface of 843,109 hectares, with most of the areas located on the Wadden Sea coasts. During the last few years the surface of the protected wetlands slightly increased from 6,712 km² to 6,850 km²; these indications are not consistent with the lists of areas of the Ramsar Convention. Anyway, it is certain that the increase in the protected surface does not mean that new wetlands were created, but only that already existing and endangered areas were now put under protection. It has not been possible thus far to assess the total surface of the wetlands destroyed from the beginning of the 20th century onwards.

There is no value estimate for one hectare of wetland either. If one hectare were evaluated ten times as much as a hectare of agricultural land and the Belgian and Dutch ISEW study were taken as an average value for all European agricultural areas, the result would be about 100,000 € per hectare.

Method of calculation:

The same two variants which will be discussed in detail in the context of variable 19 are applied in this case as well: an amount related to damage costs (a) per year and a cumulative amount related to damage costs from 1910 onwards according to the “savings banks principle”. The Genuine Savings Index adopts variant (a), ISEW and GPI adopt variant (b).

According to variant (a) there has been a positive welfare enhancement since 1993; according to variant (b) this enhancement would certainly diminish the reduction recorded from 1910 onwards.

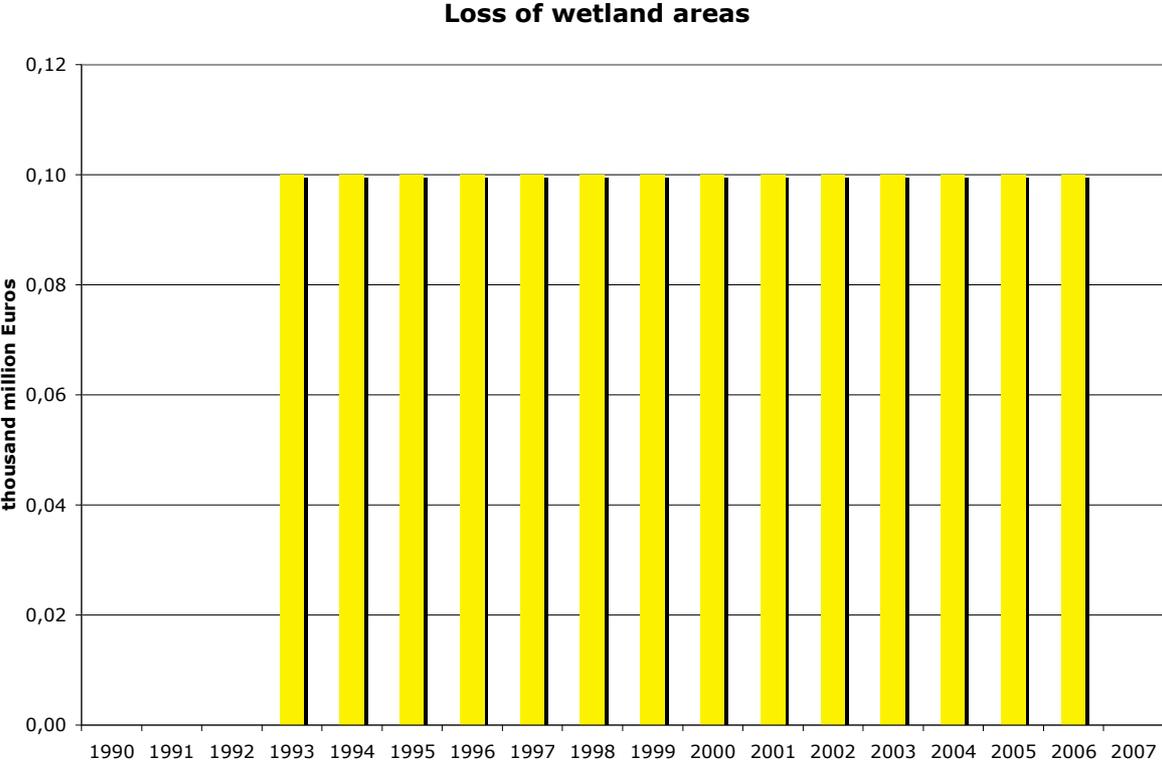
Also in this case one must decide which variant should be preferred in the calculations. We decided in favour of variant (a) in order to build a method of calculation for the indicator following as much as possible a consistent principle. Therefore this variable is an amount to be added, expressing an overall welfare enhancement.

In this case the area expansion of the protected wetlands is multiplied by the value of one hectare and results in about 1.4 thousand million euros. As this value increase has taken place in over 14 years, a value increase of 100 million euros is added for each year between 1993 and 2006.

Methodological problems:

The value assessment has to be corroborated or corrected by means of more data research.

– Figure 20 –



Relevance, Interpretation:

The loss of wetlands is a welfare reducing process. Therefore a welfare index should include all costs incurred in order to eliminate this impact on the environment, as well as all costs arising just because no repairing action is carried out for this kind of environmental damage. Vice versa, a welfare enhancement takes place when new wetlands come into being or are created.

Progression and goals:

The goal is the preservation of the still existing wetlands and wherever possible the endorsement of renaturation measures leading to an expansion of wetland areas.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations, but in European ISEW-studies it is usually put together with the variable “loss of agricultural areas”.

Variable 17: Damage from the loss of agricultural areas

Definition:

This variable should consider the average external damage costs arising on account of the loss of agricultural areas.

Data situation / Data sources:

In the Federal Republic of Germany the loss of agricultural areas can be assessed precisely every four years on the basis of the General Land Use Survey.⁵⁹

The value of agricultural land assumed in the Belgian and Dutch ISEW study as an average value for all European agricultural areas amounts to about 10,000 € per hectare in prices of the year 2006. This price was adopted in the present study as well.

Method of calculation:

The same two variants which will be discussed in detail in the context of variable 19 are applied in this case as well: an amount related to damage costs (a) per year and a cumulative amount related to damage costs from 1910 onwards according to the “savings banks principle”. The Genuine Savings Index adopts variant (a), ISEW and GPI adopt variant (b).

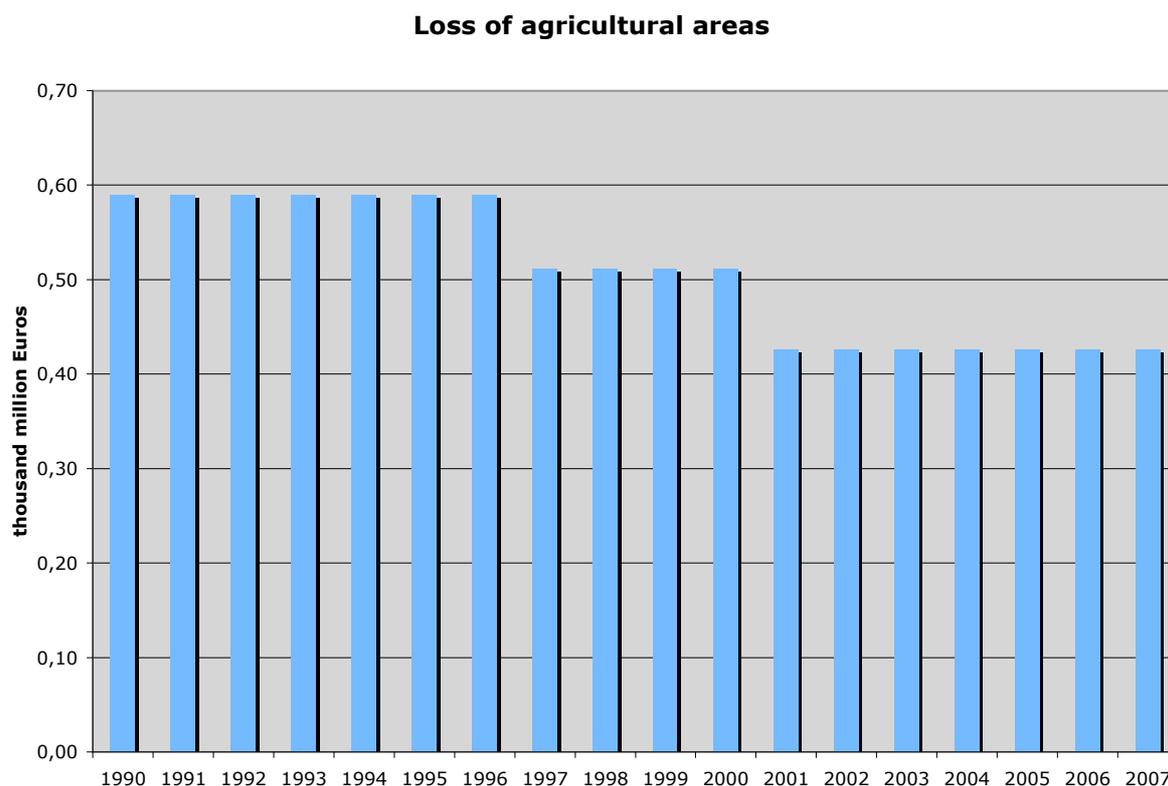
Also in this case one must decide which variant should be preferred in the calculations and we opted for variant (a) like in the previous case on account of the reasons mentioned above.

Methodological problems:

This variable is also paradigmatic for costs arising through a change in land use. Ideally every single change in land use should be evaluated, for example by means of the biotope evaluation method from Hesse, allowing to estimate the costs of corresponding compensatory measures. Moreover, in every single case it would be necessary to determine which kind of change in land use took place in the areas under consideration. The value adopted here is assumed as an average value for the net amount of utility loss.

⁵⁹ Germ.: Flächennutzungshaupterhebung

– Figure 21 –



Relevance, Interpretation:

The loss of agricultural areas is seen as a welfare reducing process, since the value creation share of the primary sector experiences a further contraction. In this context, nature can be seen at the same time as productive capital. Reallocations leading to further urban sprawl and housing development have often taken place causing an ecological loss.

The discussion about the significance of this partial variable should be carried on, since intensively used agricultural areas, in particular, can be linked with high ecological consequential costs, in turn.

Progression and goals:

The goal consists, at least, in the preservation of agricultural areas.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations.

Variable 18: Replacement costs due to the exploitation of non renewable resources

Definition:

This variable reflects the costs which the future generations will have to incur in order to build an energy production capacity on the basis of renewable resources, aimed at maintaining those goods and services that are now being produced through the present day consumption of energy from non renewable resources. (“Replacement costs”). This variable tries to establish a connection with one of the “management rules” of sustainable development, according to which non renewable resources may be used in all cases when a replacement capacity is created at the same time. The latter should allow future production through renewable resources of all those goods and services which were previously produced with the consumed amount of non renewable resources.

Data situation / Data sources:

The consumption of energy produced from non renewable resources can be assessed on the basis of the data bank of the German Federal Environment Agency or of UNEP’s Geo-Data-Portal. They include the consumption of energy produced from coal, petroleum, natural gas and nuclear energy. In order to adopt the cost items of ISEW-studies it is necessary to transform these energy consumption data into “barrel of oil equivalents“ (BOE).

In the ISEW-studies available the replacement costs for the year 1995 are estimated at 84 €/BOE (Barrels of Oil Equivalent). A linear increase rate of replacement costs of 3 % p.a. was assumed for the years before and after that date. Although in the course of time non renewable energy sources become scarcer and scarcer due to continuous consumption, the replacement costs per BOE can go down in the long term on account of new technological developments and growing economies of scale in alternative techniques for the use of renewable energy. For a more precise determination of a time series of replacement costs per BOE at national level more research is needed. (See below)

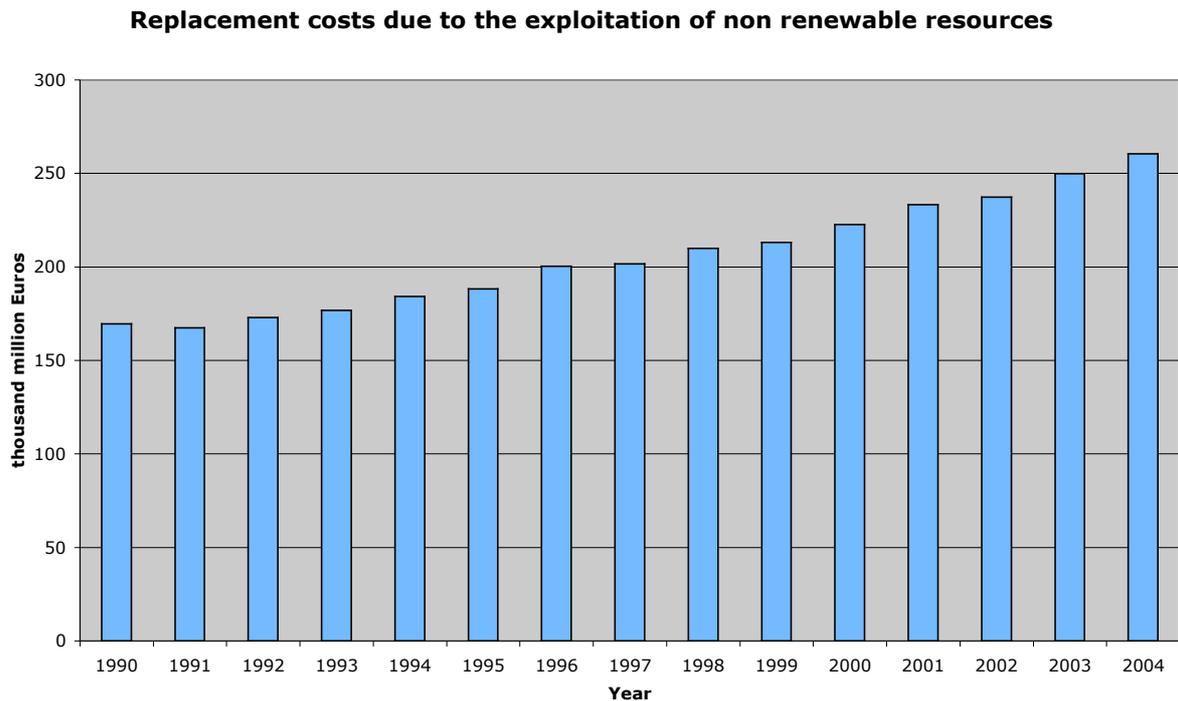
Method of calculation:

The total consumption of energy produced from non renewable resources expressed in BOE is multiplied by the respective replacement costs.

Methodological problems:

To this extent more research is needed as stated above. It is reasonable to expect the progression of the curve of replacement costs to take a falling trend.

– Figure 22 –



Relevance, Interpretation:

The replacement costs arising in future on account of the present day consumption of energy from non renewable resources are considered on a yearly basis following the principle of justice among the generations and of a long-term social perspective.

The yearly savings in coal, petroleum etc., which can already be achieved at present on account of the steadily growing production through renewable energy, help reducing energy consumption measured in BOE.

Studies for the photovoltaic industry assume that at least electricity costs for private households will achieve grid parity by 2014 (IFnE, German Engineers’ Office for New Energies 2009) or by 2015 (Deutsche Bank Research 2008, 13), which implies that replacement costs for the exploitation of fossil fuels related to this consumer’s group would be “at the same level” from that time on.

According to forecasts of the Fraunhofer-Institut für Solare Energiesysteme (ISE, 2008), in 8 years’ time solar electricity is reckoned to become cheaper than electricity from fossil fuel plants. This would lead to an actual degression of replacement costs.⁶⁰

For electricity production from wind energy, general cost-effectiveness is already foreseen for the year 2011/2012, which means that the newest plants will be able to be competitive from that

⁶⁰ Source: Umweltdialog (Eng.: Environmental dialogue) Newsletter, 8th of May 2008.

time on without any subsidies.

By 2020 new plants from nearly all sectors of the renewable energy industry should produce electricity more cheaply than conventional power plants burning fossil fuel (IFnE, German Engineers' Office for New Energies 32).

Progression and goals:

The goal is a strong reduction of the consequential costs, which can be achieved through energy saving measures, through efficiency increase and particularly through switching to renewable energy sources on a large scale (BMU, German Federal Ministry for the Environment, 2008 / BEE, German Renewable Energy Federation, 2009). When “grid parity” is achieved, replacement costs per BOE, at least for the electricity market, can be directly taken from the production chain of renewable energies (for example photovoltaic). A further future improvement would be achieved by adopting the appropriate mix of electricity production costs from wind, water and photovoltaic.

A calculation of the essentially higher replacement costs for renewable energies incurred in the past, and particularly with reference to the years from 1990 to 2004 in the time series, will nevertheless be virtually impossible. For this reason the method of calculation available now (see above) will continue to be used for the past years as well.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations; ISEW and GPI case studies undertaken before 1995 usually did not foresee a subtraction of replacement costs but, instead, of the value creation of mining as an auxiliary quantity.

Variable 19: Damage from CO₂ emissions

Definition:

The time series should include the average external damage costs in euros per ton of greenhouse gas emissions in carbon dioxide equivalents.

Data situation / Data sources:

Data about greenhouse gas emissions in CO₂-equivalents can be found in the statistics of the German Federal Statistical Office and in the publications of the German Federal Environment Agency also in long time series. The average external damage costs per ton of CO₂ (negative consequences on the climate and on public health, material damage as well as crop failures should be considered, too) can be taken from the Methodological Convention of the Federal Environment Agency (2007: *Ökonomische Bewertung von Umweltschäden*,⁶¹ Dessau); in the present project we adopted an average price of 70 €/t, whereas the range of the studies evaluated for the Methodological Convention went from 14 €/t to 280 €/t.

Method of calculation:

For this variable there are two variants with a very decisive difference.

