



**IPCC WGII  
Fourth Assessment Report  
Climate Change Impacts, Adaptation and Vulnerability  
*Government and Expert Review of Second Order Draft***

**Specific Comments**

**GOVERNMENT REVIEW COMMENTS**

**Chapter 20**

**August 2006**

**INCLUDING LATE COMMENTS AT THE END OF THE DOCUMENT**

## Discussion of Government review comments and record keeping

IT IS RECOMMENDED THAT:

- AUTHORS BEGIN WORK ON THE COMMENTS IMMEDIATELY. SUBSTANTIVE COMMENTS NEED TO BE SEPARATED FROM NON-SUBSTANTIVE, AND THE TWO SHOULD BE TREATED DIFFERENTLY
- CONTACT IS MADE BETWEEN AUTHORS AND THEIR REVIEW EDITORS IN AUGUST

### Substantive comments

- The chapter writing team should discuss all substantive Govt review comments, by email and/or at Cape Town.
- Substantive comments require full and proper consideration. The *Principles Governing IPCC Work* state that:
  - genuine controversies should be reflected adequately in the text of the Report and
  - it is the role of the Review Editors to advise the lead authors on how to handle contentious/controversial issues
- You must record the outcome of these discussions in this document, under the column 'Notes of the Writing Team'.

### Non-substantive comments

- For non-substantive comments, a very brief entry should be made in the column 'Notes of the Writing Team'. The following terms are acceptable:
  - Addressed
  - Not applicable
  - Text removed
  - A tick to denote a comment has been addressed (somewhere on the document this should be stated)

### General

- The record should be kept in this document, ideally electronically.
- The document becomes part of the traceable account of the Working Group II Fourth Assessment. When completed to the satisfaction of the Review Editors, a copy should be returned to the TSU by the **8<sup>th</sup> December 2006**.

**IPCC WGII AR4 SOD \*GOVERNMENT\* Review Comments**

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
G-20-1	A	0				<p>This chapter has an important role to play, but does not distinguish itself enough from Chapters 17, 18, and 19. We have the following suggestions:</p> <p><b><i>Definitions and representations of sustainability need to go beyond Bruntland definition.</i></b> Many different definitions of sustainability and sustainability goals are consistent with the broad Bruntland definition. The chapter should examine the literature on the importance of how one defines sustainability and the specific sustainability goals that are chosen. It is important to note that the Bruntland definition speaks only to the relationship between the needs of the present generation and the abilities of future generation to meet their own needs. Definitions of sustainability exist that would be entirely consistent with the language of the Bruntland "definition" and could speak only to the issue of economic sustainability.</p> <p><b><i>Adopt a framework that provides a more comprehensive discussion of interactions between alternative development paths, vulnerability to climate change, and adaptive capacity.</i></b> Once this framework has been established, it would enable the chapter to consider the following: how will different sustainability definitions and goals lead to different development paths? How will this then influence adaptive capacity and vulnerability? What are the implications of choices in sustainability for adaptation and mitigation choices that can or should be made (which could refer back to previous chapter). How might climate change affect the attainability of sustainability goals? It would be helpful to understand what the literature says about how climate change -- at a range of temporal and spatial scales -- can influence pathways to achieving sustainable outcomes, however defined. The value added of this chapter should be to bring vulnerability, adaptation, and relationship to development choices into the context of sustainability.</p> <p>In addition, it is important to understand how different responses to climate change (e.g. adaptation, mitigation or both, vs. impacts) can be an important factor in attaining the sustainability goals.</p> <p>In sum, the outcome of concern is sustainability, however defined. How we define sustainability has implications for how we characterize adaptive capacity and vulnerability. Climate change, as one of many stressors, can affect the attainability of sustainability goals. And, responses to climate change can be part of a portfolio of policy options for attaining sustainability goals.</p> <p><b><i>There is a strong emphasis in the chapter on aggregate impacts (and in the TS and SPM).</i></b> However, we were surprised to find it here and, more importantly, certainly wouldn't have looked for it here. We're not convinced this is the right place for this, but assume the authors were asked to include it. Therefore, assuming</p>	<p>Not really for us, given space constraints, to review all of the definitions of sustainability or sustainable development. Adopted Bruntland from the TAR per early decision consistent with the PAO</p> <p>Will try to make Figure 20.1 work in this direction.</p> <p>Will bring this point to 20.8 (opportunities) and in the concluding remarks.</p> <p>Again, a point to emphasize in the concluding remarks...this is almost really good text.</p> <p>This is part of the PAO, but will try to make relevant to the "storyline" in the linking</p>

