ipcc
INTERGOVERNMENTAL PANEL ON climate change

AR5 Scoping Meeting
Venice, Italy, 13-17 July 2009

AR5-SCOP/INF. 2
(09.VII.2009)
ENGLISH ONLY

TREATMENT OF CROSS CUTTING THEMES (CCTS) IN TAR AND AR4, AND QUESTIONNAIRE RESULTS

(Submitted by the IPCC Secretariat)

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Background

This paper presents an outline of the treatment of cross-cutting themes (CCTs) in TAR and AR4 and results of a questionnaire survey on CCTs filled out by a number of experts involved in the reflection on these themes, including former Bureau members during the TAR and AR4 assessment periods.
A number of themes are covered under the CCT denomination, including approaches to uncertainties, key sectors and systems, methodology and other issues related to more than one Working Group. 7 themes were selected in TAR and 8 themes were selected in AR4.

In the 30th Session of the IPCC, the Panel adopted the following decision regarding the CCTs and this paper is prepared as a respond to this decision.

<Decision adopted by the Panel in the 30th Session >

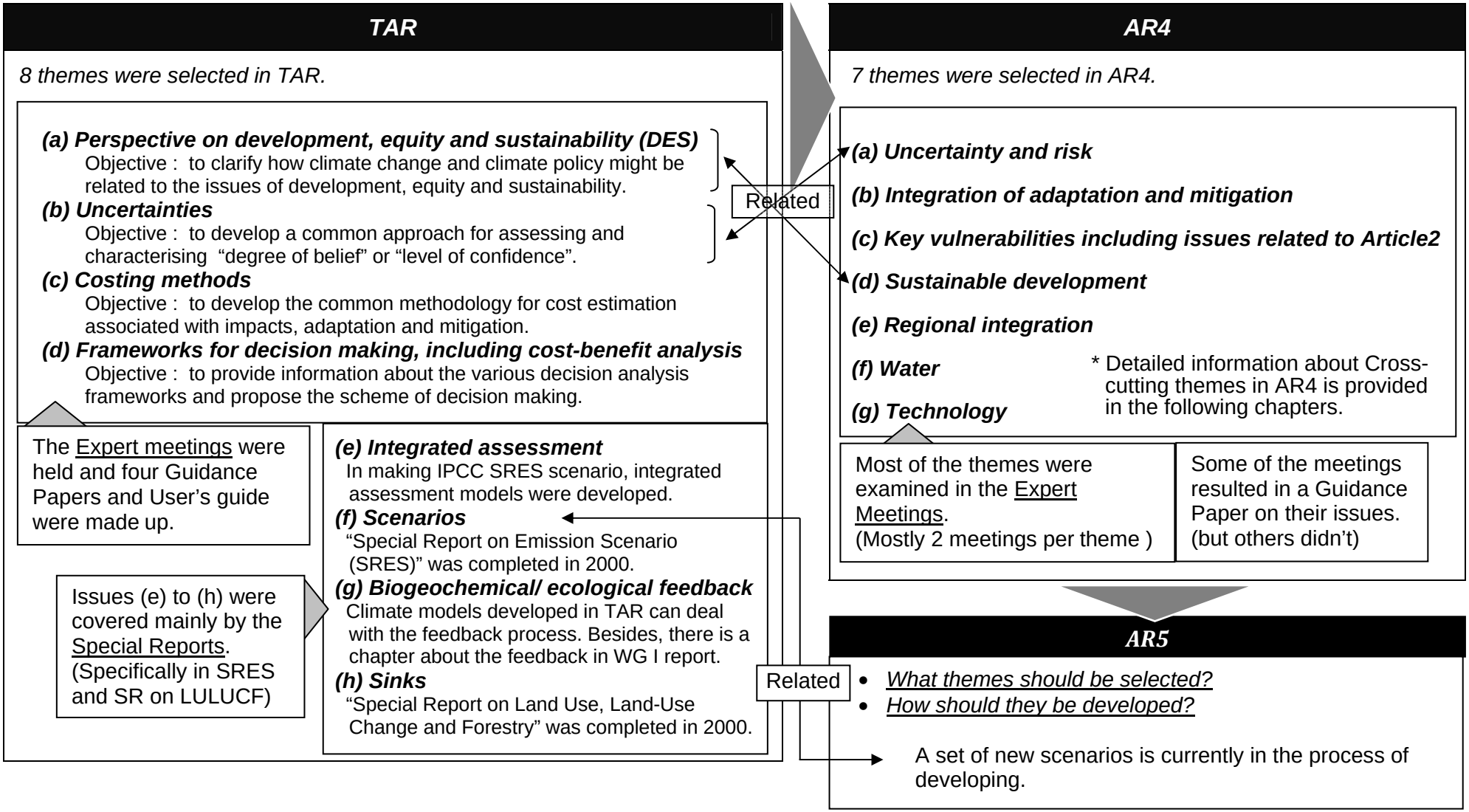
- The Panel agreed that the IPCC Vice-Chairs, in cooperation with the Co-Chairs and assistance from the IPCC Secretariat and Technical Support Units (TSU), should carry out an evaluation of the treatment of cross-cutting issues in the Third Assessment Report (TAR) and Fourth Assessment Report (AR4), summarizing issues that were covered well and the elements that could be strengthened and to identify new cross-cutting issues for AR5. They are encouraged to consult past Bureau members and TSU heads to benefit from their experience and to share their views within the Bureau. This should be carried out before the scoping meeting on AR5 in Venice.