- (a) According to the method of the Genuine Savings Index (Hamilton/Atkinson 1996), the value of the average external damage costs should be subtracted from the welfare index on a yearly basis as a *one-time charge*.
- (b) According to the logics of ISEW and GPI the value of the average external damage costs should be calculated starting from the year 1900, exposed in *accumulated* form for the time series and then subtracted from the welfare index as an increasing charge. This approach follows the logical consideration that such value represents the long-term damage of the environmental deterioration that future generations will have to compensate. For these generations to be able to afford it, a kind of “savings bank” is needed in order to compensate the present day value of future welfare losses due to the CO₂ emissions of the past.

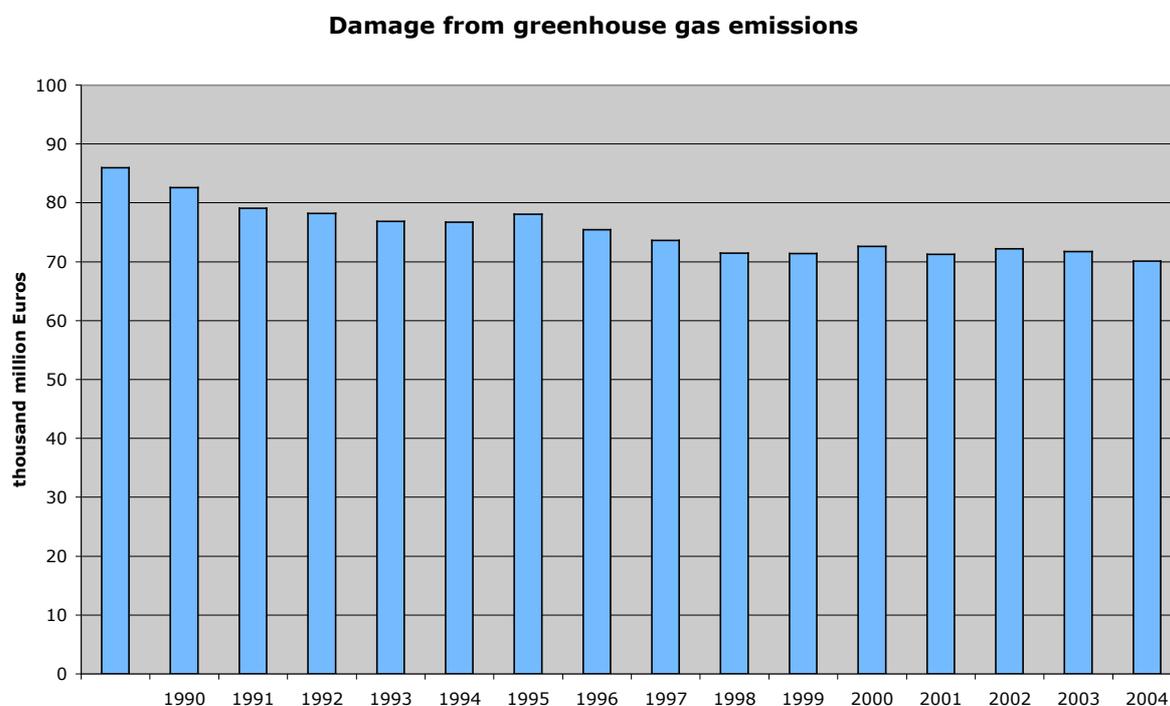
The British and the Belgian ISEW studies maintain that the value chosen here only represents the lower limit of such a savings bank approach. Nevertheless, it has to be considered that both studies work with a slowly increasing amount for the value of the average external damage costs, estimated at 19.21 €/t (in prices of the year 1995) and therefore lying well below the amount indicated in the Methodological Convention.

⁶¹ Eng.: Economic evaluation of environmental damage

Methodological problems:

None; a choice has to be made between the two calculation approaches.

– Figure 23 –



Relevance, Interpretation:

The social costs resulting from the impact of greenhouse gases are not seen as sustainable in the sense of a positive contribution to ecological, health and economic development. Therefore, the damage arising in the aftermath of the effects of climate change bears a minus sign.

Progression and goals:

The goal is a drastic reduction in CO₂ emissions by 2050.

Field of application of the variable:

This variable is used in all the ISEW and GPI calculations, although with different methods of calculation.

Variable 20: Net change in fixed capital

Definition:

The change in net fixed assets is assessed in relation with the change in the figures of employed persons.

Data situation / Data sources:

German Federal Statistical Office, yearbooks, tables “employed persons“, as well as the balance sheets in the national accounts. Ifo - Institute for economics research.

Method of calculation:

The percentage change in the number of employed persons is calculated, giving as a result the need for change in fixed assets in relation with the fixed assets of the previous years. The need for change is subtracted from the actual change in net fixed assets; the result represents a welfare enhancement vs. reduction and goes therefore into the overall indicator as an amount to be added vs. subtracted.

Methodological problems:

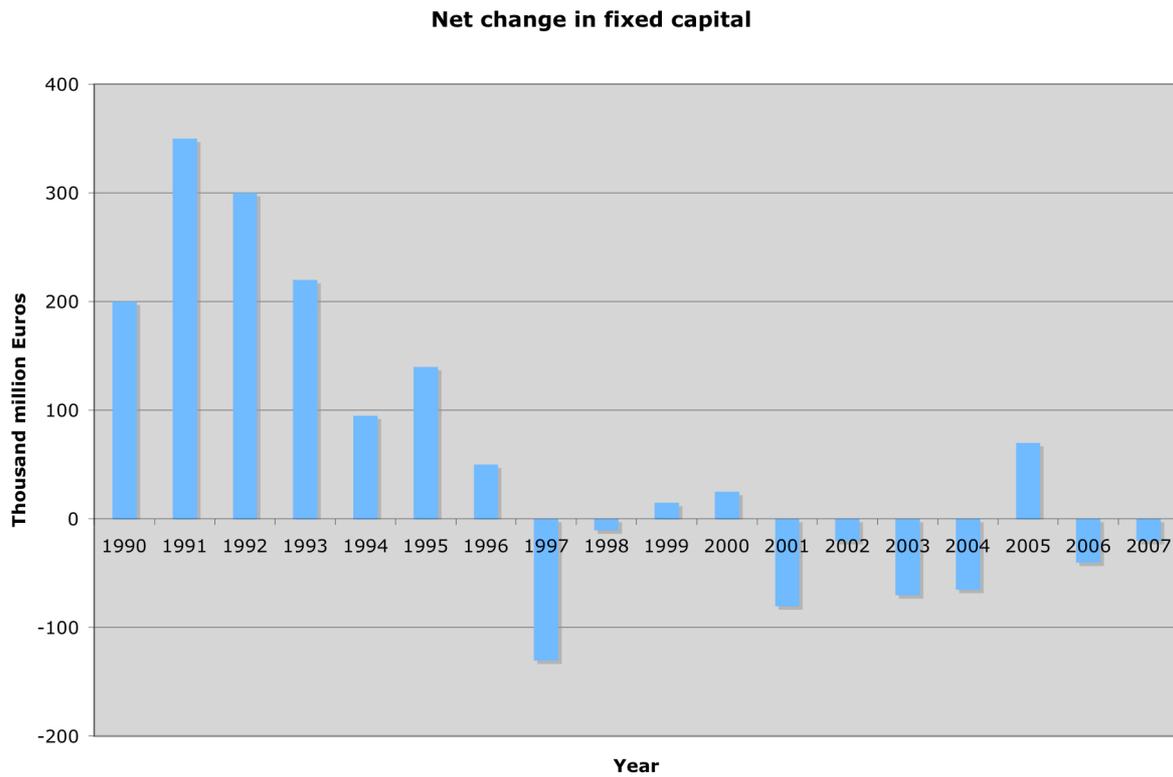
None; the unification of the two German states presumably had a strong influence on this variable in the nineties.

Relevance, Interpretation:

If the number of employed persons changes, then net fixed assets must also change in order to provide the employed persons with an adequate “arsenal“ of means of production needed to produce goods and services corresponding to a certain welfare level. A reduction in the equipment of means of production is an indication that in a certain economy there is not enough investment to keep the given level of fixed assets. (Recent studies show that in 2006 Germany’s net investment share, amounting to 3.8, ranged at the second last position in comparison with 16 more regions. On top position there were Ireland and Spain with over 17. Net investment share includes the money spent on supplementary purchases going beyond the mere renovation of existing plants and premises. German Federal Ministry of the Environment 2008: Wachstum, Beschäftigung und Klimaschutz. Grundsatzpapier für die Investitionskonferenz des BMU im Juni 2008⁶², p.3).

⁶² Eng.: Growth, employment and climate protection. Principle paper for the investment conference of the German Federal Ministry of the Environment in June 2008.

– Figure 24 –



Progression and goals:

The goal is, at least, keeping a constant level, or better reaching positive value for this variable.

Field of application of the variable:

This variable is used in all ISEW and GPI calculations.

Variable 21: Net change in international position

Definition:

This variable contains the balance of the capital account.

Data situation / Data sources:

Statistical yearbooks, table capital account

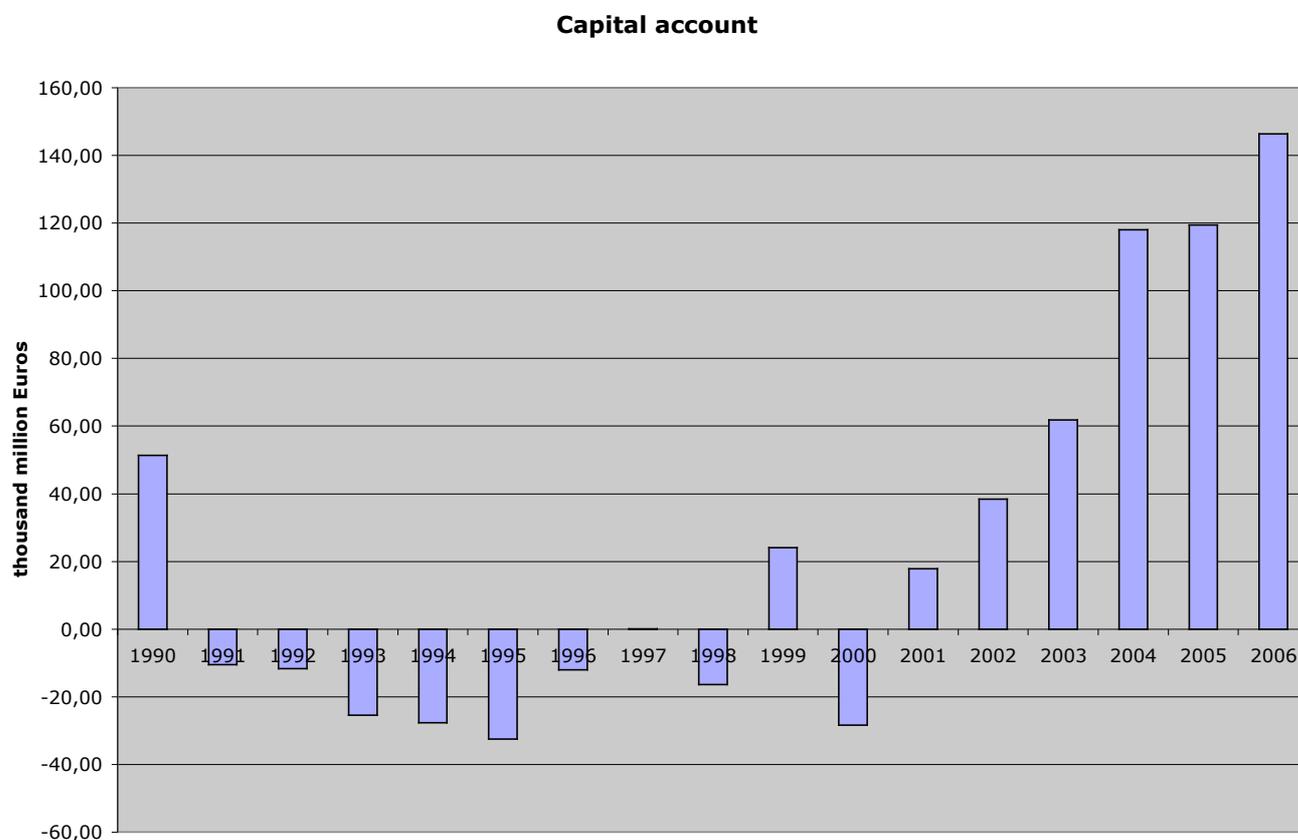
Method of calculation:

The amount of foreigners' investment in the country is subtracted and the amount invested abroad by the country is added.

Methodological problems:

In principle there are no methodological problems. Nevertheless, the German Federal Statistical Office often makes corrections in the values of the previous years.

– Figure 25 –



Relevance, Interpretation:

The change in the balance of the international position shows from year to year if a country moves in the direction of a creditor's position or of a debtor's position. In the first case the country has invested capital abroad, to which it could resort; in the latter case it is founding its prosperity to some extent on foreign capital, which could flow out again under certain circumstances.

Progression and goals:

The essential goal is a well-balanced international position according to the Law of stability; surpluses in the capital account are evaluated positively

Field of application of the variable:

This variable is used in all ISEW and GPI calculations.

8.2 Suggestion to a further amendment to the NWI (variables 22 and 23)

Variable 22: Net new indebtedness

This variable was included only in the second variant of NWI (see Appendix 1)

Definition:

The net new indebtedness of the overall state budget.

Data situation / Data sources:

The general government debt level of the overall state budget is to be found in the data provided by the Federal Statistical Office: the figures up to 1992 are in the statistical yearbook 1993, Chapter “Finances and taxes”, the figures from 1992 onwards are to be found in GENESIS-online, sector “Public Finances” (<https://www-genesis.destatis.de/genesis/online/>). However, as a consequence of the broader definition adopted for the overall state budget as to include the so called extra budgets⁶³ from the first quarter of 2007, the data of the time series from 2007 on are not comparable with the previous years. (Vol. 14, Series 2: Vierteljährliche Kassenergebnisse des öffentlichen Gesamthaushalts. 1.-2. Vierteljahr 2008)⁶⁴.

Method of calculation:

The variable is calculated for the year n as the difference between the debts (credit market debts and reserve credits) of the overall state budget in the year n and the debts in the year n-1

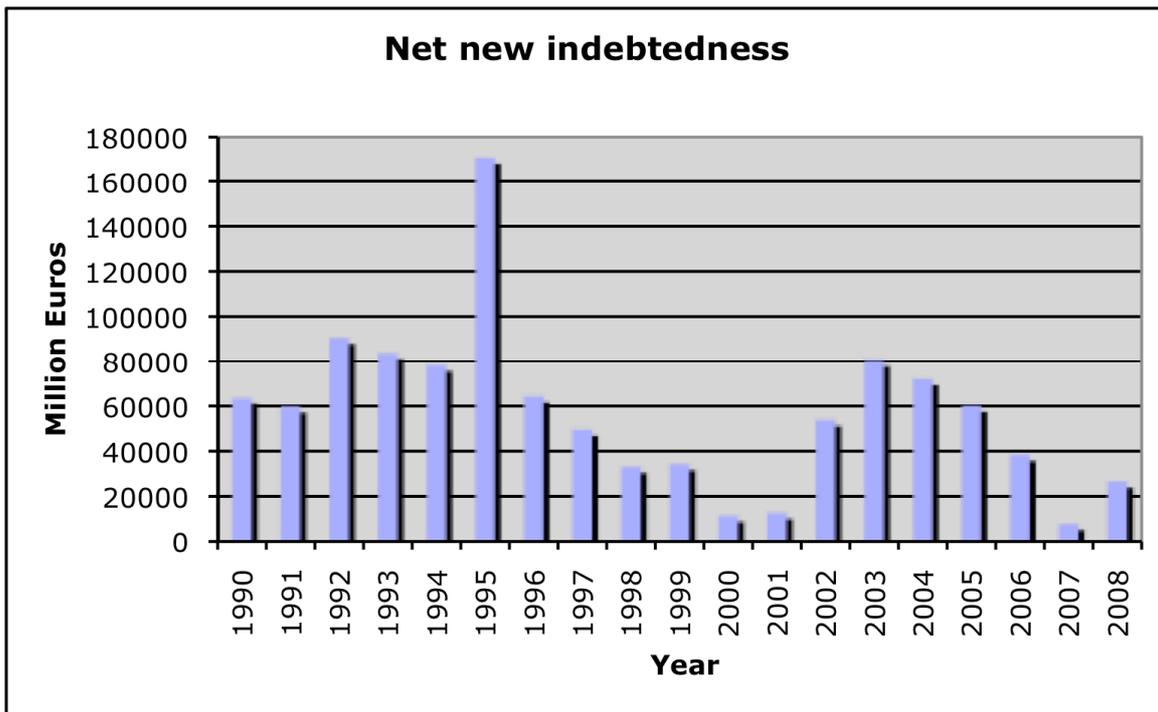
Methodological problems:

Lacking comparability of data until 2006 and from 2007 onwards.

⁶³ Selected public funds, institutions and companies belonging to the state sector according to the criteria of the national accounts.

⁶⁴ Eng.: Cash results of the overall state budget for each quarter; first and second quarter of 2008.

– Figure 26 –



Relevance, Interpretation:

Net new indebtedness is subtracted as welfare reducing, since indebtedness must be balanced again by future generations. If these means are used to finance measures or investments in education, health care or ecological transformations, then these financial means are added (see Variable 23). Alltogether it must be mentioned that nearly one third of all EU member states have a public expenditure quote of more than 50 % (Germany nearly 49 %). For a welfare index this means that the role of the state is increasing regarding the development of social welfare. The potential can have a positive or a negative impact depending on the way the public expenditures are spent (e.g., Variables 5 and 23).