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						<p>you're stuck with it, we suggest a repackaging of the chapter to increase the visibility that this is the place to go for this information. Probably not possible, but a chapter title change would be useful--Climate Change and Sustainability. Also, we suggest that the SPM and TS explicitly mention this perspective on sustainability and climate change (climate affects sustainability, via impacts), as well as the other types of relationships between sustainability and climate change (see framework comment above).</p> <p>Furthermore, the aggregate impacts discussion should provide guidance to readers on how the aggregate results should be related to the sectoral and regional impacts estimates coming out of the rest of the report, especially in light of the fact that many of the other WGII chapters stress the importance of local scale impacts and adaptation. We suggest that the discussion be put in context with the other chapters. However, please don't try to add-up the finer scale estimates. Actually, you should mention why readers should not add-up sector/regional results and stress how global estimates like those in this chapter are to be used.</p> <p>Sustainability and the SRES scenarios.</p> <p>A. Characterize for the audience the representation of sustainability in the SRES scenario storylines and quantification.</p> <p>B. To the degree that sustainability is represented in the SRES, what do we learn from SRES about achieving the MDGs, which are based on more current baseline projections?</p> <p>C. SRES is outdated. Recognizing that recent global impacts studies are based on SRES-based climate projections, the authors should discuss potential biases. For example, population projections have been revised, which needs to be acknowledged, with notable differences at the regional level.</p> <p><b><i>Address implications for resource management decisions at a range of scales of governance.</i></b> The feasibility of sustainability objectives may be influenced by climate change, so climate change must be considered in the context of resource management and development planning. What guidance can the chapter provide? (Government of USA)</p>	<p>language between sections</p> <p>Will come from bringing in summary tables a la SOD Fig SMP-3 and Fig SPM-5.</p> <p>We use SRES only to frame the range of temperature change (global mean temperature from pre-industrial levels) that needs to be considered</p>
G-20-2	A	0				<p>There is a need to ensure that all references in the text are actually included in the list of references.</p> <p>(Government of Canada)</p>	Will do.
G-20-3	A	0				<p>The authors should include a more broad discussion of the methods that can be used to place a cost on the economic and social effects of carbon. There also should be a clear understanding of the division of responsibility in this discussion between WG2 and WG3.</p>	Will handle in Section 20.6

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						(Government of Austalia)	
G-20-4	A	0				The authors present a discussion of the social costs of carbon (SCC), based in reviewing specific monetary findings of SCC from a range of literature. The utility of this discussion needs to be carefully considered due to the huge range in the findings presented for SCC, (+US\$10 to -US\$350 per tonne of carbon). It is also noted that other ranges of SCC span US\$1 to -US\$1500 per tonne of carbon. If the authors cannot agree on a smaller range, the use of specific figures should be carefully considered. The basic message that should be reported is that the cost of mitigation of climate change is probably significantly lower than costs to society of inaction, this message is not clearly presented. (Government of Austalia)	Care will be taken.  Cannot say this.
G-20-5	A	0				Table 20.6 problematic formulations in text, and the social cost of carbon is contradictory to the market cost. Need to clarify the assumptions behind the calculations. (Government of Finland)	Will handle in Section 20.6
G-20-6	A	0				Overall, the chapter is clear and conveys the point that climate change will hold up sustainable development significantly if not addressed directly, that less developed countries will face steeper challenges and sooner than will developed nations, but that developed nations too may see their adaptive capacity overwhelmed. The point about potential synergies also comes through. The balance in the chapter is weighted toward an aggregate view, and although there is reference to regional and specific cases, there is a lot of literature on local experiences and lessons directly with variability where longer time scales are envisioned that is not drawn upon or cited. (Government of USA)	Thank you.  There will be some regional and sectoral data; local experiences are perhaps too diverse for this chapter except to highlight in Section 20.8.
G-20-7	A	0				I notice that the use of weather derivatives is completely overlooked, is this deliberate? Weather derivatives could play an important role in the future taking into account that insurance, energy consumption, housing and other social issues have the potential to be economically affected by extreme weather events. Perhaps this could be considered under page 14 Hazard Management. (Government of Finland)	Will consider for Section 20.5
G-20-8	A	0				General - odd and possibly inconsistent use of square brackets in places (Government of UK)	Will adjust, with reliance that formating issues will ultimately be handled at the press.
G-20-9	A	0				Climate variability and anthropogenic climate change needs to be defined in the Executive Summary.	Difficult to include all relevant definitions in