In order to carry out the evaluation mentioned above, the IPCC Secretariat, in consultation with Prof Jean-Pascal van Ypersele, IPCC Vice-Chair, reviewed the treatment of past CCTs for background information, and then conducted a questionnaire survey on the subject. The main objective of the survey is to gather opinions and suggestions from those who worked on the coordination of the past CCTs in order to contribute to identify required CCTs in AR5 and processes for handling them effectively.

1. Treatment of the past cross-cutting themes (CCTs)

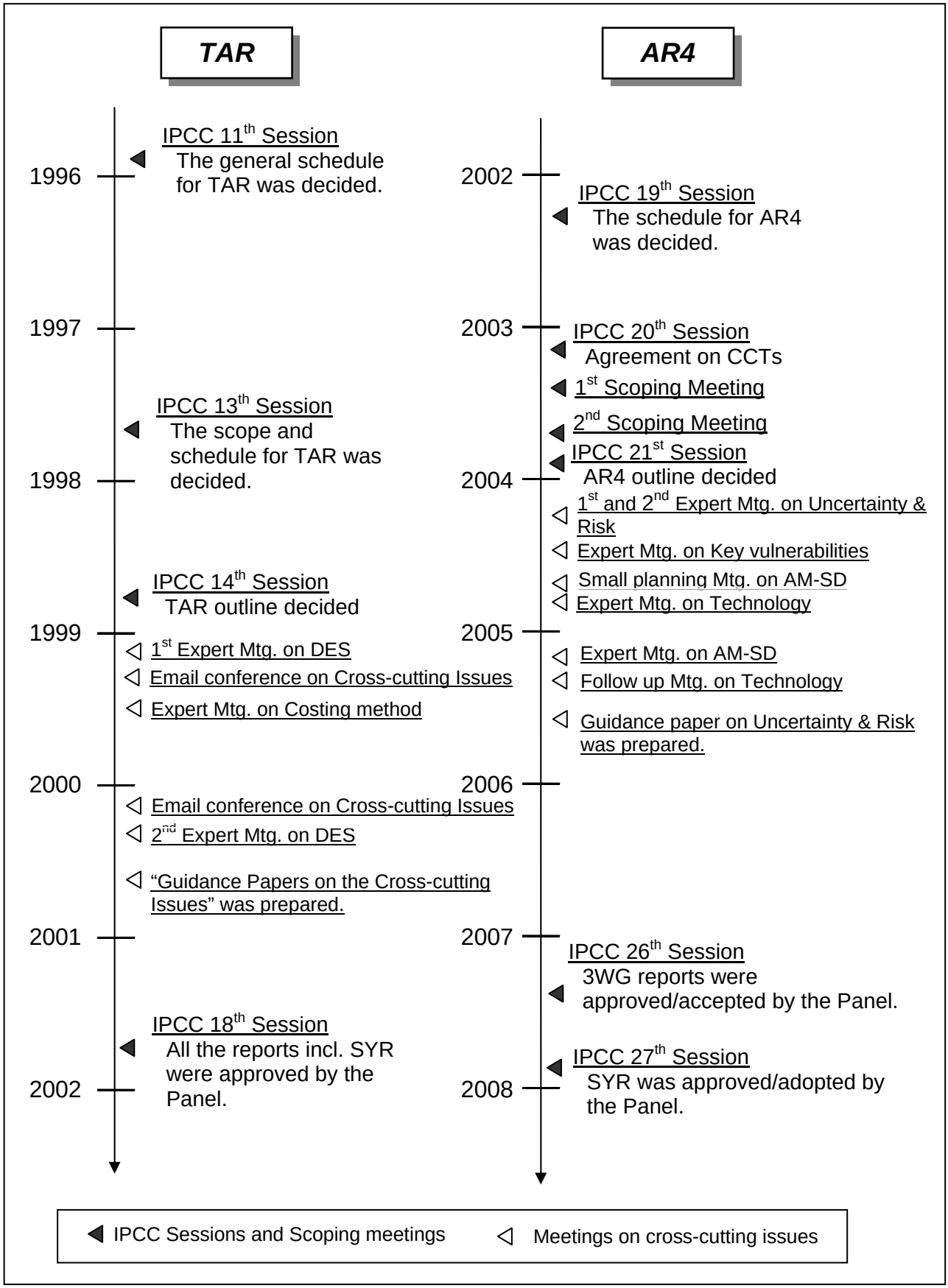
1.1. Comparison between the cross-cutting themes in TAR and AR4