Progression and goals:

The goal should be a net new indebtedness equalling zero or primarily devoted to the financing of investments in education, health or ecological transformations.

Field of application of the variable:

This partial variable is being taken into consideration for the first time.

Variable 23: Public expenditure on ecological transformation

This variable was included only in the second variant of NWI (see Appendix 1)

Definition:

Public expenditure and investments aiming at the implementation of environmental-friendly production processes, products and consumer goods are useful for a sustainable economic-ecological development and are considered positively here as a contribution to social welfare.⁶⁵

The relevant investment areas are: energy efficiency, renewable energies, local transport, clean cars and lorries, intelligent electric grid (“smart grid”), water use, research.

The corresponding public expenditure has been incurred, for example, in the first and second economic stimulus packages of the German federal government but corresponding expenditure items of the previous years can also be considered in this context. On account of the worldwide economic stimulus packages adopted by the states to fight the present day economic crisis there arise questions again as to the sustainability of economic development. This is not only related to the new dimension of such economic stimulus packages (the economic stimulus packages adopted in Germany in 2009 amount to 1.4. per cent of GDP, the second economic stimulus package alone amounts to 0.6 per cent of GDP), but also to the issue of a qualitative evaluation of GDP- relevant state expenditure.

Data situation / Data sources:

In Germany there is no reliable database for this indicator yet, and particularly no time series. Concerning Germany, most comparative studies available about Europe either do not include a quantified parameter or are based on estimates at least for partial items (see among others Deutsche Bank Advisors 2009; Bruegel 2009a und 2009b, Ecologic 2009).

The calculation of a time series is, therefore, not possible yet but it should be tried in the next few months. At the end of 2008 and at the beginning of 2009, according to Robins, Cover und Singh (2009) 2.170 million million Euro have been allocated in economic stimulus packages worldwide; Europe’s share thereof amounts to 490.1 thousand million Euro. For Germany a total amount of 81 thousand million Euro was calculated; 10.7 thousand million Euro thereof for “green means”. This would correspond to about 13.2% of the total amount of the German economic stimulus package. (Saha/von Weizsäcker (2009, 13) calculated, instead, a total amount of about 106.13 thousand million Euro for Germany).

⁶⁵ Differently from the budgeting of the “green state expenditure” on the whole, used in the context of state economic stimulus packages (see Deutsche Bank Advisors 2009,14 or UNEP/Barbier 2009, 147f.), there are explicitly *no* environmental repairing measures or expenses on environmental protection included in this variable (see to this respect variable 11: Compensatory social expenses due to environmental impact).

Method of calculation:

The yearly amounts related to the various investment items aiming at ecological transformation in Germany are added and recorded as positive contribution to welfare development on the whole.

Methodological problems:

- a) The data situation for Germany has not been fully clarified yet, since conceptual and empirical questions arise as to the classification and delimitation of “green investment”.
- b) Since this partial variable is not only related to exceptional economic stimulus packages, but it also intends to include comparable expenditure in the past, e.g. in the frame of integrated environment and climate protection programmes of the German federal government, the preparation of time series requires a methodological effort, in order to make the results of the calculations undertaken consistent and comparable over a long period of time.⁶⁶

For the reason above, also for this variable a “reminder item” is adopted, to start with, totalling an amount of 2 thousand million Euro per year, which will have to be adjusted in the next few years through an accurate analysis. Only for the year 2008, which is not yet included in the overall time series of NWI, the foreseen value for this variable amounts to 10.7 thousand million Euro.

Relevance, Interpretation:

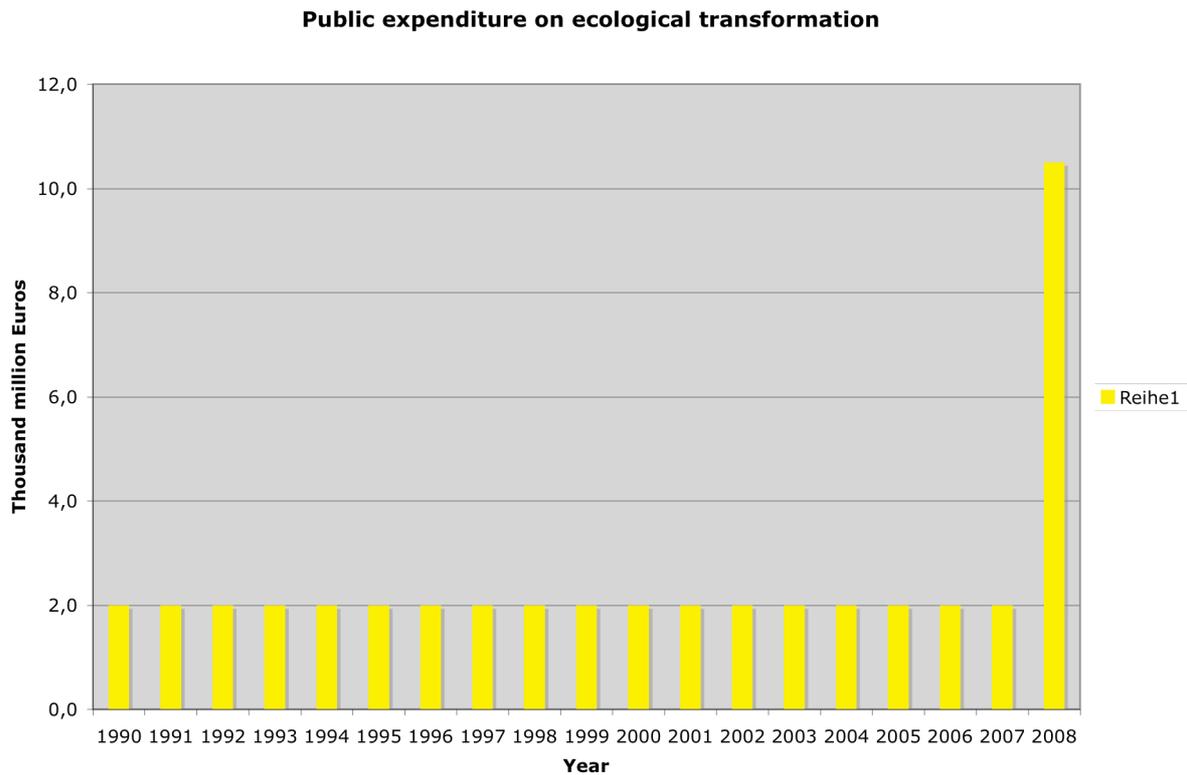
In the context of the national welfare indicator, state expenditure must not be automatically recorded as welfare enhancing; quite on the contrary, a part of the expenditure enters the balance sheet as defensive costs for the maintenance of the already achieved level of social welfare, for example to compensate environmental damage.

The important point made by many political actors can not be ignored, as they claim that such stimulus expenditure should allow a real change of direction and promote financing in the direction of ecological modernisation and structural transformation. In contrast, economic stimulus measures in traditional industries, such as the transportation industry, mostly encourage exactly the same kind of production and consumption processes, which have led thus far to massive impact on the environment and the climate. Systematically, this partial variable has to be classified similarly to public expenditure on health care and education.⁶⁷

⁶⁶ A solution will be possible only if the overall state budget can be studied more thoroughly as far as welfare enhancing effects are concerned. This could happen, among other possibilities, through a sustainable impact assessment of laws, programmes and expenditure items.

⁶⁷ Structural transformation is needed in the direction of a Low-Carbon-Economy (see e.g. Stern 2009, BMU/UBA Umweltwirtschaftsbericht 2009 – Environmental economic report of the Federal Environment Agency and of the Federal Ministry for the Environment 2009), which gives results in terms of individual wellbeing thanks to the creation of jobs in future and would contribute, at a macroeconomic level, to the partial avoidance of damage caused in future by the otherwise unthwarted climate change.

– Figure 27 –



On the contrary, variable 22, the second variable which entered the national welfare indicator as a new proposal in comparison with the first publication, is related to the *financing* of state expenditure: as it was mentioned above, expenses financed through new indebtedness are recorded negatively at first, that is to say, they are subtracted from the welfare balance. This means that, on balance, credit-financed state expenditure for ecological transformation is evaluated neutrally, since it is subtracted on account of its financing under variable 22 and compensated again under variable 23 on account of the type of expenditure.

Progression and goals:

The share of public expenditure devoted to ecological and energy saving modernisation of production processes, products and consumer goods is relatively small in an international comparison, at least in both German economic stimulus programmes.

In consideration of the post-Kyoto negotiations and of the measures necessary for meeting the 2-degree goal, yearly public expenditure for ecological transformation should grow; international discussions envisage a level of about 1-2% of GDP in western industrial countries (see e.g. Edenhofer/Stern 2009). Additional welfare enhancing side effects of such investments are: less import of fuel and other, mostly non renewable energy sources, support in the creation of future-

oriented occupational fields or jobs, reduction of emissions and waste (and of the consequential damage to be expected).

Field of application of the variable:

This variable is being used for the first time.

Need for additional studies:

The reflections above should be compared, among others, with the Environmental economic report of the Federal Environment Agency and of the Federal Ministry for the Environment 2009 as well as with other studies about the “greening of industries”. Research on previous public expenditure for ecological transformation is also needed. During the phase of further provisions for the second economic stimulus package, some of the green expenses, which, at present, can only be named, will probably become concretisable. Other public expenses, going rather in the direction of social relief and of a facilitation of the ecological structural change, are also relevant for this variable. Yet, they are even more difficult to delimitate from other state budget items, which are not included in the NWI.

9. A first aggregation of the partial indicators: a rough plan of the welfare index

9.1 Basic variant and modifications of the NWI

Appendix 1 contains the data tables of the variables which are now gathered together in the overall calculation of the National Welfare Index. In the data tables colours have the following meaning:

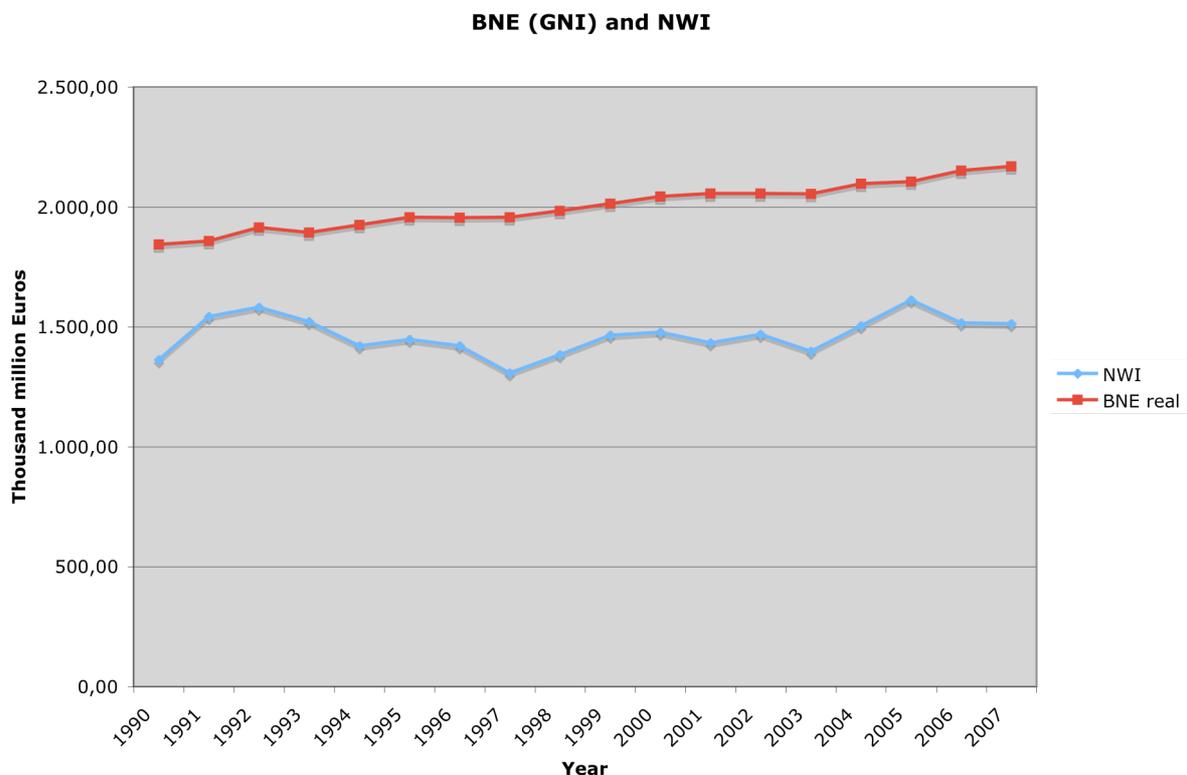
- black figures: somewhat reliable primary data from official statistics;
- blue figures: data extrapolated or intrapolated on the basis of other somewhat reliable primary data, in order to complete the time series;
- red figures: estimates that must be verified through a deepening analysis in the following phase of the project.

The calculation of the National Welfare Index can now be undertaken with the following formula:

$$\text{NWI} = \text{Var. 2} + (\text{Var. 3} + \text{Var. 4} + \text{Var. 5} + \text{Var. 6} + \text{Var. 20} + \text{Var. 21}) - (\text{Var. 7} + \text{Var. 8} + \text{Var. 9} + \text{Var. 10} + \text{Var. 11} + \text{Var. 12} + \text{Var. 13} + \text{Var. 14} + \text{Var. 15} + \text{Var. 16} + \text{Var. 17} + \text{Var. 18} + \text{Var. 19})$$

This formula leads to the result documented in the following graph:

– Figure 28 –



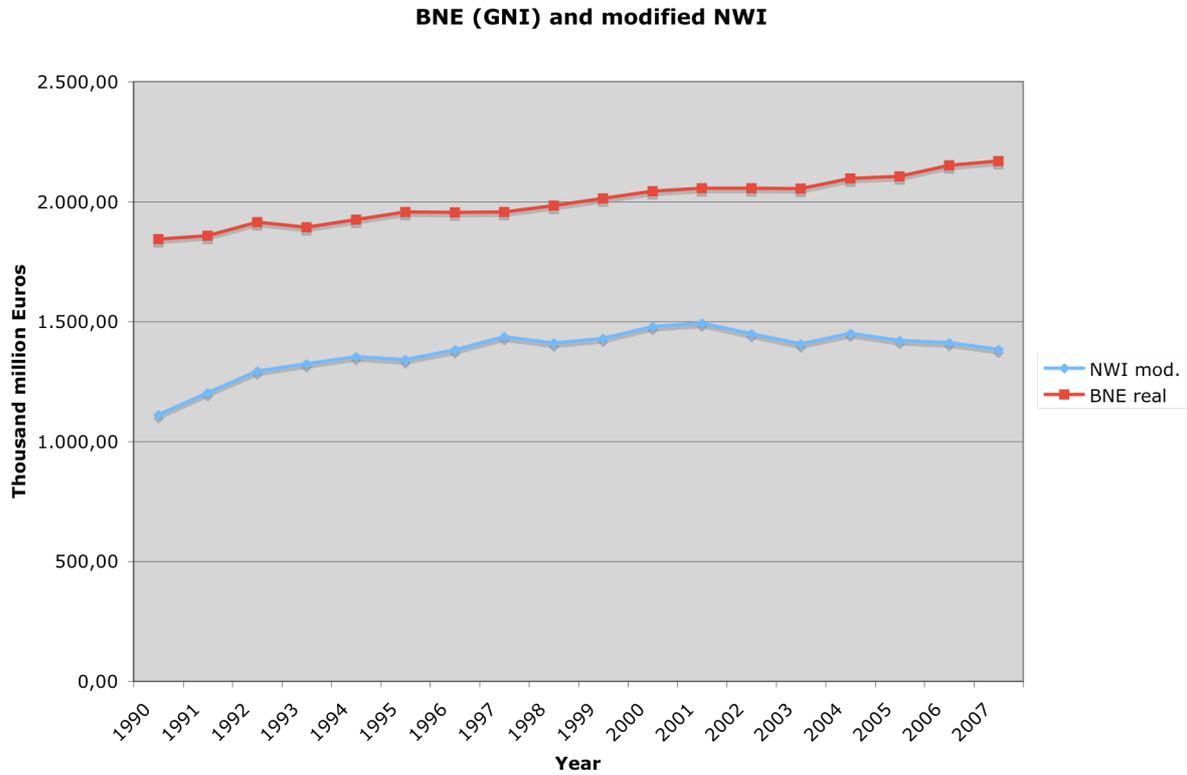
In the graph **BNE** stands for the development of Gross National Income (GNI) in prices of the year 2000, while **NWI** indicates the development of the National Welfare Index.

A first sensitivity analysis of the NWI already shows that its fluctuations are very clearly determined by the two “capital variables”, i.e. var. 20 (Net change in fixed capital) and var. 21 (Net change in international position). Both variables correct welfare aspects in the economic domain. The following graph shows a modified NWI, in which these two variables were excluded again, in order to highlight the significance of ecological and social variables as such.⁶⁸

⁶⁸ Concerning the choice of the variables of NWI as well as the interpretation of the progression of the curves, see

$$NWI_{\text{mod}} = NWI - (\text{Var. 20} - \text{Var. 21})$$

– Figure 29 –



This graph has a “flatter” progression than the graph of the NWI without modification; in the calculation of the NWI_{mod} the relative influence of ecological and social variables is clearly higher than in the case of the NWI, which is comparatively more strongly determined by economic variables.