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						(Government of Austalia)	ES, but will try when usage is not common. Otherwise, reference to text should suffice.
G-20-10	A	1		37		Authors may wish to consider the Goklany cites offered as a general comment to Chapter 18. (Government of USA)	We did.
G-20-11	A	3	1			Executive Summary: Generally a lack of focus and clear "take-home" messages. (Some statements are "backed" only by a single study.) (European Union)	Redone completely
G-20-12	A	3	9	3	13	Sustainable development also implies controlling emissions from waste. Include a reference to efforts to manage waste (e.g. managing emissions from nitrous oxide). (Government of Austalia)	OK, but
G-20-13	A	3	16	3	17	The sentence "However, some development activities can exacerbate climate-related vulnerabilities" [20.3.3, 20.7.1 and 20.8.3] should be bolded as it is a "headline statement" of equal importance to the preceding sentence. (Government of Austalia)	done
G-20-14	A	3	19	3	21	There are ample references in Sections 20.4 and 20.8.3 which contradict drawing this conclusion. The conclusion should be dropped or reframed to be consistent with the literature cited in the said sections. (Government of India)	Made clear.
G-20-15	A	3	27	3	27	Suggest replacing "...can be counter productive if signal drawn from variability produces false impressions....." by "...can be counter productive if signal drawn from variability, both on high and low side, produces false impressions.....". (Government of India)	Done
G-20-16	A	3	28	3	28	Suggest adding a sentence at the end of paragraph: "Under-preparation to deal with current variability may result in more severe damages in the long-run than over preparation, especially in developing countries, due to lower than efficient deployment of resources for building adaptive capacities". (Government of India)	Done
G-20-17	A	3	30	3	32	The authors should explain whether the figure that 200 to 600 million people could experience hunger, takes into account estimates of food distribution. More generally, it should be clarified whether the estimates take into account the general expected increase in global population (which would mean very low impact). (Government of Austalia)	Done in text specifically
G-20-18	A	3	30	3	32	Key points / bullets in the executive summary are clear and concise with the exception of the sixth paragraph, which should be revised (Government of Canada)	Revised

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G-20-19	A	3	34	3	43	The reader could interpret this paragraph as prescribing the cost of carbon. Please include a sentence delineating the social costs from market prices. (Government of Australia)	Done
G-20-20	A	3	34	3	43	The range -\$10 to \$350 is too wide and the distribution of marginal social cost of carbon reported is very skewed to draw such a conclusion with 'high confidence'. Besides, as noted in the last sentence of the paragraph, the studies from where the distribution is derived differ in assumptions regarding various key parameters and therefore using the concept of 'probability distribution' is invalid since the numbers from different studies originate from incomparably different stories. Therefore suggest dropping the conclusion or modifying it with adequate caveats to avoid misrepresentation. (Government of India)	But the distribution shows high confidence on the sign.
G-20-21	A	3	45	3	46	This could mean that discount rate of 2 to 3% is used (with high confidence) in current impacts literature. The discount rates are hyperbolic in general and especially much higher in developing countries to begin with, which should be noted here. The mitigation literature suggest higher discount rates and therefore somewhere this misalignment should be discussed, together with the role of sustainable development to align these. (Government of India)	Not referencing discount rate.
G-20-22	A	3	51	3	51	Insert the words "and communities" after "nations" and before "abilities" as the chapter shows that poor communities in developed countries are also vulnerable. (Government of Australia)	Done
G-20-23	A	4	10	4	13	The statement "If climate sensitivity is high, inequity across this distribution would disappear before 2100 because adaptive capacity would be overwhelmed almost everywhere." is much too simplistic, and potentially misleading. (European Union)	Revised.
G-20-24	A	4	11	4	13	Suggest replacing: "...inequities across this distribution would disappear..." by ".....the stresses across the nations would enhance and inequities would exacerbate across the distribution and unfavorably vis-à-vis developing countries." (Government of India)	Deleted
G-20-25	A	4	15	4	19	This conclusion is incorrectly framed. It is correct that unfettered (which is not a quantifier or precisely explained term in the report) climate change would overwhelm both developing and developed countries. However, the welfare losses in such a case would be much more substantial in developing countries. Therefore, mitigation throughout would benefit developing countries more than developed countries and though in extreme cases of climate change the welfare losses would be overwhelming everywhere, the comparative welfare losses would be much	Revised.

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						higher in developing countries. It is suggested to reframe the statement taking into consideration this comment and clearly specify measure used for vulnerability (and also for benefits/ costs) and reinterpret and restate explanation under Figures 20.7 and 20.8 accordingly. (Government of India)	
G-20-26	A	4	15	4	19	The statement that one group of countries (developpe resp. developing) would benefit more than an other is much too simplistic and potentially misleading. (European Union)	Revised to be more careful
G-20-27	A	4	21	4	28	The text mentions CO2 concentration however it fails to touch on temperature increase, a critical impact factor. One without the other is insufficient and we recommend that the writers include in this text work from WG1 which reviews climate sensitivity and from there assess the relationship between CO2 concentration levels and temperature increase. There should be no independent assessment of climate sensitivity by WG2. (Government of Japan)	Included in text.
G-20-28	A	5	1			Section 20.1: There is very little discussion of a theoretical framework for vulnerability. The only reference are the Brundtland report and the WEHAB framework. In general, large parts of the chapter lack a clear message. Aauthors may wish to identify their main messages first, to lay out a conceptual framework for studying the links between SD and CC, and to work backwards from there. Inappropriate attention is given to single studies, while no reference at all to the work of Graciela Chichilnisky. Some sections seem to be irrelevant to the topic of the chapter (see detailed comments). (European Union)	See responses to Expert Review, comment #75-76
G-20-29	A	5	40			Delete one adaptation. (Government of Finland)	edit
G-20-30	A	6	39			Section 20.2: "A synthesis of new knowledge relating to impacts and adaptation": The whole section contains only 4 references. In contradiction with its title, it deals exclusively with "adaptive capacity". Should be merged with some other section. (European Union)	Refocused with reference to Chapter 17
G-20-31	A	7	50			It is question of multiple stresses, but only ecological systems are mentioned. There are multiple stresses concerning also social and economic systems. (Government of Finland)	Good point. Will address this in revisor by discussing socio-economisch stressors and adding references.
G-20-32	A	8	22			In the past few decades' is quite a vague expression (Government of Finland)	Will clarify
G-20-33	A	8	31			montane regions -> mountane regions (Republic of Korea)	Will make sure proper English used

