

**“Estimating global damages from climate change” -
German comments on the background paper for the WPGSP project
„Benefits of climate policy”**

First of all Germany welcomes the efforts made by the Working Party on Global and Structural Policies and especially thanks Joel Smith and Sam Hitz for providing a very valuable input to the expert workshop. We want to emphasise that there is a great need for further elaboration on how impacts will change as the climate changes. This also includes the questions regarding existing thresholds as well as tolerable rates and magnitudes of climate changes. How are these questions be answered in the background paper?

Firstly, the damage relationships between impacts and climate change: As stated in paragraph 169 “there are different relationships between impacts and temperature across the sectors”. Especially for parabolic relationships it seems to be essential to examine the regional impacts as “Lower latitude areas, and particularly their human sectors... tend to be more vulnerable to climate change than do higher latitude areas” (paragraph 208). But regional differences in impacts are masked by global results as described for instance for agriculture. We are convinced, that these regional impacts have to be taken into account when trying to answer the threshold question. Therefore in our view global aggregated impacts are **not** sufficient and may be misleading as the most vulnerable regions are not captured adequately.

Paragraph 175 states “The relationship between impacts and change in climate is clearly uncertainfor water resources”. This finding is very surprising for us because the IPCC-TAR indicated that water shortages is a key risk for 3 billion people more than today according to a 2 to 3°C increase in global mean temperature. Furthermore the authors stated that “regarding human health... there will be increasing adverse effects on human health with increasing global mean temperature”. But why then is the damage relationship for Health in table 6 indicated as “Unknown”?

Again similar findings refer to paragraph 165 where it says: “The few studies on aggregate impacts ...consistently estimate that there will be damages beyond approximately 2 to 3°C of increase in global mean temperature. Damages are estimated to continue increasing at higher increases in temperature.” Is then an indication as “Unknown” acceptable in Table 6?

For that reasons we consider it absolutely necessary to revise Table 6 and its interpretation.

Secondly, the thresholds: In paragraph 177 the following is said clearly ”Given the fact that most studies **show some impact** with even small amounts of temperature change, we can rule out the threshold relationship.” but a few lines below “the relationship between total impacts and climate change up to a 3 to 4°C increase in global mean temperature **remains uncertain**”.

What could be the reason for that uncertainty? The authors of the background paper give the answer themselves in para 206: “The studies reviewed in this paper tended to assess a more limited range of time and climate change (compared to the latest IPCC projections of 1.4 to 5.8°C of warming by 2100). This limited scope makes it more difficult to address ... impacts at low levels of climate change”. In other words: If the studies **do not show** any impact at low levels of climate change, **there is no confidence at all** that there will be **no impact** in reality. Therefore we have some doubts, whether the initial question “...what are the **total** damages across sectors from climate change as a function of increasing GMT? (paragraph 167)” is formulated exactly and target-oriented.

This point is very well reflected in paragraph 225 of the conclusions: “There could be substantial adverse impacts at a few degrees of warming in these sectors, but the current state of the literature does not allow us to make such a claim.” If the IPCC had not published the TAR last year we would consider this statement to be absolutely true. The question regarding the threshold sought is answered in the same paragraph: “While there is consistency among these studies to the extent that, at some level of climate change, global impacts clearly become negative, there is uncertainty about where this threshold lies.” We consider these facts to be the most important findings of the literature survey.

The statement in paragraph 224 “there will be increasing adverse impacts beyond approximately 3 to 4°C increase in global mean temperature” reversely implies no damages below that value, what is contrasted by evidence. Large parts of Europe and other parts of the world have been suffering heavy storms and severe floods during the last few years as is

indicated by the rising damage costs acknowledged by the insurance sector. The catastrophic impacts of these recent extreme events give a renewed sense of urgency to the global fight against climate change. Thus the statement should be reconsidered in the light of extreme events, in particular as these are the causes of the most severe damages (see also IPCC, TAR WG 2, Chapter 8).

Thirdly the tolerable or acceptable rates and magnitudes of climate changes: Although Germany is convinced that it is the responsibility of the Parties of the UNFCCC to decide what constitutes “dangerous anthropogenic interference with the climate system” in the context of Article 2 of the Convention, there is a strong need for continued scientific advice.

As stated in paragraphs 170 to 177 the vulnerability can vary substantially among different sectors. This is due to different exposure, sensitivity and adaptation capabilities of these systems. That means damages in different sectors will appear at different levels of climate change. Therefore the examination of damages **in each** such “reason for concern” should be the basis for determining what levels of climate change are acceptable. As the paper only addresses “aggregate impacts and to some extent distributional impacts (paragraph 5)” it does not fully, in our view, react to the challenge to give scientific advice to the question regarding acceptable climate change. In our view, the IPCC TAR clearly constitutes the best available scientific information and assessment of these issues as it considers additionally risks to unique and threatened systems, risks from extreme climate events and risks from future large-scale discontinuities.

In conclusion Germany considers the paper as an addition to the more comprehensive assessment of scientific literature undertaken by the IPCC. As the scope of the paper is limited, especially due to the aggregation of impacts and insufficient information at lower levels of climate change we think that regarding the quantification of thresholds the conclusions of the study are premature. Further research efforts should be undertaken in order to overcome these limitations. Furthermore Germany would like to see a well balanced executive summary of the paper that should contain all concluded findings.