9.2 Which variant of the NWI is the right one?

In the previous chapter we introduced two modifications of NWI and in appendix 1 we are going to introduce one more variant. Finally, the list of variables included in chapter 7 showed that we can easily accept the idea of undertaking a further integration of NWI through supplementary variables, insofar as clearly improved databases will be made available in future. The systematic approach chosen for the present study can be summed up as follows:

both of the following paragraphs for details.

- the *basic form* of NWI includes variables 1 – 21 of the list:
 - consumption expenditure weighted with income distribution (var. 1 - 2)
 - value creation not paid through the market (var. 3 - 4)
 - social factors (var. 5 - 10)
 - ecological factors (var. 11 - 19) as well as
 - economic factors (var. 20 - 21).
- the *modified form* of NWI renounces both economic factors (var. 20 - 21); the latter are to be understood as corrections of national accounts in the true sense of the word, as they look at more “classical” GDP/GNI factors.⁶⁹ Both variables are characterised by remarkable fluctuations and are quite remarkable in their influence. Therefore, the modified form of NWI allows concentrating the observation on the essential ecological and social corrections as well as on the correction of the value creation not paid through the market (housework and voluntary work).
- Appendix 1, in addition, introduces a *second variant* of NWI, now including the variables 22 and 23 as well. This integration is a first development of NWI, still to be considered as temporary, though; it shows further need for research and does not deliver any certain result. The main idea is that state investments for the ecological transformation of production and consumption processes must be seen as a welfare enhancement, while net new indebtedness of public budgets, on the contrary, must be classified as a reduction of welfare. Particularly, in the development of time series for the variables regarding ecological transformation, more conceptual explanations should be added and empirical analyses should be done concerning data collection.
- The opportunity for the observation of both of these variables certainly has to do, on one hand, with the financial dimensions which reached a particularly large volume in the attempt to overcome the economic and financial crisis of the years 2007 to 2009. On the other hand, state indebtedness has been one of the subjects since the beginning of the discussion on the adequacy of GDP (see chapter 2) as well as now in the somewhat newer context of a sustainable management of the economy.
- Also the reflections on the integration of investments into the ecological modernisation of the economy receive new impulse through the discussion on “Green Recovery” programmes; from a systematic viewpoint, sensible reflections can be made on the question whether such investments/expenses should go hand in hand with a new understanding of

⁶⁹ See also Stiglitz/Sen/Fitoussi (2009), op.cit., who defined some of the themes necessary according to the French commission for the correction of GDP, as GDP-themes in the true sense of the word.

the role of the industrial policy of the state.⁷⁰

- On the contrary, other *critical variables*, particularly those related to the environmental domain, are not yet included: particularly the costs of at least partly anthropogenically caused natural calamities and the costs of the loss of species. To this respect, methodological conceptions and empirical data bases are not even enough to include somewhat reliable estimations into the NWI.

The survey about the variants and reflections on the further development of the NWI, once more included here, show that, at present, the NWI can not yet be seen as a thoroughly completed conception. Nonetheless, we think that nowadays it is already possible to continue writing down the NWI every year in its basic form and in its modified form as well and to compare it with the GNI. In the next few years, however, we will have to work on an improvement of the data basis and also to reflect on the opportunity of introducing more, principally essential variables into the NWI.

9.3 Details about scaling and the interpretation of curve levels

In the interpretation of the curves of GNI and NWI there is an essential fact to consider, which is very easily forgotten as a consequence of the “illusion of numerical precision”, created through exact numbers, wherever possible with several digits after the decimal separator, and through nice charts: welfare measures, including NWI, use an ordinal scale and not a cardinal scale. This means: from a numeric value, equaling the double of another one, it should not be inferred that the welfare of an individual or a society is exactly twice as high. Welfare measures like NWI are directionally stable, which means that a higher value always expresses to a welfare enhancement. It is also certain that a strong increase or decrease of the index corresponds to a stronger increase or decrease of welfare than a weak change in the time series. But the values of the time series on the whole can not be interpreted in the sense of a mathematical-numerical precision, although they are based on single variables, measured in currency units.

What is the meaning of this result, usually deceiving for non-experts, in terms of a comparison between GNI and NWI? First of all it is necessary to make clear that GNI, as a measure which is

⁷⁰ Keywords are, for instance, the integrated environmental and climate protection programme of the German Federal Government, phrases such as the “Third Industrial Revolution” (BMU, Federal Environment Agency /FFU, Environmental Policy Research Centre 2008) or the promotion of environmental friendly innovations in the context of the Lisbon strategy of the EU (BMU Federal Environment Ministry /UB 2008).

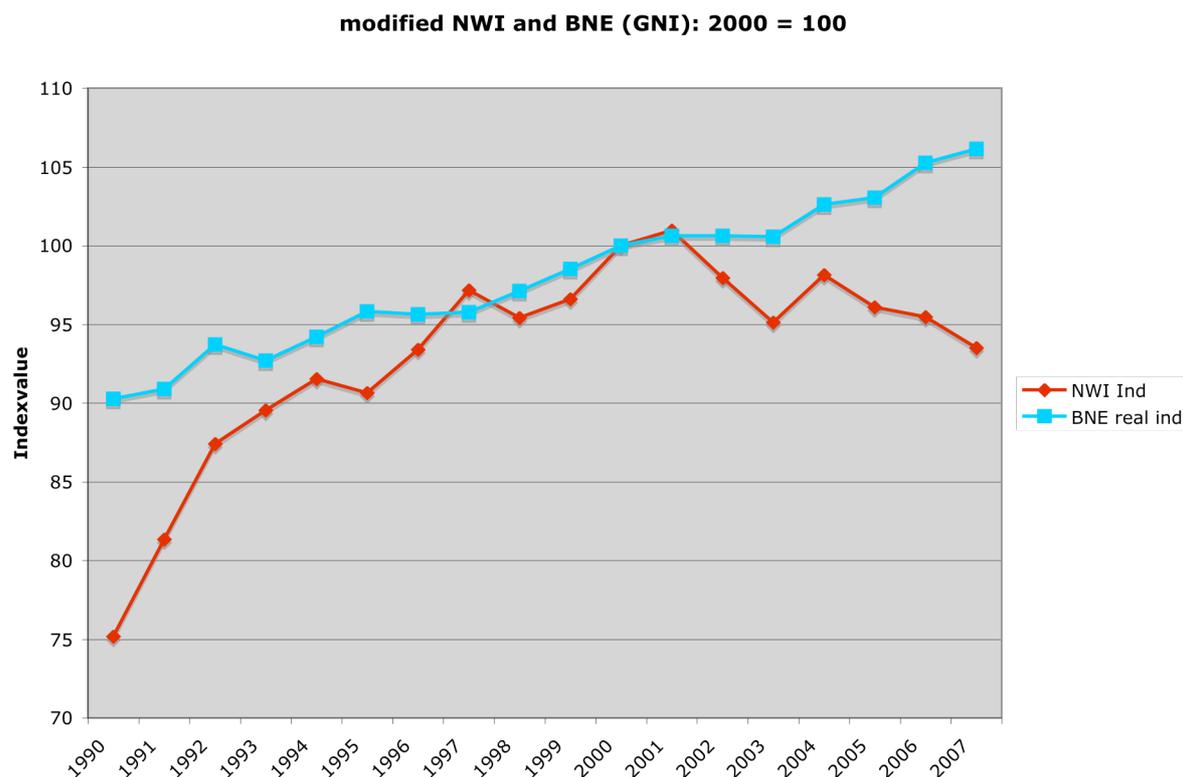
well defined in accordance with the method of calculation valid from time to time for the economic value creation transferred through the market, is a measure actually using a cardinal scale. A 10 percent higher GNI says that the economic performance measured in this way has really grown by 10 percent. But if GNI now had to be interpreted *as a welfare measure* (which is rejected by present day's statisticians calculating GNI), then one could not say that society is better off than before by 10 percent, because the *welfare* increase by a certain sum can no longer be expressed on a cardinal scale: a person with 100,000 € on her or his bank account today who previously used to have only 10,000 € does not necessary feel exactly ten times better than before, not even if you only looked at her or his economic welfare. If we would interview different persons they would give different estimations on the "value" of 100.000 €.

Why all this effort then, if most statisticians have now reached an agreement on the fact that GDP/GNI is no welfare measure? The reasons were already mentioned in the first chapters: in political and public debate, GDP/GNI is used as a welfare measure, although the experts' debate has taken distance from that attitude. Moreover, it turns up in the German federal sustainability strategy and therefore it is seen as an official sustainability indicator. And it is not possible to use it as an auxiliary quantity or a "surrogate measure" for a welfare observation, since the progressions of the curves show that there are times when the growth rates of GNI and NWI are extremely different; it is not even so seldom the case that the GNI grows while the NWI decreases. As the NWI can be seen at least as a directionally stable welfare index, such a result means, in fact, that under certain circumstances a growth of GNI could mean a reduction of welfare.

9.1. About the discussion of the curves

If we look at the two figures 28 and 29 we notice first that the level of GNI and NWI as NWI_{mod} is different: in both of the figures, GNI is clearly above NWI. Seen from the viewpoint of welfare theory, we can not, as shown above, interpret this difference like on a cardinal scale. But we can draw the conclusion that not all economic activities that lead to the creation of economic value will result in an increase of welfare. But the different levels also results from a structural difference in the construction of GNI and NWI because the calculation start from a different basis. In the following figure, GNI und NWI_{mod} are normed to a basis year with an index value 100 to show the relative difference in the development of the graphs

– Figure 30 –

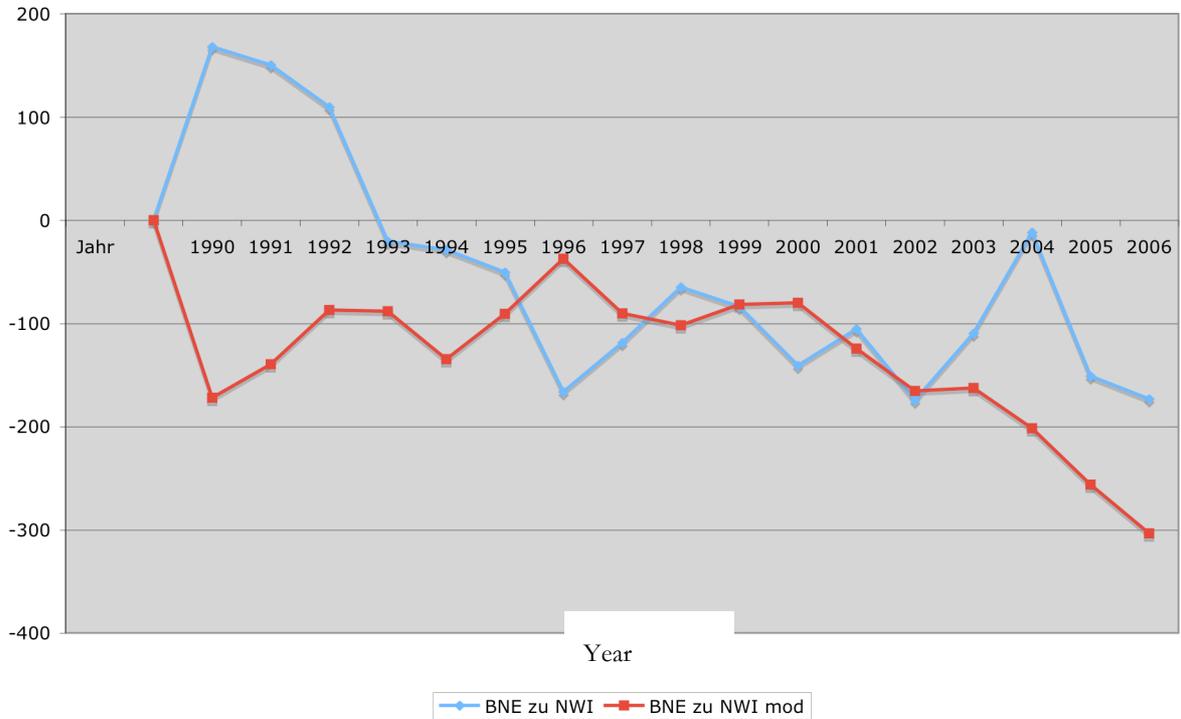


A second remark is not related to the absolute height of the curves but to their *progression*. It becomes clear that GNI grew rather steadily during the whole period while the modified NWI reached its climax around the year 2000 and fell back again during the following years. The unmodified NWI has a substantially more variegated development: it has maxima in the years 1992 and 2005, an essentially falling trend between 1992 and 1997; it grows again between 1998 and 2005 and it finally falls back after 2005. If both curve progressions are normalised at the level of the year 2000 as a reference with a respective index value of 100, then the result will be a nearly continuous growth of GNI, while the modified NWI at first grows more strongly, in a relative observation, but at the end of the time series it clearly falls back again. With a normalisation taking other years as reference the curve progressions would be different, out of merely mathematical reasons, but the general trend would be the same in any case.

A similar image results from the two following graphs. Here the curve progressions of GNI and NWI were normalised in such a way, that the absolute height of both curves does not play any role; it is the *distance* between the two curve progressions which is represented here. Also in this case the choice of the basis year for the normalisation of this observation has some meaning in terms of graphic representation. Here the normalisations according to the reference years 1990

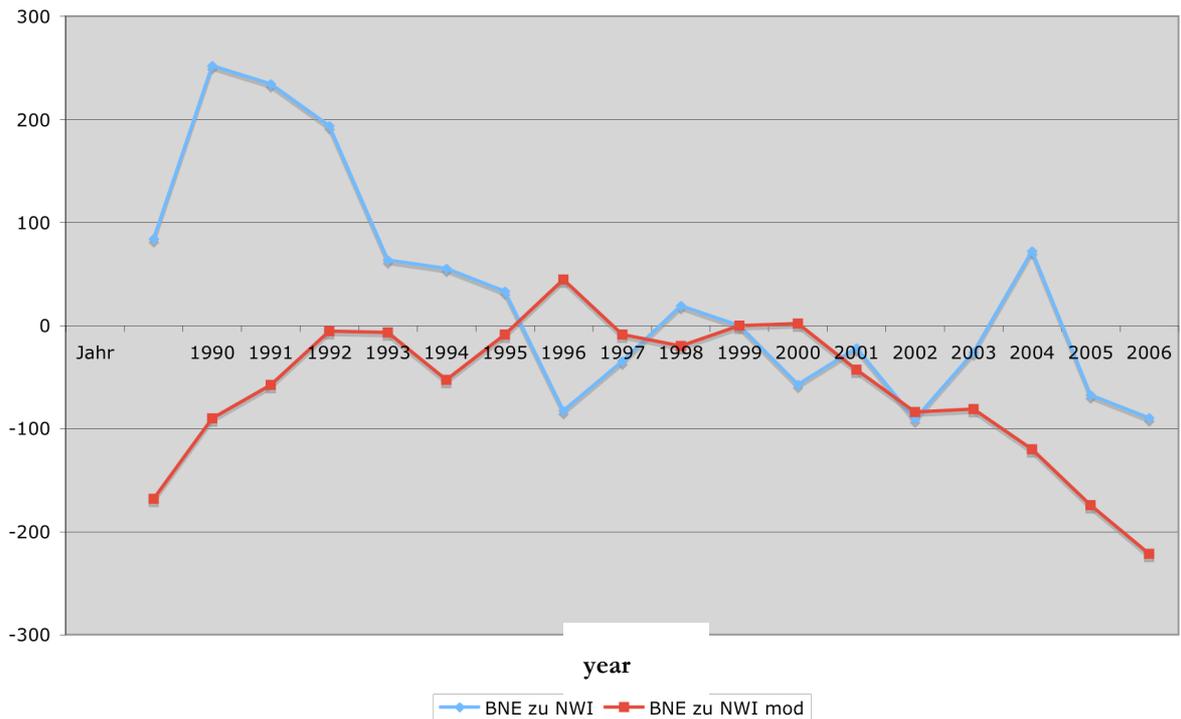
and 2000 are represented, respectively for the distance between GNI and NWI (blue line) and for the distance between GNI and modified NWI (red line).

Measure of distance A (1990 = 0)



– Figure 32 –

Measure of distance B (2000 = 0)



It becomes clear, in this context, that since 1996 the NWI_{mod} has been experiencing a falling trend in comparison with gross national income. Considering the aspects expressed by the partial variables of NWI, it would be sensible to start a more deepened discussion as to whether Germany has really got closer to the purpose of an economically balanced sustainable development or whether the economic statements on the basis of GNI should be newly interpreted, at least, or even partly relativised.