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G-20-34	A	8	47	8	49	Showed that plants located in cities where fraction of college graduates grew faster experienced larger increases in productivity'. What are these plants? Certainly not flowers and trees, but probably factories etc. Explain more clearly. (Government of Finland)	Corrected
G-20-35	A	9	46			gains OF trade (?) (Government of Finland)	From
G-20-36	A	9				Table 20.1: if climate change(temperature increase),---- ecosystems(plants & grasss) may be decreased(not always steady) -> if climate change(temperature increase),---- biodiversity (polar bears & marine mammals may be decreased(not always increase) (Republic of Korea)	Yes
G-20-37	A	10	2			Two-way causality' could be replased by 'interaction' (Government of Finland)	Will clarify discussion of "causality"
G-20-38	A	10	32		34	At the end of the sentence add the following references: Goklany (2005a, 2006a): References: Goklany, I.M.: 2005a. "A Climate Policy for the Short and Medium Term: Stabilization or Adaptation?" Energy & Environment 16: 667-680; Goklany, I.M.: 2006a: Integrated Strategies to Reduce Vulnerability and Advance Adaptation, Mitigation, and Sustainable Development, forthcoming in Mitigation and Adaptation Strategies for Global Change (reprints/preprint available at <a href="http://members.cox.net/igoklany/">http://members.cox.net/igoklany/</a> ) (Government of USA)	See Expert review comments #163, 165
G-20-39	A	10	35		39	Many of the same points have also been made in Goklany (2000, 2003, 2005). (Government of USA)	See Expert review comments #163, 165
G-20-40	A	10	38			factors that ARE critical (Government of Finland)	edit
G-20-41	A	10	48		51	It's not clear that this sentence is true as a general proposition. Modify sentence to read as follows: "Ford et al. (2006) showed that <i>under some circumstances</i> unequal acquisition ...between generations" (Government of USA)	edit
G-20-42	A	10	49			technologies can weaken social (Government of Finland)	edit
G-20-43	A	10	51	11	3	The references do not contain a citation to Belliveau. In any case, this is unlikely to be true as a general proposition. Consider, for example, trade can enhance adaptive capacity (or adaptability) whether or not it explicitly considers climate (see, e.g., Goklany 1995). (Government of USA)	Update citation of Belliveau (see response to Expert review, comment #174)
G-20-	A	12	31	12	31	Add Europe as an example.	OK

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44						(Government of Sweden)	
G-20-45	A	12	44			Delete ) (Government of Finland)	OK
G-20-46	A	12	45			definitions of sustainability (Government of Finland)	OK
G-20-47	A	13	1		2	This is a very good point - more specific research needed (Government of UK)	Noted
G-20-48	A	14	11	14	12	Insert: "strengthen and alter the infrastructural design in areas of high risk to reduce the damages when hazards do occur (e.g. Strengthen roads, clean or stabilize polluted areas and plan for backup systems). (Government of Sweden)	Revised
G-20-49	A	15	17	15	50	There seems to be a lot of literature and experience missing in this section (though perhaps referenced in other chapters) but useful here because to a great extent perception of the effects of and responses to current variability will inspire further consideration of how to incorporate the impacts of change. The severe sustained drought in the US West is one topic that has a lot of research attention on this issue. Here is just one of multiple citations: Climate Science and Drought Planning: The Arizona Experience, AWRA Paper #04074; Kathy Jacobs, Gregg Garfin and Barbara Morehouse. (Government of USA)	Revised to account for most omissions subject to space constraint
G-20-50	A	15	17	15	20	Sentence fragmented and is generally unclear as a result - consider revising location of parentheses or sentence structure altogether for clarity (Government of Canada)	Revised
G-20-51	A	15	31		34	B & v A ref is relatively old (1999) - it would be helpful to cite more recent work (Government of UK)	OK
G-20-52	A	15	36		50	Really only one reference / one example from NAPAs - needs more specific exmples, otherwise point is weak (Government of UK)	OK
G-20-53	A	15	49			This translation of of knowledge (delete is) (Government of Finland)	OK
G-20-54	A	16	1			Section 20.6 is useful but perhaps too much made of Fast Track and might not need to be so detailed (Government of UK)	OK
G-20-55	A	16	11	16	14	Arnell, Levy, Nicholls, Parry, Van Lieshout and Schoeter are not in the reference list (Government of Finland)	OK
G-20-	A	16	20	16	21	Change "...social and economic state of the world" to "...social, economic and	Revised