9.5 Quantitative meaning of the variables

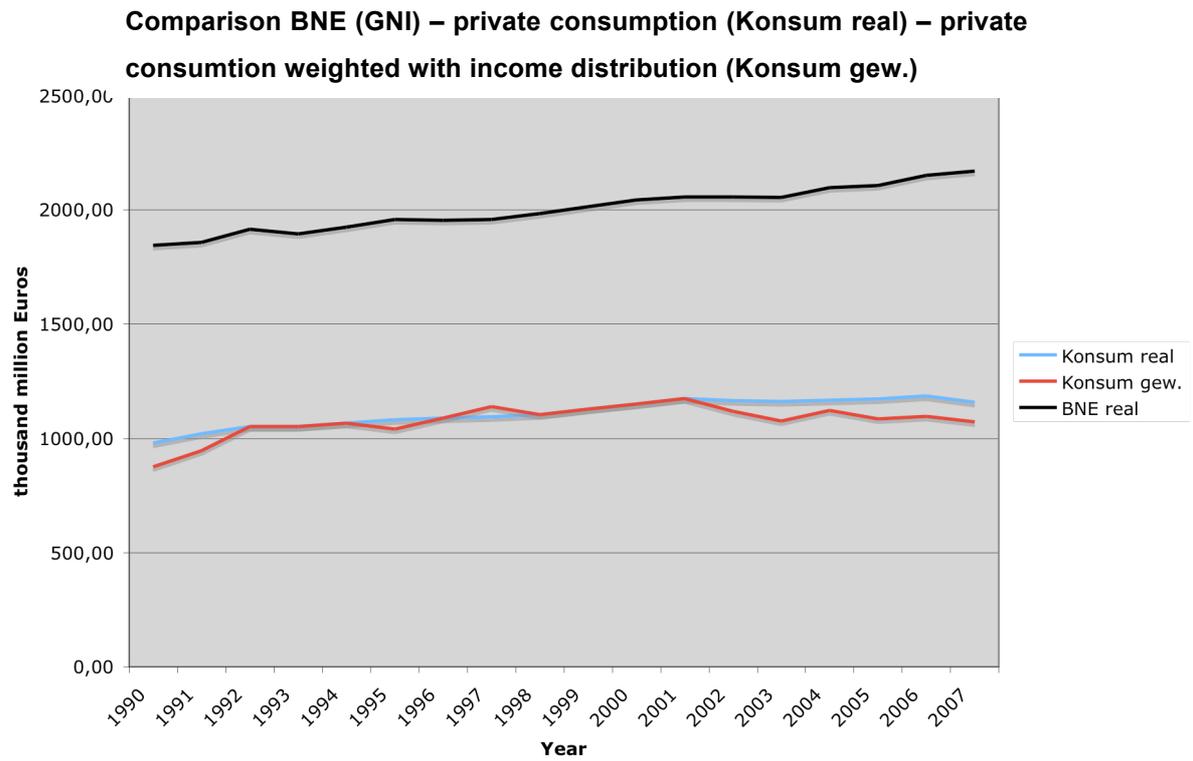
Observing the single variables it becomes clear that income distribution can strongly change the basis of NWI. Housework and voluntary work are the “positive bulks” with a strong quantitative weight. On the negative side it is the cumulative negative external effects on the environment which weigh heavily. The result is not really surprising but it shows once again, and very clearly indeed, that we must fundamentally revise the idea according to which economic growth would virtually go necessarily hand in hand with welfare improvements.

The following graphs show

- the different influences in the development of real GNI in relation to real private consumption, with and without weighting consumption with income distribution;
- the relative importance of household labour and voluntary work, and of the other variable groups (social, ecological and economic variables)

The relative quantitative importance of the single variables can be seen from the figures and from the table of data in the appendix. Of greater importance are household labour, public expenditure for health and education, the depletion of non renewable resources and the damage from CO₂ emissions. Also very important are the two economic variables; there are, at the same time, extremely volatile.

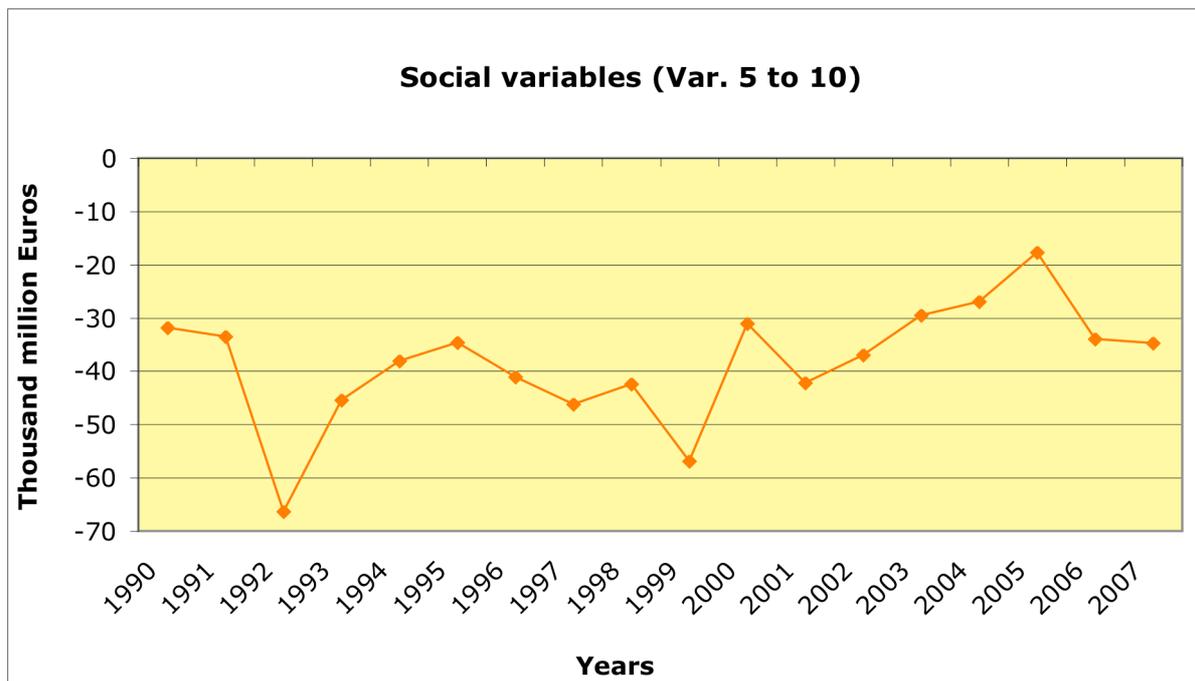
– Figure 33 –



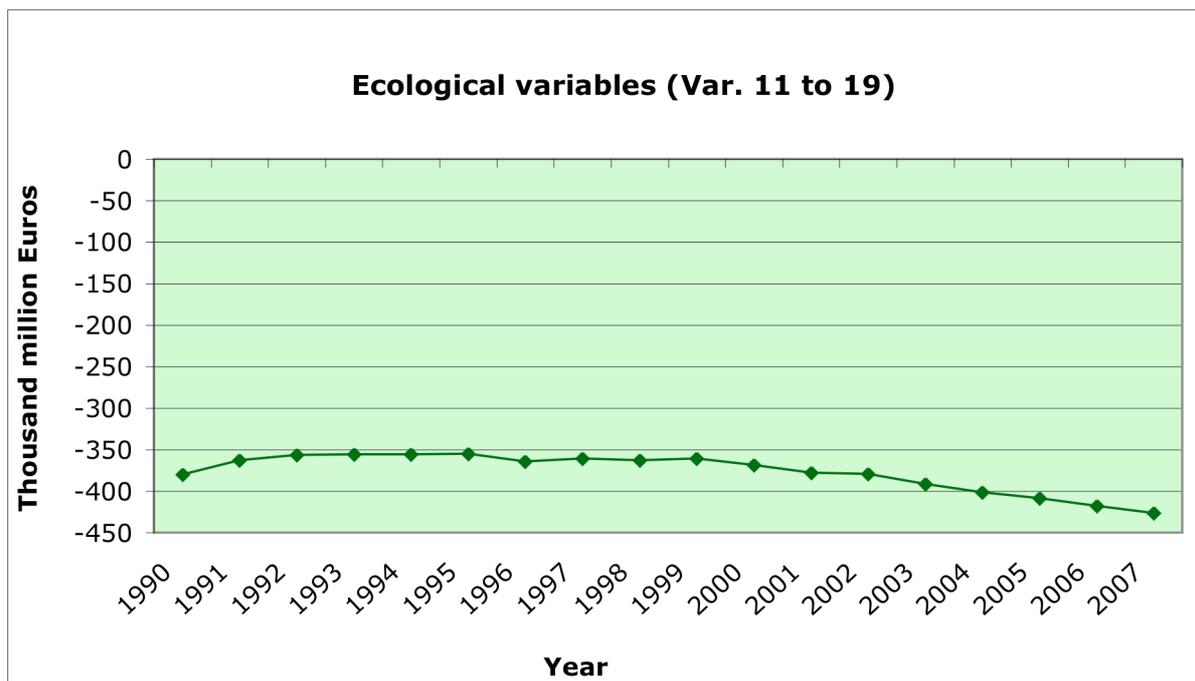
– Figure 34 –



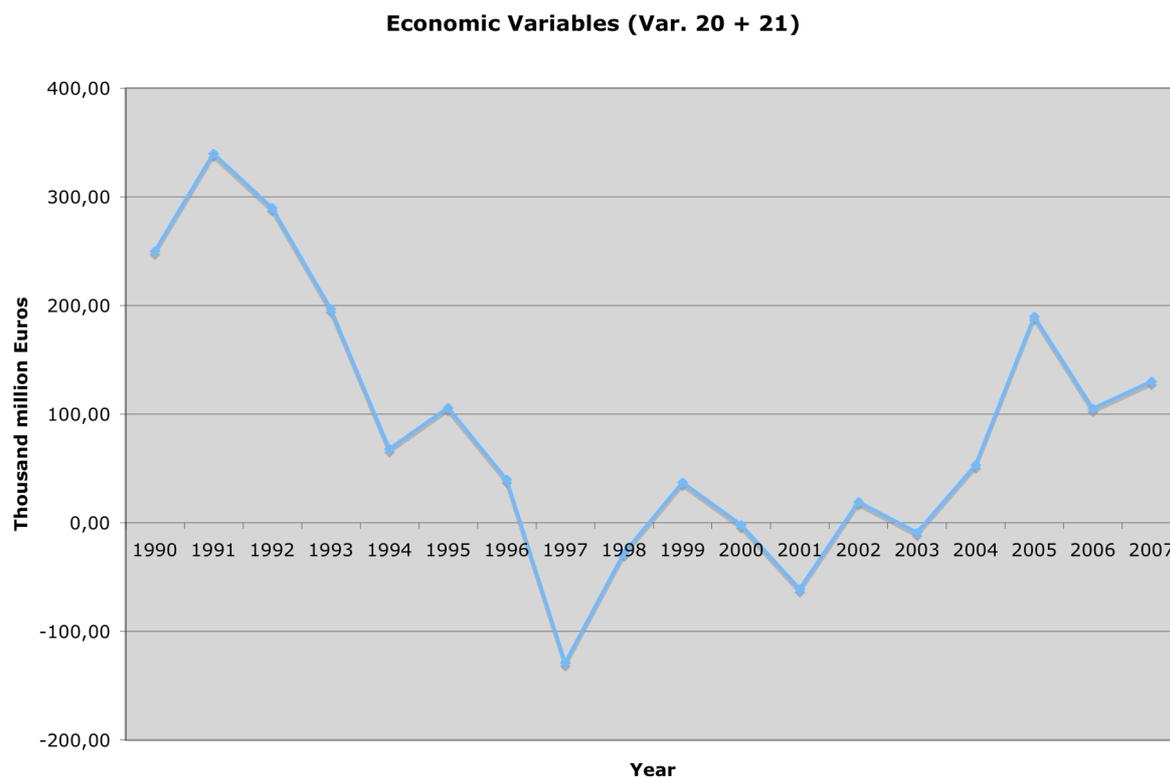
– Figure 35 –



– Figure 36 –



– Figure 37 –



9.6 Information variants: partial indicators provide autonomous informational potential

If the future discussion on this approach were to show that a welfare index is not sufficiently accepted in its totality, then an adequate procedure could be found even in a gradual solution, in accordance with which at first several partial indicators, generally seen as being sensible, would complete the information conveyed by GDP or GNI. This could happen in the form of the “variable cluster“ graphs presented here, which highlight a special aspect of the welfare debate each, or in a direct comparison of these clusters with the progression of GDP / GNI.

10. Political potentials of complementary welfare measurements

The remarkable scientific efforts devoted to the creation of complementary indicators beyond GDP, above all with many partial indicators and the identification of a trend covering some decades, can only be justified if the “added value” of such a reporting system becomes evident. This added value consists of following elements:

- Of the improvement of the information basis for *political decision-making* („Better information for good governance“, for details see also Jänicke/Zieschank 2004). There can not be an immediate guide to action on the basis of the curve progression of the aggregated welfare index but, firstly, the comparison with the progression of GDP provides the essential supplementary information and, secondly, the single variables, i.e. the ecological, economic and social “blocks“, highlight social trends that must be evaluated adequately and in this sense they can at least indicate need for action on the basis of their progression.

- Of the opening of chances for a reflection about the meaning of social progress; all this is linked with a *goal discussion* on account of changing measurements or of social processes of value change.

- Of the creation of reliable and differentiated information about a complementary view of economic development and of social progress; this represents an important basis for *political participation*, for a sensible participation of the citizens. At the same time, information about the trends of social development based on facts is an important basis for *social cohesion*. It improves the chances for a common view of social welfare and its evolution. Without such an information basis social discussions would be carried out in a substantially more disparate manner. (See Zieschank 2007).

- Of the support of a trend towards *dematerialisation of economic development*. On one hand, an efficiency revolution allowing an internationally successful management of the economy, with the minimum possible use of natural resources and a reduced impact on the environment, is nearly inevitable. On the other hand, it is sensible to achieve a new understanding of prosperity, a reference that is still often understood separately and not in the sense of a really consistent political strategy. Prosperity should no longer refer solely to an accumulation of goods as its first goal, but it should rather take into stronger consideration „welfare“ – social welfare and the common good – and include „well-being“ – personal well-being. From a political point of view it is all about a stronger emphasis on the role of the citizen than on the role of the consumer which has been dominant up to now. Efficiency enhancements in the use of natural resources and alternative prosperity enhancements going beyond the accumulation of products are a new, decisively innovative strategy for industrial societies building the core of a new definition of social progress.

It should not be neglected thereby that, also in the case of the application of a welfare index in the context of national sustainability strategies, at least three areas of conflict will remain:

- Firstly, between *sustainability requirements* at the macro level and the maintenance of the *quality of life* at the micro level: i.e. in case the expectations of an improving quality of life at a personal level continue to be connected with a growth in material consumption, then conflicts will arise, for example, in relation to the management rules of sustainability; as a matter of fact, in the welfare index described in this paper private consumption has always been evaluated positively thus far and it came neither to the determination of an upper limit of consumption nor to the definition of an “economy of frugality” as the optimum of welfare. The alternative concept of the improvement of “happiness“ mentioned above may well emphasise, in principle, immaterial and social aspects, but the relations between personal happiness, social common good and ecological limits still remain equally undetermined, since postulated equilibriums seem to be quite fragile.
- Secondly, regarding *time orientation* with its differences between the guidelines of sustainable development and those of welfare orientation: welfare has been up to now mainly related to the historical and the present situation of the country, while the principle of sustainability puts a stronger emphasis on the future situation.
- Generally, between the *economic* welfare, mainly aiming at the wellbeing of one’s own country, and an *ethically motivated* responsibility in the use of the resources available as well as concerning the ecological functions of nature. Moreover, ethical responsibility includes taking account of the extremely unequal global distribution of wealth and of the highly unequal use of natural resources per capita worldwide. An example of the consequences of this inequality worldwide is provided by the increases in world food prices as a consequence of the cultivation of agricultural raw materials for industrial utilization.⁷¹ Up to now, the NWI has been (too) indifferent with regards to this important aspect of sustainability oriented policies.

⁷¹ See to this respect, among others, Diefenbacher, Hans (2008): „Zum Konfliktpotenzial erneuerbarer Energien“ (On the conflict potential of renewable energies), in: Heinemann-Grüder, Andreas et al.: Friedensgutachten (Peace report) 2008. Berlin/Münster: Lit-Verlag, p. 231 – 244.

11. Institutionalisation: conceptual layout and ideas for establishing welfare indicators

Past experience with the development of complex sustainability indicators in Germany suggests the three criteria and methods described as follows:

First point: The welfare index should not be overloaded. Significant issues which have been missing in sustainability strategies thus far should be better recorded in independent parts of these reporting systems. This category includes above all:

- Biodiversity – there is good reason to think it is the crown discipline of sustainable development
- Happiness or wellbeing of the citizens. Indexes referring to the measurement of happiness can not be monetarised in a reasonable way. The discussions related, also about the quality of data generation and the interpretation of subjective indicators, should be followed in parallel during the successive elaboration of the welfare index introduced in this paper.⁷²

Second point: To develop the welfare index further an intelligent participation process should be planned. The political and public debate about new parameters in the measurement of welfare is an essential goal, connected with this new proposal of indicators. In the case of the German federal sustainability strategy, there has been an organised process of integration and participation of social stakeholders from the beginning. It would be practical to continue this tradition in a manageable framework. Public forums are expensive, though. Furthermore, the partial variables will continue to be disputable, to some extent, when they are seen by the light of different social interests; at the same time, this is also true for the current variety of scientific positions. Under such circumstances, traditional participation processes hold the danger of making the index eternally provisional with their continuing feedback modifications. In order to avoid an eventual blocking of the formation of consensus or the continual arising of new differentiations it is advisable to fix a binding time frame from feedback, as the case may be, using internet. In principle, this opens good chances for a call for input and facilitates, at the same time, the accomplishment of a possibly planned participation process.

⁷² See to this respect above all MEA (2005), the chapters on the relation between biodiversity and wellbeing.

Third point: An intelligent institutionalisation of information finding and reporting about welfare measurements complementary to GNI should be built up. It is worth thinking about the securing of a “relative autonomy“ of sustainability reporting from politics and therefore from its possibly rapidly changing priorities. The indicator systems of sustainability reporting are tools to build *long term policies*. Single deficits or conflicts should not be allowed to jeopardise the reporting system as such. The institutional anchoring of welfare indicators in independent research centres or in the Council for Sustainable Development is an important basis for their legitimating and a guarantee for a long lasting form of this kind of reporting based on indicators. Furthermore, the finding of data should be supported wherever possible by various institutions as well as by the Federal Environment Agency.

12. Conclusions and outlook

12.1. The issue of qualitative economic growth as a frame for the further discussion on a national welfare index

The consequences caused by the modality of translation of social and economic processes into parameters and by the modality of definition of a “positive development” as such often seem to be underestimated. The awareness-building orientation of stakeholders on these figures is still brought about in an equally massive and routinised way, as shown by the example of GDP. Nearly like a lighthouse in the troubled waters of economy, such a fixed orientation point leads to the adoption of multifaceted and cost-intensive manoeuvres: “The dominance of GDP is particularly evident when it is falling; then panic breaks out – that should not necessarily happen” (European Economic and Social Committee 2008).

At present, the opposite direction of influence can be clearly recognised as well, in the sense of an evolutionary, although slow, further development or adaptation of the reporting systems to social, economic and ecological changes, as the discussions “beyond GDP” mentioned above have already shown at OECD- und EU-level as well as in the single countries.

Nowadays, the financial and economic crisis, in spite of the undisputed need for timely reaction with suitable economic policies, is offering at the same time an opportunity for such a re-orientation: regarding the evaluation as to whether the reproduction of the requisites for economic growth in a traditional sense is possible and appropriate, and regarding the evaluation as to whether a national welfare index, for instance, could already be the expression of a changed socio-economic basis at the level of social mirroring.

An important function of the research project presented in this paper is contributing, through the NWI, to problematise the hitherto dominating growth paradigm and to give shape to a sustainable economic development. At this point it is worth saying openly, that this happens on the background of an upgraded appreciation of state institutions as opposed to market institutions. As a matter of fact, the developments of the crisis have not only made clear, although against the intentions of large circles of the political and economic elite, how little market forces and the self-healing forces allegedly connected with them contribute to the stability of social development. They also show that, in the context of a sustainability strategy, important impulses towards a stronger *qualitative* economic growth ultimately have to come primarily from the political sphere. Certainly, this task is not yet fully accepted by the political sphere. In fact, the “neutrality” of GDP as regards the quality of the goods and services produced does suggest the equal treatment of all economic activities, but this judgment may turn out to be false, if one considers aspects of welfare and of sustainable development with quantitative climate protection objectives and resource efficiency enhancements defined unambiguously.

Some of the issues interrelated to all this in the international debate are:

- *sustainable economic growth*: How should “sustainable growth” be defined? Is it possible to pursue such a goal in the context of a durable development compatible with the environment at political and economic level?
- The question about the essential characteristics of a *sustainable world economy* (e.g.: Worldwatch Institute 2008).
- The debate, going beyond the mere welfare discussion, as to whether it is possible, if not necessary, to pursue *Steady-State-Economies* in future, that is to say economies with “zero growth” as a viable model.⁷³

To this respect a new paradigm has arisen, which contradicts the hitherto dominating growth imperative even more drastically, since it explicitly regards a contraction of western economies as possible or maybe even probable. It is a concept of “*De-Growth*”. According to this approach, ecological sustainability and social justice are considered to be achievable aims, only if permanent economic growth in the classical sense will not be at the centre of political and economic strategies any longer. The problems of western industrial societies, discussed in particular in France and Italy and more and more often also in England, demonstrate, according to this thesis,

⁷³ See to this respect the critical discussion on the conditions and possibilities for the realisation of such a model in Binswanger (2007).

that even the decoupling of economic growth from environmental deterioration, achievable in real terms, or years of improvements of the eco-efficiency of production and consumption are not sufficient for sustainable development, and that they would be partially annulled by strong rebound effects: for example, material savings in consumer goods lead to lower prices and therefore contemporarily stimulate consumers' demand.

These currents of thought are very important for the development and, above all, for the future topicality and acceptance of the welfare index introduced in this paper. At present, we think that, in Germany, a slowly growing development of the NWI should be seen as positive. If a similar embedding of indicators is carried out as in the German federal sustainability strategy, then at least a political target could be indicated. Indeed, as a result, the index can also grow when private consumption is stagnating or slightly falling: This would be possible in the case of a more equal income distribution or of a growth in unpaid social work without a reference market, but also in the case of a successful reduction of environmental damage or of the social consequential costs of socio-economic development. Vice versa, this implies at the same time that the national welfare index can also fall when private consumption grows.

The discussion should continue on this point, though, since the NWI is also based, ultimately, on the basis quantity of private consumption, which goes straight into the calculation of the index with a positive sign. According to new surveys, for example in the field of the "Carbon Footprint-Concept" (Hertwich/Peters 2009) 72% of all greenhouse gas emissions in the world are due to private consumption, and a growing income goes hand in hand with a growing emission (in the case of CO₂ only, expense elasticity amounts to 0.81).

This question shows that, in the next few years, a general formation of consensus about the practical shaping of market economy and therefore ultimately also about future lifestyle will be necessary in order to be able to make the relevant decisions. Such discussions should be supported with the NWI; in this context the index will have to prove its adequacy in the various political fields.

Inside the narrower, but still higher ranking economic debate on sustainable growth, the NWI can deliver an empirical contribution as to how such a sustainable growth can be conceptually understood, made operational and measured, without claiming to be able to deal exhaustively with all aspects of the concept.

- Sustainable growth means no turnover orientation for the sake of it; on the contrary, it gives

a critical evaluation of all single items of economic accounting, so that a “reframing“ takes place. For example, a reduction in ecologically damaging subsidies in the fields of (air) traffic, brown coal mining and agriculture might also lead to income losses.⁷⁴

- Sustainable growth is oriented on the qualitative contribution of economic activities and occurrences; qualitative means here the possibility of a differentiation and therefore of a prioritisation of single economic activities in view of sustainability criteria, as it becomes clear in the handling priorities of the “Green New Deal” concepts or with regards to the growing importance of the environmental industries for economic development in Germany.⁷⁵
- Sustainable growth could be then achieved as a result, at least for a certain period of time, when economic activities are no longer connected with economic, social and ecological erosion or, at least, when these erosion phenomena tend to diminish strongly.
- Sustainable growth means, on the whole, moderate growth in modern industrial societies, also in order to minimise those rebound effects which arise through product quantities and activities tending to be more compatible with the environment but steadily growing in terms of mass.

There are, in fact, many reasons to believe that a society and an economy consistent with the requirements of sustainability can be achieved in the long run only through “steady state economy” (among others Victor 2008, SDC 2009); “steady state” does not indicate, in this sense, a completely static equilibrium but a situation in which some parts of the economy can definitely grow while others, correspondingly, experience a contraction. The starting point for this reflection is the thesis of “uneconomic growth“ in the sense of Herman Daly, who claimed that a steadily growing part of the economic growth is used up in order to guarantee its own prerequisites in the ecological, economic and social domain. One of the most reasonable reactions to this is “Cleaner production” or “Better production”, i.e. the production of durable fixed assets or consumer goods. Both lead to a possible reduction in turnover, in the first case through the rule of more expensive products, such as bio-products in the agricultural sector, in the latter case through lower turnover growth because of the longer useful life of consumer goods.

A further element to be added is the necessity of a resource management for renewable raw

⁷⁴ See to this respect a study by Greenpeace (2008) about environmentally damaging subsidies and tax relief of the Federation in the field of energy, amounting to a total volume of 34.5 million Euro. URL: http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/energie/Greenpeace_Subventionsstudie_final.pdf

⁷⁵ See for example UNEP 2009: A Global Green New Deal, as well as Jänicke/Zieschank 2008 about the structure and function of the environmental industry.

materials as well as for non-replaceable raw materials. In order to avoid predatory exploitation and excessive utilization, for example in the stocks of wood or fish available, altogether “well-balanced” eco-balances are absolutely necessary, although it should be discussed in any case, whether this equilibrium has to be reached in small or rather in large areas separately, and whether certain temporary fluctuations can be accepted or not. If the concept of “Carrying Capacity“, known from the research on ecosystems, were to be taken into better consideration as for the consequences of production and consumption, the result would be strongly limiting impulses for the dynamics of growth. A reduction in the amount of waste would be possible so far, only if also GDP/GNI, which are clearly correlated to it in many states, were to diminish. The “management rules for sustainability”,⁷⁶ created in Germany by respected experts in enquête commissions or in experts’ bodies, are ultimately compatible only with a steady state economy.

This final idea is also underlined by the conclusions of the reporting system about the Ecological Footprint, according to which, in principle, the world economy is already running on the capacity of 1,2 planets, at present. Only with constant economic activities can efficiency enhancement be so strong as to avoid an excessive impact on the ecological systems of the earth.

12.2 On using the NWI – a provisional outlook

The NWI is to be seen as a starting point for a debate on the issues of economic growth, sustainability and social prosperity going beyond academic circles. In Germany, this discourse seems to arouse a certain interest, if one can take an indication from previous experiences in the presentation of the provisional results during the experts’ workshops at the beginning of 2009, in Berlin at the Federal Ministry for the Environment, and contacts with mass-media.⁷⁷

No steps have been taken thus far towards a larger public and no discussion has taken place with other federal institutions, although it would be thinkable, since the welfare index could possibly influence the definition of the set of indicators for the German federal sustainability strategy, for

⁷⁶ They were used also in the draft of the German federal government about the progress report on the German sustainability strategy in 2008. For instance, one of the rules says: Non renewable natural goods (such as minerals or fossil energy sources) may be used continuously only to the extent to which their function can be replaced through other materials or through other energy sources. In the long term, the emission of substances or the use of energy may not exceed the adaptability of eco-systems, such as climate, forests or the oceans.

⁷⁷ Reports were published in the first six months of 2009 in several newspaper articles, among which some articles in “Zeit” and in “Spiegel”, and broadcast in several radio programmes, like Deutschlandfunk und Südwestfunk 2. An article for „Zeitzeichen“ is under preparation now.

example if it were to be used as an index to compare with GDP.

The participants in the project agree that this discussion has to be carried on in interrelation with the resonance coming from politics, administration, science and public opinion. There is no “missionary” attitude in all this, though. However, the NWI can be understood as an attempt to use the information surplus of a new instrument, in the sense of the “best available knowledge”. With this approach it is not necessary to wait until a nearly perfect or consensually widely accepted information instrument for the ascertainment of social welfare aspects will be available. In Germany, such an expectation might lead to a never ending attempt of successive improvement: some previous attempts, made in the Eighties, to elaborate a comprehensive social reporting for Germany with indicators led us ultimately back to the starting point, just because the result achieved could not be considered to be perfect, with the consequence that, for many years, social reporting was unjustifiably left to lead a shadowy existence.

However, the NWI can be used unspectacularly by all stakeholders who hope to gain an added value from it. If the methodological or political preoccupations are too strong, then one can still resort to the reporting systems already available for economic or sustainable development. The participants in the project intend to continue writing the NWI in its present day form in the next few years with continuously updated information and, if possible, to improve it, if progress in data availability will allow to do so. Therefore, the question as to whether the NWI should be applied or not, could also be dealt with at a later stage.

The welfare index was created as a reaction to the weaknesses of GDP/GNI; for this reason it must be used at the aggregated level, otherwise its ambition would very quickly give way to the clearly existing self-criticism. The fact that the main weakness necessarily lies herein, and that this was very soon recognised also by institutions with technical expertise like the German Federal Statistical Office, belongs to the process of elaboration of ambitious complex indicators. Preoccupations are related with good reason to the uncertainties in the overall selection of the single indicators, to the data situation partly in need of improvement, to the adopted value estimates in the attribution of monetary cost quantities to physical and social processes like environmental damage and consequential social costs, to the different meaning of partial variables and, considering the width of the index composition, certainly also to the issue of transparency.

Giving up the further use of monetary complex indexes, “composite indicators”, on account of

these lines of argument, would not change anything in the evident *need* for such supplementary information. This is clearly understandable on the basis of the explanations included in chapter 4.

In order to guarantee visibility and public communicability, an index at the same level as GDP/GNI is an important advantage, since it is only through the different progression of both curves, then indexed, that the chance of an interest for alternative welfare measuring might grow in the course of time. The different curves of development make the question of the “real” welfare of a country evident, although it will probably never find an “objective” answer.

In the eyes of the representatives of mass-media, political stakeholders and decision makers, a representation in aggregated form illustrating the core information seems to be sensible and to some extent indispensable. Scientific experts and representatives of industrial, commercial or professional unions often prefer using partial variables: if we do not intend to consider this need, then, at this stage of the project it would be possible to present some single components together with the aggregated indicator, i.e. the charts concerning unpaid work or the development of external environmental effects. In this way the advantages of complementary detail information could be delivered additionally, particularly in the comparison with the GDP/GNI curve.

Both approaches are justified; this becomes very clear if one considers the data available as an “information pyramid”.⁷⁸ The participants in the project intend to leave the decision on how to use the NWI and its partial variables to the potential user of the information system. In order to achieve an adequate interest for the newly elaborated National Welfare Index, though, from the viewpoint of its “constructors” it would be useful to present the highly aggregated statements in any case: a deepening of the knowledge on the part of the information user is always possible, but the path through the thick forest of single trees does not always lead to a clearing of quick and encompassing perception.

In conclusion, at this stage of the research-and-development project it is worth mentioning that the results should also be presented in the administrative und parliamentary environment, to the branch colleagues in the scientific environment as well as to the general public. Part of this is an international conference to discuss the results of alternative welfare measuring, particularly in relation with the problematic of growth.

⁷⁸ According to this analogy, the total result of NWI would have to be found in the thickened top of such a pyramid, the cluster of ecological, economic or social partial variables is in the middle and single variables with the belonging data background are in the larger base of the pyramid.

Appendix 1: a second, completed variant of the NWI

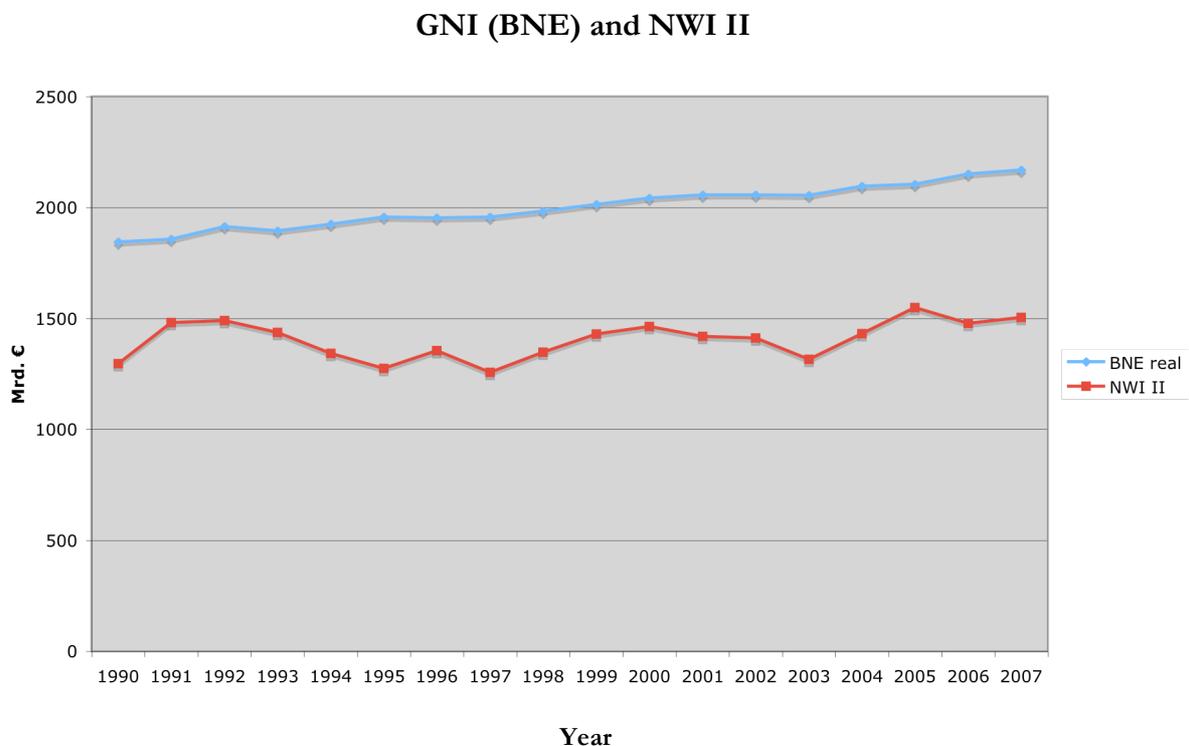
The following graphs show a second variant of the NWI including the additional variables 22 and 23: net new indebtedness of public budgets and public expenditure for ecological transformation. Therefore, the calculation of the New Welfare Index is made using the formula below:

$$\text{NWI}_{II} = \text{Var. 2} + (\text{Var. 3} + \text{Var. 4} + \text{Var. 5} + \text{Var. 6} + \text{Var. 20} + \text{Var. 21} + \text{Var. 23}) - (\text{Var. 7} + \text{Var. 8} + \text{Var. 9} + \text{Var. 10} + \text{Var. 11} + \text{Var. 12} + \text{Var. 13} + \text{Var. 14} + \text{Var. 15} + \text{Var. 16} + \text{Var. 17} + \text{Var. 18} + \text{Var. 19} + \text{Var. 22})$$

From the second variant both the basic form (following the formula above) and the modified variant (without variables 20 and 21) are calculated and shown in the following graphs.