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56						technological state of the world.” Also, add as a citation, Goklany (2006a). Reference: Goklany, I.M.: 2006a: Integrated Strategies to Reduce Vulnerability and Advance Adaptation, Mitigation, and Sustainable Development, forthcoming in Mitigation and Adaptation Strategies for Global Change. (Government of USA)	
G-20-57	A	16	24			Add a new paragraph as follows: “An important shortcoming of such impact assessments is that they do not fully account for changes in adaptive capacity over time due to changes in the level of economic development or secular changes in technological prowess. Both can affect the level of impacts in the absence of explicit policy changes because changes (positive or negative) in adaptive capacity can affect spontaneous or autonomous adaptation. (Government of USA)	Point made elsewhere, but OK
G-20-58	A	17	1			Table 20.3. The figures are in MILLIONS, which is missing. (Government of Finland)	OK
G-20-59	A	17	9	17	18	This paragraph seems to suggest that studies which integrate climate change with other socio-economic developments (such as the Fast Track studies and ATEAM) are less useful than studies which simply look at the sensitivity of a system to given levels of climate change. It may well be that the opposite is true, in particular for social systems. (European Union)	Revised
G-20-60	A	17	21			Section 20.6.2 should include discussion, or explanation, of how the different lifetimes of gases in the atmosphere is caught in studies of aggregate impact estimates. (Government of Australia)	Phrase added
G-20-61	A	17	28		32	The procedure used for estimating the social cost of carbon needs to be clarified. In particular it is not clear whether or how changes in future adaptive capacities (due to economic development, secular changes in technology, and in social and human capacity) are accounted for in estimating future impacts, as they should be (see, e.g., Goklany 2006a). (Government of USA)	Phrase added
G-20-62	A	18	26	19	32	See above comment on providing specific dollar figures in the discussion of the SCC. (Government of Australia)	Don’t understand comment
G-20-63	A	18	26	23	6	The procedures used for estimating the social cost of carbon in the various exercises noted on these pages needs to be clarified. This should be accompanied by a critical evaluation of these procedures, how accurate they are likely to be and what that implies for the results noted herein. In addition it is not clear whether or	Same as comment 61

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						how changes in future adaptive capacities (due to economic development, secular changes in technology, and in social and human capacity) are accounted for in estimating future impacts, as they should be (see, e.g., Goklany 2006a), and the implications of these methods should be noted. (Government of USA)	
G-20-64	A	19	21	19	22	No model can calculate the social costs. It should read ' integrated assessment models can calculate estimates of social cost of each of them under certain assumptions'. In the models there are always tens of assumptions of model structure, parameter value etc. which determine the results of the estimates - not the social costs. (Government of Finland)	Seems to apply to lines 24 to 25. Reworded
G-20-65	A	20	14	20	17	Here again is a misunderstanding that integrated models can calculate social costs and capture ALL underlying and critical complexity. Integrated models can capture some small aspects of the complexity of reality - not all of it. Another issue is whether the assumptions of the model structure and relationships of the variables and the parameters of the model are correct. In any case, even integrated models are always simplified representations of reality. (Government of Finland)	Phrase added to acknowledge that even integrated models are always simplified representations of reality.
G-20-66	A	21	2	21	11	Here the assumptions seems to be that scientific (which probably here means environmental) + economic = all. Where are the socail and cultural dimensions of sustainable development? (Government of Finland)	Economic changed to socio-economic
G-20-67	A	21	11			Add in the end of the chapter 'according to the assumptions made in the model by Hope' (Government of Finland)	Reference repeated at end of section.
G-20-68	A	21				Table 20.5. What does it mean in the economic impact when the sign is + and the range is '-0.1 - 1.0% of GDP' (Government of Finland)	Phrase added to table title explaining that a + sign means that an increase in the value of the parameter leads to an increase in the SCC and vice versa.
G-20-69	A	22	41	23	3	" if the social cost calculations are complete and markets are perfect " : SCC cannot be "complete" as some of the impacts does not have an unquestionable market value (e.g. ecosystem damages). The SCC estimates are worth having as it represents a comparison basis for evaluating mitigation costs. However, balancing SCC and abatement costs is only valid in a context of strict cost-benefit analysis, which only represent one of the possible evaluations of impacts/mitigation issues. (Government of Belgium)	The specific comment is wrong, as many of the SCC estimates do include estimates of ecosystem damages. Language toned down to acknowledge that this is a theoretical economic result only.
G-20-	A	23	3	23	6	The prize of carbon in the EU markets is calculated incorrectly. 20 €/ton of CO2 is	The comment is wrong; the calculation is