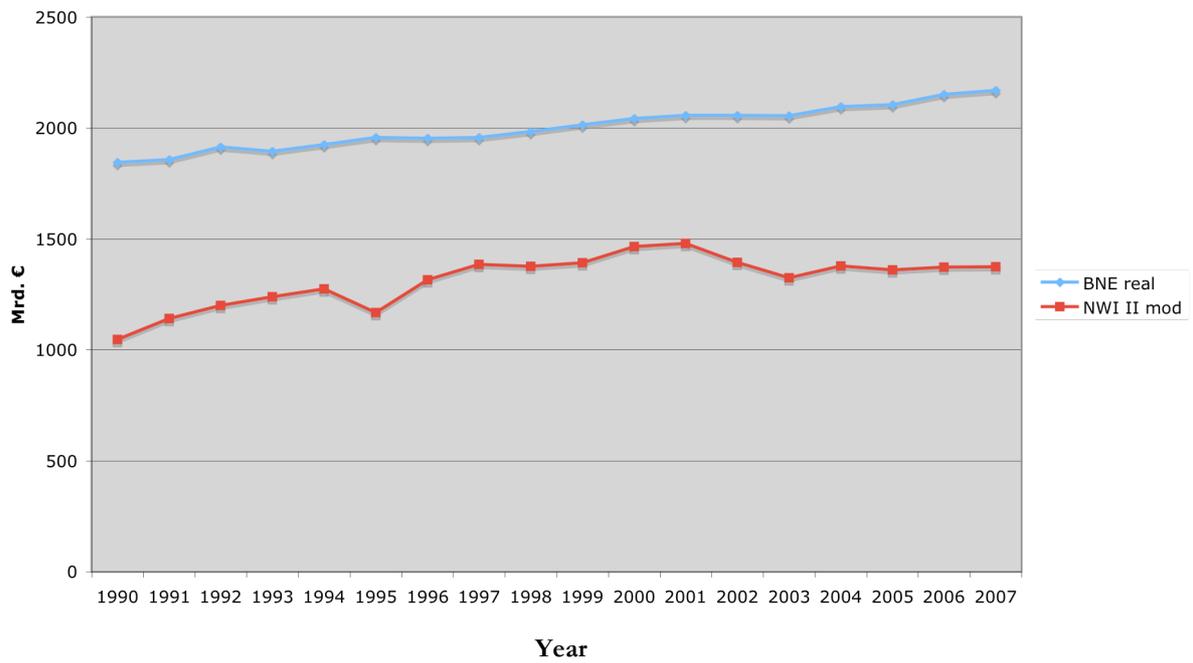
The result is documented in the following graphs:

– Figure 38 –



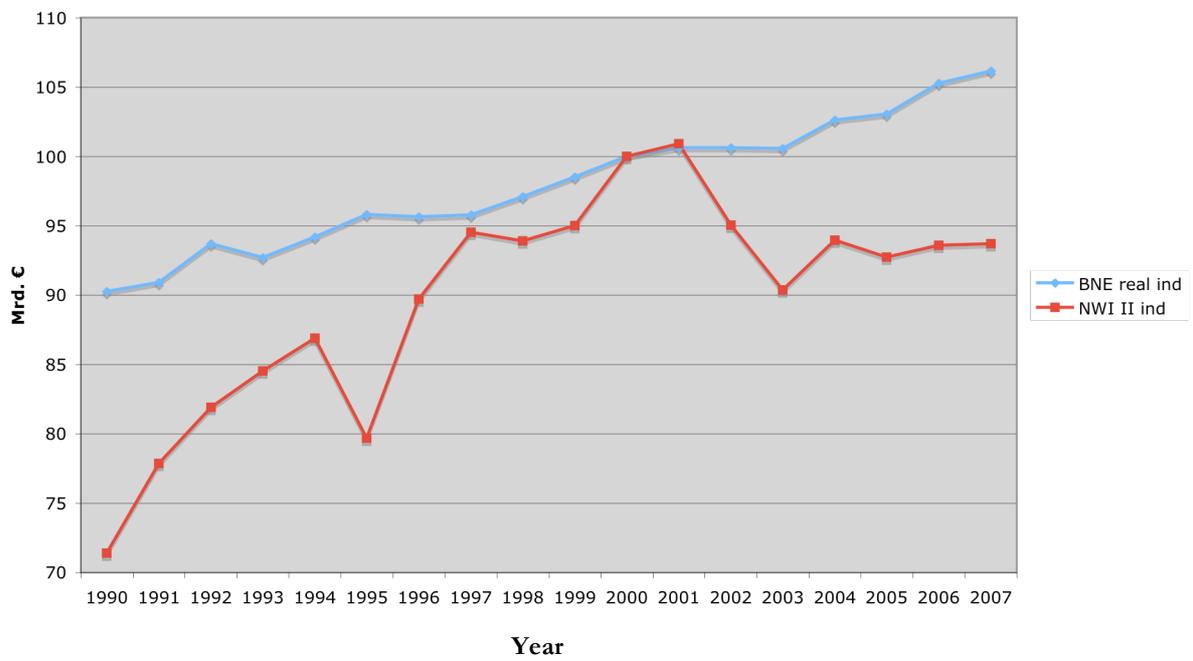
– Figure 39 –

BNE (GNI) and NWI_{mod.} II



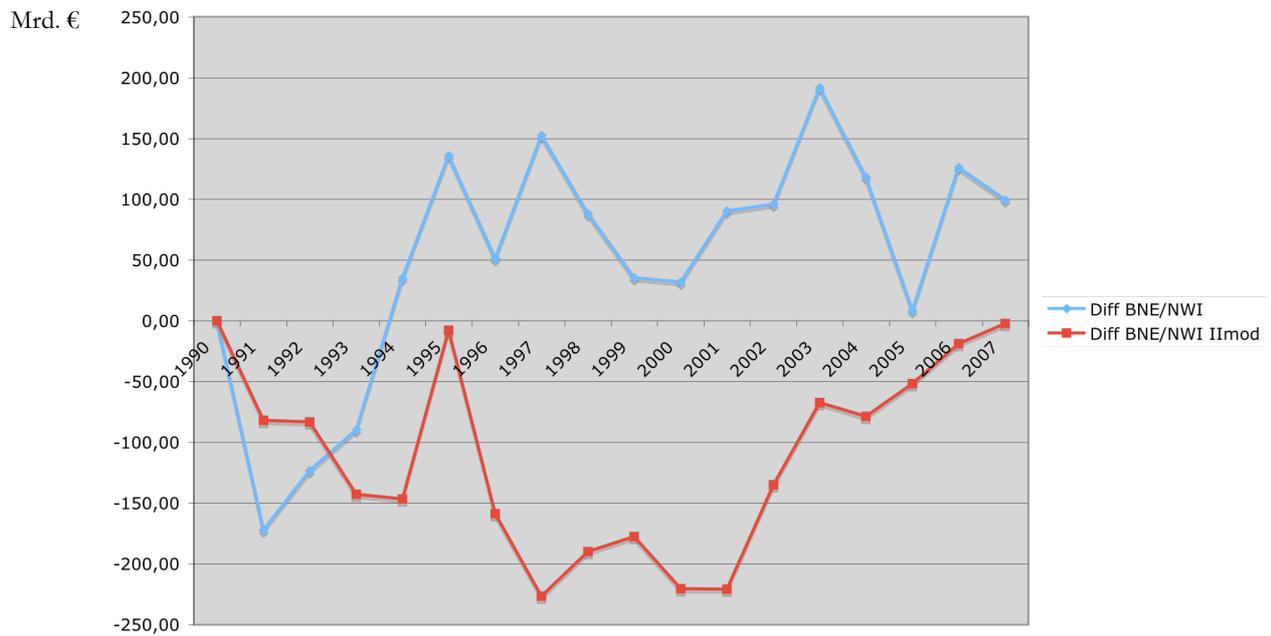
– Figure 40 –

BNE (GNI) and NWI_{mod.} II: 2000 = 100



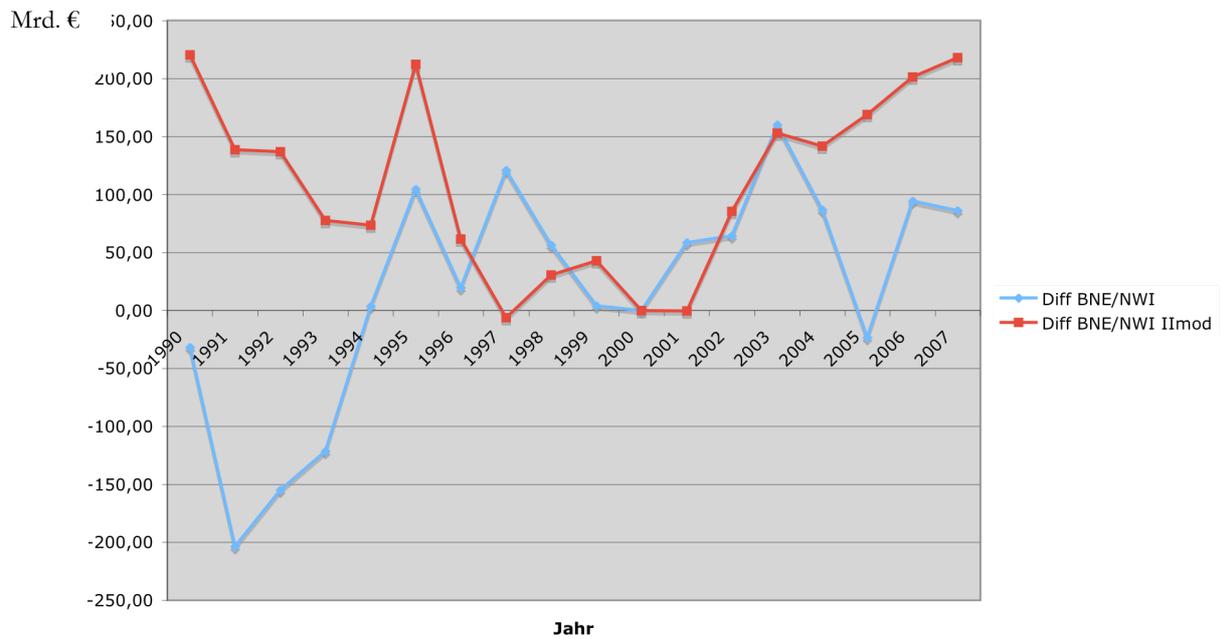
– Figure 41 –

Measure of distance A: 1990 = 0



– Figure 42 –

Measure of distance B: 2000 = 0



The results for the second variant of the NWI are to be seen as temporary, since the data on expenditure for ecological transformation are not yet available and for this reason only a “reminder item” has been used here (see data sheet on variable 23). Therefore the difference between NWI and NWI_{II} is to be ascribed mainly to the variable net new indebtedness; it is clearly recognizable here that some maximum values of this variable, such as in the year 1995, are now to be found in the progression of NWI_{II} as well. Nonetheless, a possible transition from NWI to NWI_{II} should be discussed only at a later stage, when data on variable 23 are available with sufficient empirical precision.

Appendix 2: Data

	Var 01/02	Var 03	Var 04	Var 05	Var 06
	Weighted	Household		Publ. expandit.	Consumer
	consumption	labour	Voluntary work	health education	durables
1990	874,65	599	50	95,00	-26,45
1991	945,00	603	51	94,00	-26,45
1992	1.051,16	613	51	92,00	-56,29
1993	1.052,19	622	51	90,00	-37,14
1994	1.065,65	630	52	89,00	-25,10
1995	1.039,65	638	52	88,13	-23,22
1996	1.088,55	645	53	87,55	-29,73
1997	1.138,79	652	53	82,83	-28,22
1998	1.103,58	659	54	82,44	-26,80
1999	1.126,51	666	54	81,71	-38,77
2000	1.149,69	674	55	82,01	-14,40
2001	1.173,38	684	56	81,47	-24,76
2002	1.118,88	690	56	82,21	-21,85
2003	1.075,67	695	57	81,99	-14,63
2004	1.122,22	700	57	80,46	-13,56
2005	1.084,46	705	58	80,80	-8,37
2006	1.096,67	709	58	80,00	-24,77
2007	1.072,19	713	59	79,00	-24,77

Var 07	Var 08	Var 09	Var 10	Var 11	
Commuting	Cost of traffic accidents	Cost of crime	alcohol and drug abuse	Compensat. social exp./env.	
1990	31,00	45,00	3,88	20,50	44,00
1991	32,80	44,00	3,75	20,50	43,00
1992	33,03	43,00	5,52	20,50	42,00
1993	30,39	42,00	5,38	20,50	41,00
1994	30,80	40,00	10,69	20,50	40,00
1995	31,21	38,79	9,00	20,50	39,00
1996	32,17	37,30	8,97	20,50	38,00
1997	32,59	36,65	11,02	20,50	37,45
1998	33,83	35,60	8,12	20,50	35,30
1999	33,18	35,66	10,43	20,50	33,98
2000	33,11	35,62	9,46	20,50	34,32
2001	33,55	33,94	10,93	20,50	32,70
2002	33,74	33,19	9,84	20,50	32,29
2003	33,43	30,94	11,93	20,50	32,05
2004	33,75	29,10	10,43	20,50	32,09
2005	33,26	28,00	8,42	20,50	32,39
2006	34,45	26,00	8,19	20,50	32,70
2007	35,00	25,00	8,50	20,50	33,00

	Var 12	Var 13	Var 14	Var 15	Var 16	
	Water pollution	Soil pollution	Air pollution	Noise	Changes in wetland areas.	
1990	14,60	2,00	59,99	3,50	0,00	0,00
1991	14,90	2,00	48,51	3,60	0,00	0,00
1992	13,70	2,00	42,29	3,70	0,00	0,00
1993	14,50	2,00	38,87	3,70	-0,10	-0,10
1994	14,40	2,00	34,25	3,80	-0,10	-0,10
1995	14,30	2,00	30,07	3,80	-0,10	-0,10
1996	14,00	2,00	27,59	3,90	-0,10	-0,10
1997	14,00	2,00	25,95	4,00	-0,10	-0,10
1998	14,00	2,00	23,82	4,10	-0,10	-0,10
1999	13,60	2,00	22,35	4,10	-0,10	-0,10
2000	13,30	2,00	20,59	4,20	-0,10	-0,10
2001	13,00	2,00	19,89	4,10	-0,10	-0,10
2002	12,90	2,00	18,86	4,30	-0,10	-0,10
2003	12,50	2,00	18,35	4,20	-0,10	-0,10
2004	12,50	2,00	17,88	4,20	-0,10	-0,10
2005	12,40	2,00	17,33	4,00	-0,10	-0,10
2006	12,30	2,00	16,75	3,90	-0,10	-0,10
2007	12,10	2,00	15,00	4,00	0,00	0,00

	Var 17	Var 18	Var 19	Var 20	Var 21	Var 22	Var 23
	Agricult.	Non	CO2	Net changes	Capital	Net new	Ecological
	areas	renewables	emissions	fixed capital	account	debts	transform.
1990	0,59	169,52	85,96	200,00	50,00	63,40	2,00
1991	0,59	167,49	82,6	350,00	-10,00	59,70	2,00
1992	0,59	172,91	79,1	300,00	-10,00	90,44	2,00
1993	0,59	176,75	78,19	220,00	-23,00	83,54	2,00
1994	0,59	184,26	76,86	95,00	-27,00	78,16	2,00
1995	0,59	188,28	76,72	140,00	-34,00	170,71	2,00
1996	0,59	200,34	78,05	50,00	-10,00	64,20	2,00
1997	0,51	201,56	75,46	-130,00	1,00	49,47	2,00
1998	0,51	209,91	73,64	-10,00	-18,00	32,96	2,00
1999	0,51	213,04	71,47	15,00	22,00	34,17	2,00
2000	0,51	222,57	71,4	25,00	-27,00	11,34	2,00
2001	0,43	233,2	72,59	-80,00	19,00	12,58	2,00
2002	0,43	237,4	71,26	-20,00	39,00	53,77	2,00
2003	0,43	249,87	72,17	-70,00	61,00	80,45	2,00
2004	0,43	260,45	71,75	-65,00	118,00	72,02	2,00
2005	0,43	270,00	70,14	70,00	120,00	60,10	2,00
2006	0,43	280,00	70,00	-40,00	145,00	38,27	2,00
2007	0,43	290,00	70,00	-20,00	150,00	7,66	2,00

	NWI	NWI mod.	BNE (GNI) real
1990	1.361,66	1.111,66	1844,21
1991	1.542,82	1.202,82	1857,24
1992	1.582,52	1.292,52	1914,69
1993	1.521,28	1.324,28	1893,99
1994	1.421,50	1.353,50	1924,52
1995	1.446,40	1.340,40	1957,69
1996	1.421,05	1.381,05	1954,20
1997	1.307,80	1.436,80	1956,73
1998	1.383,00	1.411,00	1984,07
1999	1.465,74	1.428,74	2013,11
2000	1.476,82	1.478,82	2043,16
2001	1.432,36	1.493,36	2055,97
2002	1.467,63	1.448,63	2055,79
2003	1.397,75	1.406,75	2054,96
2004	1.504,15	1.451,15	2096,50
2005	1.611,11	1.421,11	2105,41
2006	1.516,78	1.411,78	2150,60
2007	1.512,89	1.382,89	2168,80

Appendix 3: Literature

- Alber, J./Fahey, T./Saraceno, Ch. (Eds.) (2008): Handbook of Quality of Life in the Enlarged European Union London/New York.
- Ark, B. van/ Jäger, K./Manole, V./Metz, A. (2009): Productivity, Performance, and Progress. Germany in International Comparative Perspective. Englischsprachige Langfassung einer Studie von The Conference Board im Auftrag der Friedrich-Ebert-Stiftung. Bonn. URL: <http://library.fes.de/pdf-files/wiso/06289.pdf>
- Atkinson Foundation (2008): Canadian Index of Wellbeing. URL: <http://www.ciw.ca>
- Binswanger, H. Chr. (1979): „Natur und Wirtschaft“, in: Meyer-Abich, Klaus-Michael (Hrsg.): Frieden mit der Natur. Freiburg/Basel/Wien: Herder.
- Binswanger, H. Chr. (2007): Die Wachstumsspirale. Marburg: Metropolis.
- Bleys, B. (2006): The Index of Sustainable Economic Welfare for Belgium – Data, Methodology and Preliminary Results. Brussels: Vrije Universiteit
- Bleys, B. (2007): Simplifying the Index of Sustainable Economic Welfare: A Case Study for the Netherlands. Brussels: Vrije Universiteit.
- Bleys, B. (2008): A Simplified Index of Sustainable Economic Welfare for France, 1980 – 2006. Brussels: Vrije Universiteit.
- Bund für Umwelt- und Naturschutz/Deutscher Naturschutzring/Naturschutzbund Deutschland (Hrsg.) (2008): Nationale Nachhaltigkeitsstrategie – Entwurf zum Fortschrittsbericht 2008. Stellungnahme der Umweltverbände. URL: http://www.bund.net/fileadmin/bundnet/pdfs/nachhaltigkeit/20080618_nachhaltigkeit_stellungnahme_fortschrittsbericht.pdf
- Bundesamt für Statistik/Bundesamt für Umwelt, Wald und Landschaft/Bundesamt für Raumentwicklung (Hrsg.) (2003): Nachhaltige Entwicklung in der Schweiz. Indikatoren und Kommentare. Neuchâtel.
- Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Hrsg.) (2008): Wachstum, Beschäftigung und Klimaschutz. Grundsatzpapier für die Investitionskonferenz des BMU im Juni 2008, hekt. Mskr.
- Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit /Umweltbundesamt (Hrsg.) (2008) : Umwelt und Innovation – Eine Evaluation von EU-Strategien und Politiken. Reihe Umwelt, Innovation, Beschäftigung Band 1/08
- Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit /Forschungsstelle für Umweltpolitik (2008): Die Dritte Industrielle Revolution - Aufbruch in ein ökologisches Jahrhundert. Dimensionen und Herausforderungen des industriellen und gesellschaftlichen Wandels. Berlin.
- Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit / Umweltbundesamt (2009): Umweltwirtschaftsbericht 2009. Berlin und Dessau.