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70						about 5.5 €/ton of C and 30 €/ton of CO2 is about 8 €/ton of C. You should multiply the prize per ton of CO2 by 0.27 and not divide to get prize per ton of C. (Government of Finland)	correct.
G-20-71	A	23	3	23	6	The prize in the european markets depends how much emission allowances are given to companies. It does not reflect the social costs. (Government of Finland)	Agreed. Phrase added to acknowledge this. See comment 72.
G-20-72	A	23	5	23	5	The authors need to provide an explanation of what this statement illustrates and should adjust the figure of \$100 as the spot price per tonne of carbon under the ETS, to account for the significant fall of the market that occurred in April-May 2006. The authors should also provide an explanation as to why US\$ are used, and based on what year, to achieve this figure. (Government of Austalia)	Text revised to bring figures up to date, and specify euro to \$ conversion rate.
G-20-73	A	23	24	23	24	Consider clarifying the phrase "geographic texture" in the context of the complementary roles of mitigation and adaptation to avoid ambiguity (Government of Canada)	Revised
G-20-74	A	23	34		36	The sentence, "Goal 7, ... is the most immediately relevant of the MDG's to climate change" reveals a constricted and simplistic view of the relationship between MDGs and climate change. First, the relationship between the two runs both ways. Meeting the MDGs would, in addition to advancing sustainable development, would enhance both adaptive and mitigative capacities. Thus the impacts of climate change would be modulated by how far societies have advanced toward the MDGs. In fact, from that perspective, MDGs 1 through 6 listed on Table 20.7, for instance, would directly or indirectly enhance a number of the determinants of adaptive and mitigative capacity (e.g., economic development, propensity for technological change, social and human capital (Goklany 2006a). (Government of USA)	We will ensure that the full relationship of climate change to the MDG's (and vice versa) is described much more clearly than is the case in the current draft.
G-20-75	A	24	2		3	The sentence, "Current literature ...by 2015" is not quite accurate. Authors should ensure that a balanced review of the literature is reflected. Consider that Goklany 2003, 2005a, 2005c suggest that MDGs 1 and 6 should both be sensitive to climate change (in addition to MDG7), there is in fact guidance in the current literature that allows us to gauge whether climate change will affect progress toward those MDGs. Goklany, I.M.: 2005a. "A Climate Policy for the Short and Medium Term: Stabilization or Adaptation?" Energy & Environment 16: 667-680; Goklany, I.M.; 2003. Relative Contributions of Global Warming to Various Climate Sensitive Risks, and Their Implications for Adaptation and Mitigation, Energy & Environment 14: 797-822. (Government of USA)	We will ensure that the full relationship of climate change to the MDG's (and vice versa) is described much more clearly than is the case in the current draft.

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G-20-76	A	24	8	24	10	Climate Change impacts MDG in more ways than suggested here. For instance, the investments made in long-life assets, like infrastructures, in the near-term have to provision for adaptation to more severe future climate and to this extent investment will be withdrawn from some other development activities which could have otherwise helped achieving MDGs. (Government of India)	We will ensure that the full relationship of climate change to the MDG's (and vice versa) is described much more clearly than is the case in the current draft.
G-20-77	A	24	31			what unit is 'mt CO2'? Is it millitons of CO2? I believe that here it should be just tons of CO2 not millitons or megatons. (Government of Finland)	Will clarify
G-20-78	A	24	33	24	35	This statement is not necessarily correct. Resources deployed in fossil fuels can enhance energy security in countries endowed with e.g. coal and this can help to improve food security (e.g. since deployment of domestic energy resources reduces imports) and hence enhance adaptive responses to climate. (Government of India)	Interesting point. Of course, additional resources devoted to fossil fuel might well end up affecting climate adversely, negating the increase in adaptive capacity. In any case, it is the balance that needs to be emphasized clearly.
G-20-79	A	24	41	24	42	Each situation must be analysed quantitatively'. I am sure we should analyse the situation both quantitatively and qualitatively. As mentioned earlier in my comments the quantitative models cannot capture all aspects of reality and that is why also qualitative analysis is needed. (Government of Finland)	Agree
G-20-80	A	25	2	25	4	There are huge differences between countries (see e.g. Luukkanen et al (2005) Converging CO2 Emission to Equal per Capita Levels. Mission Possible? FFRC-Publications 2/2005. Finland Futures Research Centre, Turku School of Economics and Business Administration. Turku. 139 p.) (Government of Finland)	Noted
G-20-81	A	25	9	36	28	Sections 20.7.2 and 20.7.3. are based on a single "study" (Yohe et al., 2006), which is not peer-reviewed. Based on the limited knowledge provided not based on any validated model of vulnerability. Given the very preliminary status of this work, authors should consider deleting Sections 20.7.2 and 20.7.3 and most of 20.7.4 and Figure 20.10. (European Union)	Changed focus; only new 20.7 uses maps.
G-20-82	A	28	4			Author may want to consider: There may be co-benefits associated with enhancing adaptive capacity and reducing vulnerability to climate-sensitive problems. In addition, greater adaptive capacity would affect the timing of mitigation policies. (Government of USA)	Ok, but WGIII is the mitigation report
G-20-83	A	28	11	28	22	The text mentions CO2 concentration however it fails to touch on temperature increase, a critical impact factor. One without the other is insufficient and we	noted