- Bundesregierung Deutschland (2002): Perspektiven für Deutschland. Unsere Strategie für eine Nachhaltige Entwicklung. Berlin.
- Bundesregierung Deutschland (2008): Fortschrittsbericht 2008 zur nationalen Nachhaltigkeitsstrategie.. Für ein nachhaltiges Deutschland. URL: http://www.bundesregierung.de/Content/DE/Publikation/Bestellservice/___Anlagen/2008-11-17-fortschrittsbericht-2008,property=publicationFile.pdf
- Castañeda, B. (1997): An Index for Sustainable Economic Welfare for Chile. Solomons: Institute for Ecological Economics.
- Center for American Progress (Hrsg.) (2007): Progressive Growth. Transforming America's Economy through Clean Energy, Innovation, and Opportunity.
- Cobb, C.W. (1989): „The Index for Sustainable Economic Welfare“, in: Daly, H./Cobb, J. B. Jr. (Hrsg.): For the Common Good – Redirecting the Economy toward Community, the Environment, and a Sustainable Future. Boston, 401 – 457.
- Cobb, C.W./Halstead, T. (1994): The Genuine Progress Indicator – Summary of Data and Methodology. San Francisco: Redefining Progress.
- Commission of the European Communities (2009): Communication from the Commission to the Council and the European Parliament. GDP and beyond - Measuring Progress in a changing World. COM (2009) 433 final. Brussels. URL: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0433:FIN:EN:PDF>
- Dahm, D./Scherhorn, G. (2008): Urbane Subsistenz. Die zweite Quelle des Wohlstands. München 2008.
- Deutsche Bank Research (Hrsg.) (2008): Deutscher Maschinenbau macht Wirtschaft fit für die Zeit nach dem Öl. Energie und Klimawandel – aktuelle Themen 435. (Autor: Josef Auer). Frankfurt/M.
- Deutsche Bank Advisors (2009): Global Climate Change Regulation. Policy Developments: July 2008-February 2009. URL: http://www.dbadvisors.com/deam/stat/globalResearch/climatechange_globalpolicydevelopments.pdf
- Deutsches Institut für Medizinische Dokumentation und Information (DIMDI) (Hrsg.) (2003): ICD-10-GM 2004 Systematisches Verzeichnis: Internationale Statistische Klassifikation der Krankheiten und verwandter Gesundheitsprobleme. Köln: Deutscher Ärzte-Verlag.
- Diefenbacher, H. (1991): „Der ‚Index of Sustainable Economic Welfare‘ – eine Fallstudie über die Entwicklung in der Bundesrepublik Deutschland“, in: ders./Habicht-Erenler, S. (Hrsg.): Wachstum und Wohlstand – Neuere Konzepte zur Erfassung von Sozial- und Umweltverträglichkeit. Marburg, 73 – 88.
- Diefenbacher, H./Ratsch, U. (1992): Verelendung durch Naturzerstörung – die politischen Grenzen der Wissenschaft. Frankfurt, 121 – 148.
- Diefenbacher, H. (1994): „The Index of Sustainable Economic Welfare – A Case Study of the Federal Republic of Germany“, in: Cobb, C.W./Cobb, J.B. Jr. (Hrsg.): The Green

- National Product – A Proposed Index of Sustainable Economic Welfare. Lanham/New York/London, 215 – 246.
- Diefenbacher, H. (2008): „Zum Konfliktpotenzial erneuerbarer Energien“, in: Heinemann-Grüder, A. et al.: Friedensgutachten 2008. Berlin/Münster, 231 – 244.
- Diefenbacher, H./Zieschank, R. (2008): Wohlfahrtsmessung in Deutschland – ein Vorschlag für einen neuen Wohlfahrtsindex: Statusbericht zum Forschungsprojekt. Heidelberg, auch URL: <http://www.beyond-gdp.eu> > News
- Dimas, St. (2007): The European contribution to a global effort: next steps in measuring progress. Manuskript, Europäisches Parlament, 20. November 2007.
- Dolan, P./Peasgood, T./White, M. (2006): Review of research on the influences on personal well-being and application to policy making. University of Sheffield. Report commissioned by Defra. London.
- Dorow, F. (1991): „Probleme der monetären Bewertung in einer Umweltökonomischen Gesamtrechnung“, in: Hölder, E. u.a.: Wege zu einer Umweltökonomischen Gesamtrechnung. Stuttgart, S. 34 – 45.
- Edenhofer, O. / Stern, N. (2009): Towards a global green recovery. Recommendations for immediate G20 action. Report submitted to the G20 London Summit. URL: http://www.pik-potsdam.de/members/flachs/publikationen-2/edenhofer-stern-global-green-recovery-g20/view?set_language=de
- Enquête-Kommission „Schutz des Menschen und der Umwelt“ (Hrsg.) (1998): Abschlussbericht. Deutscher Bundestag. Bonn.
- European Environmental Agency (2008): EEA core set of indicators. URL: <http://themes.eea.europa.eu/IMS/CSI>
- EUROSTAT (Hrsg.) (2007): Measuring progress towards a more sustainable Europe – 2007 monitoring report of the EU sustainable development strategy. Luxembourg: Office for official publications of the European Community. URL: www.insee.fr/fr/publications-et-services/dossiers_web/dev_durable/eurostat_report2007.pdf
- EUROSTAT (2008): Nachhaltige Entwicklung in Zahlen. URL: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1998,66119021,1998_66391726&_dad=portal&_schema=PORTAL
- Frankfurt School of Finance & Management / UNEP (2009): The global financial crisis and its impact on renewable energy finance. Frankfurt.
- Frenkel, M./John, K.D. (2006): Volkswirtschaftliche Gesamtrechnung, 6. Auflage. München.
- Goossens, Y. et al. (2008): Alternative progress indicators to Gross Domestic Product (GDP) as a means towards sustainable development [IP/A/ENVI/ST/2007-10]. Brussels: European Parliament, DG Internal Policies.
- Guanno, G./Tiezzi, S. (1998): „The Index of Sustainable Economic Welfare for Italy“, in: Nota di Lavoro, Heft 5, 1998.

- Hamilton, C./Saddler, H.(1997): The Genuine Progress Indicator. A New Index of Changes in Well-Being in Australia. Lyneham: The Australia Institute.
- Hertwich, Edgar G. /Glen, P. Peters (2009): Carbon Footprint of Nations: A Global, Trade-Linked Analysis. In: Environ. Sci. Technol., Article ASAP. URL: <http://pubs.acs.org/doi/abs/10.1021/es803496a>
- Hochreiter, H./Obermayr, B./Steiner, K./Stockhammer, E. (1995): Der Index of Sustainable Economic Welfare (ISEW) – eine empirische Studie zur Wohlstandsentwicklung in Österreich von 1955 bis 1992. Interdisziplinäres Institut für Umwelt und Wirtschaft, Wien.
- IfnE – Ingenieurbüro für neue Energien (2009): Strom aus erneuerbaren Energien bis zum Jahr 2020. Kosten-Nutzen-Betrachtung ausgewählter Aspekte. Teltow. (Studie im Auftrag des Bundesverbandes Erneuerbare Energie e.V.).
- IFOK (2008): Ergebnisbericht Fachdialoge zur nationalen Nachhaltigkeitsstrategie 2007. Bensheim/Berlin/München.
- Instituut voor Milieu- en Systeemanalyse (IMSA) (Hrsg.) (1995): A Pilot ISEW for the Netherlands. Amsterdam. Manuskript.
- Jackson, T./Marks, N. (1994): Measuring Sustainable Economic Welfare – A Pilot Index: 1950 – 1990. London: Stockholm Environment Institute.
- Jackson, T./Stymne, S. (1996): Sustainable Economic Welfare in Sweden – A Pilot Index 1950 – 1992. Stockholm: Stockholm Environment Institute.
- Jänicke, M./Zieschank, R. (2004) Zielbildung und Indikatoren in der Umweltpolitik, in: Müller, F./Wiggering, H. (Hrsg.): Umweltziele und Indikatoren - Wissenschaftliche Anforderungen an ihre Festlegung und Fallbeispiele. Gesellschaft für UmweltGeowissenschaften. Berlin – Heidelberg, 39 – 62.
- Jänicke, M./Zieschank, R. (2008): Structure and Function of the Environmental Industry. The hidden Contribution to Sustainable Growth in Europe. FFU-Report 01-2008, Forschungsstelle für Umweltpolitik, FU Berlin. Berlin, 34 S.
- Jespersen, J. (1994): Et Velfærdsindeks for Danmark, 1965 – 1990. Roskilde. Manuskript.
- Layard, R. (2005): Happiness: Lessons From a New Science. London.
- Leipert Chr. (1989): Umwelt und Volkswirtschaftliche Gesamtrechnung. Einleitung, in: Leipert, Chr./Zieschank, R. (Hrsg.): Perspektiven der Wirtschafts- und Umweltberichterstattung. Berlin, S. 169 – 175.
- Lutz, C./Meyer, B. (2008): Beschäftigungseffekte des Klimaschutzes in Deutschland. Untersuchungen zu gesamtwirtschaftlichen Auswirkungen ausgewählter Maßnahmen des Energie- und Klimapakets. Forschungsbericht 205 46 434, Dessau-Roßlau.

- Lutz, C./Meyer, B. (2009): Environmental and Economic Effects of Post-Kyoto Carbon Regimes. Results of Simulations with the Global Model GINFORS. *Energy Policy*, 37. S. 1758-1766.
- Meyer-Ohlendorf, N. /Görlach, B. / Umpfenbach, K. / Mehling, M. (2009): Economic Stimulus in Europe – Accelerating Progress towards Sustainable Development? (Background Paper ESDN-Meeting Prague).
- Leipert, Chr. (1989): *Wie Umweltzerstörung das Wirtschaftswachstum fördert*. Frankfurt.
- New economics foundation (Hrsg.) (NEF 1994): *Growing Pains? An Index of Sustainable Economic Welfare for the United Kingdom, 1950 – 1990*. London.
- New economics foundation (Hrsg.) (NEF 2006): *The unhappy planet index – An index of human well being and environmental impact*. London.
URL: <http://www.happyplanetindex.org/>
- New economics foundation (NEF 2009): *National Accounts of Well-being: bringing real wealth onto the balance sheet*.
URL: <http://www.nationalaccountsofwellbeing.org/learn/download-report.html>
- Nissen, H.-P. (2004): *Das Europäische System Volkswirtschaftlicher Gesamtrechnungen*, 5. Auflage. Heidelberg.
- Offer, A. (2008): *A vision of prosperity*. SDC reports & papers. URL: <http://www.sd-commission.org.uk/publications.php?id=741>
- Parlamentarischer Beirat für nachhaltige Entwicklung, *Stellungnahme zum Indikatorenbericht 2006 des Statistischen Bundesamtes „Nachhaltige Entwicklung in Deutschland“*. Berlin 2007.
- Pfeiffer-Gerschel, T./Kipke, I. (2009): *2008 National Report to the EMCDDA by the REITOX National Focal Point Germany – New Developments, Trends and In-Depth Information on Selected Issues: Drug Situation 2007/2008*. München/Köln/Hamm: European Monitoring Centre for Drug and Drug Addiction.
- Pulselli, F. M./Bastianoni, S./Marchettini, N./Tiezzi, E. (2008): *The Road to Sustainability – GDP and future generations*. Southhampton.
- Rat für Nachhaltige Entwicklung (RNE) (2008): *Stellungnahme des Nachhaltigkeitsrates zum Entwurf des Fortschrittsberichtes 2008 der Nachhaltigkeitsstrategie der Bundesregierung*. Berlin.
- Robins, N./Cover, R./Singh, Ch. (2009): *A Climate for Recovery*. HSBC Global Research. London.
- Rowe, J./Anielski, M. (1999): *Genuine Progress Indicator 1998. Executive Summary*. San Francisco: Redefining Progress.
- Rubik, F. (1985): “Das Bruttosozialprodukt als Indikator für Lebensqualität? Kritik und Alternativen”, in: Projektgruppe Ökologische Wirtschaft (Hrsg.): *Arbeiten im Einklang mit der Natur*. Freiburg, S.145 – 176.

- Saha, D./von Weizsäcker, J. (2009): Estimating the size of the European Stimulus Packages for 2009. Un Update. URL: <http://aei.pitt.edu/10549/01/UPDATED-SIZE-OF-STIMULUS-FINAL.pdf>
- Second Millennium Ecosystem Assessment Report: Ecosystems and Human Well-Being: Biodiversity Synthesis. MEA 2005.
- Simon, R./Spegel, H. (2002): Report to the EMCDDA by the Reitox National Focal Point Germany: Drug Situation 2001. München/Köln/Hamm: German Reference Centre for the European Monitoring Centre for Drugs and Drug Addiction.
- Statistisches Bundesamt (2007): Umweltökonomische Gesamtrechnungen. Ausgaben für Umweltschutz. Fachserie 19, Reihe 6 (Berichtsjahr 2004). Wiesbaden.
- Statistisches Bundesamt (2008): Nachhaltige Entwicklung in Deutschland. Indikatorenbericht 2008. Wiesbaden.
- Stern, N. et al. (2006): Review on the Economics of Climate Change. Cambridge.
- Stiglitz, J./Sen, A./Fitoussi, J.-P. (2009): Rapport de la commission sur la mesure des performances économiques et du progrès social. Paris, auch URL: <http://www.stiglitz-sen-fitoussi.fr/fr/index.htm>
- Sustainable Development Commission (SDC) – Jackson, T. (2009): Prosperity without growth? The transition to a sustainable economy. London.
- Talberth, J./Cobb, C./Slattery, N. (2006): The Genuine Progress Indicator 2006. A Tool for Sustainable Development. Redefining progress. Oakland.
- Umweltbundesamt [German Federal Environment Agency] (2007): Ökonomische Bewertung von Umweltschäden. Methodenkongvention zur Schätzung externer Kosten. Dessau.
- UNEP (2009) – A Global Green New Deal. (Report by E. Barbier). URL: http://www.unep.org/greeneconomy/docs/GGND_Final%20Report.pdf
- Victor, Peter A. (2008): Managing without growth: slower by design, not disaster. Cheltenham, Northampton.
- Wagenführ, R. (1973): Wirtschaft- und Sozialstatistik, Bd. 2. Freiburg.
- Wicke, Lutz (1986): Die ökologischen Milliarden. München.
- Won, J./Hong, S. 1998): A Korean ISEW. Seoul: Korea Institute for Health and Social Affairs. Tao.
- Worldwatch Institute (Hrsg.) (2008): In Zusammenarbeit mit der Heinrich-Böll-Stiftung und Germanwatch: Zur Lage der Welt 2008: Auf dem Weg zur nachhaltigen Marktwirtschaft?
- World Wildlife Fund (2007): Europe 2007. Gross Domestic Product and Ecological Footprint. Brussels.

Zaipu, T./Shieh, C.H. (1999): The Index of Sustainable Economic Welfare (ISEW) for Taiwan 1978 – 1998. Taiwan: Ming Chuan University.

Zieschank, R. (2007): Einsatz von Indikatoren im Rahmen der Nachhaltigkeitsstrategie der Bundesrepublik. – Anmerkungen aus der Sicht eines Befürworters. Challenger Report für den Rat für Nachhaltige Entwicklung. Berlin.