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						recommend that the writers include in this text work from WG1 which reviews climate sensitivity and from there assess the relationship between CO2 concentration levels and temperature increase. There should be no independent assessment of climate sensitivity by WG2. (Government of Japan)	
G-20-84	A	29	25	30	11	Except for the first sentence [“However, there are many challenges.”], much of what is in these two paragraphs is editorial, and argumentative, if not completely erroneous. For instance, the notion that “economic growth is pursued through unfettered market principles” is a figment of the imagination. Accordingly, we would modify these two paragraphs to read as follows: “However, there are many challenges. Perhaps the primary one is to continue progress toward improving health, education, access to safe water and sanitation, and other indicators of social and environmental progress while nurturing the institutions that underpin economic development and its benefits. It is recognized that many of these activities and institutions will be more resilient and robust if they are undertaken at the grassroots level.” (Government of USA)	Will consider suggested revision
G-20-85	A	29				The text mentions CO2 concentration however it fails to touch on temperature increase, a critical impact factor. One without the other is insufficient and we recommend that the writers include in this text work from WG1 which reviews climate sensitivity and from there assess the relationship between CO2 concentration levels and temperature increase. There should be no independent assessment of climate sensitivity by WG2. (Government of Japan)	As before
G-20-86	A	30	6		22	While climate change may not yet be totally “mainstream,” it may be important to recognize that mainstream actors and institutions are beginning to consider how best to incorporate this issue. The State of California, the world’s seventh largest economy, is incorporating climate change. There is movement in private sector (insurance, corporations that are embracing sustainable development (BP), law suits in the US are exposing tension between states and the federal government with regard to the regulation of greenhouse gases, and localities are taking definitive steps to incorporate science and access expertise (King County Executive, 2005, Climate Impacts Group). Perhaps this section should refer to the fact that changes currently underway, such as those in the Arctic, or the growing body of research raising issues of increased sea-level rise projection, or the challenges of changes in the timing and distribution of snow-pack, are inspiring at least curiosity and potentially new innovation in decision settings.	Lots of examples in chapter 17

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						(Government of USA)	
G-20-87	A	30	16			One of the challenges to implementing actions that would advance adaptive capacity is that many in the climate change community believe that mitigation is a superior approach to adaptation, and that the latter is plagued with shortcomings. For there to be progress on adaptation any controversy should be aired and addressed. References: Dang, H.H., Michaelowa, A. and Tuan, D.D.: 2003, 'Synergy of adaptation and mitigation strategies in the context of sustainable development: the case of Vietnam', Climate Policy 3S1, S81-S96; Huq, S. and Grubb, M.: 2003, Scientific assessment of the inter-relationships of Mitigation and Adaptation. Available at <a href="http://www.ipcc.ch/activity/cct2a.pdf">http://www.ipcc.ch/activity/cct2a.pdf</a> ; Klein, R.J.T., Schipper, E.L. and Dessai, S.: 2003, Integrating mitigation and adaptation into climate and development policy: three research questions, Tyndall Centre for Climate Change Research Working Paper 40; Goklany, I.M.: 2006a: Integrated Strategies to Reduce Vulnerability and Advance Adaptation, Mitigation, and Sustainable Development, forthcoming in Mitigation and Adaptation Strategies for Global Change. Wilbanks, T.J., Kane, S.M., Leiby, P.N., Perlack, R.D., Settle, C., Shogren, J.F. and Smith, J.B.: 2003, 'Possible responses to global climate change: integrating mitigation and adaptation', Environment 45, 28- 38. (Government of USA)	see Expert comment #436; cite chapter 18; also add references as per Expert comments #416-421
G-20-88	A	30	20	30	22	Include some of the suggestions for improving the mainstreaming process for MEAs as provided by Watson International Scholars for the Environment. (Government of Australia)	Agree
G-20-89	A	30	44	30	44	change "biophysical" to; "biological, chemical, physical and geological processes, technical solutions and" (Government of Sweden)	Edit
G-20-90	A	31	1	31	1	change "biophysical" to; "biological, chemical, physical and geological processes, technical solutions and" (Government of Sweden)	Edit
G-20-91	A	31	9		21	A wealth of information exists on participatory approaches that certainly would add richness here with suggestions for everything from steps to organizing research that is more accessible to practitioners to the role of on-going assessments involving technical staff in the process of the research, to modes of communication, dissemination, and training. For starters: Morehouse and Lemos, Global Environmental Change, Co-Production of Science and Policy. (Government of USA)	Additional references to be added in response to Expert review (comments #453, 460)
G-20-92	A	33	11	33	12	insert: "recycling of natural resources, sharing of knowledge and improved environmental legislation"	edit

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Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Government of Sweden)	
G-20-93	A	33	16		30	One old reference linking CC and SD communities - no new work cited - weak (Government of UK)	Additional references to be added
G-20-94	A	33	21			role' instead of 'rule' (Government of Finland)	Edit
G-20-95	A	33	41		44	The discussion in this paragraph needs to be expanded identifying additional areas where potential synergies exist. Accordingly the two (whole sentences) on these lines should be modified to read as follows: “Beg et al. (2002) outlines such challenges as well. He and Goklany (2000a, 2006a) also identify potential synergies between climate change and other policies that could facilitate adaptation such as those that address desertification, biodiversity, <i>hunger, water stress, coastal flooding, and malaria.</i> ” (Government of USA)	Edit; add cite for Watson et al (World Bank document—from Tony Janetos)
G-20-96	A	33	47			There should be a new paragraph that addresses the importance of developing, nurturing and/or strengthening the institutions that underpin economic development, build technological prowess and human and social capital, since they would help address climate change and sustainable development simultaneously. References have been provided previously. (Government of USA)	Will consider additional text on institutions
G-20-97	A	34	9		11	Replace, “for the attainment of MDGs” with “ <i>attaining or maintaining goals associated with sustainable development</i> ”. (Government of USA)	AfDB cited report refers directly to MDGs; cite 20.7
G-20-98	A	34	24	30	30	Delete the first three sentences of this paragraph as they are policy prescriptive. (Government of Australia)	Delete phrase “recent negotiations...”; Text describes an action that has already occurred, and discusses related technical issues; can link to WG3, 13.3.3.8, and also add Bouwer and Aerts (2006)
G-20-99	A	35	8			Start a new paragraph with “Expanding research...” and replace “...this arena ...” with “ <i>these arenas...</i> ” (Government of USA)	Ok, but revised, too.
G-20-100	A	35	17			but there is a need to develop by these communities to integrate (delete 'is' and replace 'can' by 'to') (Government of Finland)	Ok, but revised, too
G-20-101	A	36				The text mentions CO2 concentration however it fails to touch on temperature increase, a critical impact factor. One without the other is insufficient and we recommend that the writers include in this text work from WG1 which reviews climate sensitivity and from there assess the relationship between CO2	Noted

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						concentration levels and temperature increase. There should be no independent assessment of climate sensitivity by WG2. (Government of Japan)	
G-20-102	A	37	10	37	12	It's not clear to us that the wrong lessons are not being learnt from both the 2003 heat wave and Hurricane Katrina. With respect to the heat wave, the problem wasn't that adaptive capacity was overwhelmed as much as adaptive capacity was not deployed. One could make the argument that the basic problem might be that while the European politicians were talking a lot about climate change they were unprepared for manifestations for any of its consequences. The next time around, one should expect Europe to be better prepared, and the toll of more of these heat waves should be much reduced. The lack of deployment of adaptive capacity also applies to Hurricane Katrina. Moreover, the adaptive capacities of developed nations are less likely to be overwhelmed. Accordingly, rewrite the sentence extending from line 8 to line 11 as follows: "Doing so supports the long-held opinion that developing countries are generally more vulnerable than developed countries. <i>However</i> , if the effects of climate change on the chosen metric are <i>too</i> severe that they <i>can</i> overwhelm the capacities of even the most advanced economies to adapt, <i>or if available adaptive capacity is not deployed, the effects could be disastrous.</i> " (Government of USA)	Deleted, though Katrina lessons elsewhere with reference to using AC
G-20-103	A	37	21	37	21	Change the end of the sentence to: ", environmental pollution and degradation" (Government of Sweden)	Deleted.

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**LATE comments for chapter 20**

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
20-1	LATE	0				The title of this chapter is "Perspectives on Climate Changes and Sustainability". However, there is almost no description about sustainability. Instead, the paper by Yohe, G, et al. (2006) was cited many times and some paragraphs are directly from this paper. Therefore, this chapter should be better organized and some parts need to be rewritten. It is not appropriate to cite only one paper in many parts of IPCC's report. (Government of China)	PAO, and revised to diminish reliance on Yohe, et al.
20-2	LATE	0				Chapter 20 is biased towards economy and present technicalities which cannot easily fulfill the IPCC's objective to satisfy all kind of users (Government of Argentina)	PAO
20-3	LATE	3	45	3	46	Delete medium confidence. Change "high confidence" to low confidence because of the result only from one integrated assessment. (Government of China)	Disagree
20-4	LATE	23	9	28	23	The title of this section is "Implication for regional, sub-regional, local and sectoral development; access to resources and technology; equity". But, in this section, access to resources and technology equity are not included. (Government of China)	Revised
20-5	LATE	26	21	26	24	Change "with enhanced adaptive capacity in the developing countries of Africa and China if climate sensitivity were high." to "with enhanced adaptive capacity in African countries and China if climate sensitivity were high." (Government of China)	Revised
20-6	LATE	27	19	27	19	Delete "and China" because China is a developing country. (Government of China)	Revised
20-7	LATE	28	25	28	25	The title of this section is "Opportunities, co-benefits and challenges for adaptation". However, there is no description related to co-benefits to adaptation. (Government of China)	Revised, but there are space limitations; co-benefits handled in Chapter 17
20-8	LATE	33	51	34	1	Delete sentence "While mitigation within the UNFCCC includes clearly defined objectives, measures, costs, and instruments. This is not the case for adaptation." (Government of China)	Revised, but true we think.
20-9	LATE	34	24	34	43	Delete these two paragraphs. (Government of China)	Revised, but do convey important messages.