Themes selected in TAR and AR4 are as follows. Some of the themes in AR4 are related to the themes in TAR.



1.2. Comparison between the schedules of Cross-cutting themes in TAR and AR4

Normally it takes about 6 years for the IPCC to develop Assessement Reports. Schedules of developing CCTs in TAR and AR4 were as follows.



1.3. Detailed information on CCTs in AR4

* This section provides only the information on AR4, as information on TAR is too old to collect in detail. Outlines of the cross cutting themes in TAR are described in section 1.1.

1.3.1. Outline of clarification process of CCTs in AR4

Feb. 2003

IPCC 20th Session

The following points were addressed in the document "PREPARATIONS FOR THE FOURTH ASSESSMENT REPORT".

- Two scoping meetings were planned and cross-cutting themes would be identified in these meetings.
- The focus of the first scoping meeting would be to agree on the general scope and approach.
- The second scoping meeting would focus on cross cutting themes.
- Six cross cutting themes were suggested and approved in this Session.
  (a)Uncertainty and risk , (b)Integration of adaptation and mitigation (c)Key vulnerabilities , (d)Sustainable development , (e)Regional integration , (f)Water
- There was a discussion whether "Technology" should be a cross-cutting theme and the Session agreed to include "Technology" as one of the cross-cutting themes.

Apr. 2003

AR4 First Scoping Meeting

The seven cross-cutting themes and the lead WG for each theme was identified and approved in this meeting.

(a) Uncertainty and risk (WG I to lead)
(b) Integration of adaptation and mitigation (WG III to lead)
(c) Key vulnerabilities (including issues relating to Article 2 of the UN FCCC) (WG II to lead)
(d) Sustainable development (WG III to lead)
(e) Regional integration (WG I to lead)
(f) Water (WG II to lead)
(g) Technology(WG III to lead)

The anchors of seven themes were named to be responsible for leading the discussions among each issue. (Two anchors per each issue)

Sep. 2003

AR4 Second Scoping Meeting

The comments from governments and organizations on seven cross-cutting themes were introduced. There were some discussions about the themes and the concepts of seven themes were approved.

Nov. 2003

IPCC 21st Session

The AR4 outline, seven cross-cutting themes and the concepts of them were approved by the Panel.

1.3.2. Development process of CCTs in AR4

(a) Uncertainty and risk (WG I to lead)

- The workshop on this issue was held and the guidance paper was delivered to the authors of WGs as follows;
  Apr. 2004 IPCC Workshop on Uncertainty and Risk (Geneva, Switzerland)
  May 2004 IPCC Workshop on Describing Scientific Uncertainties in Climate Change to Support Analysis of Risk and of Options (Maynooth, Ireland)
  Jul. 2005 Guidance paper on this issue was delivered
- This paper defined the types of uncertainty, likelihood scale and confidence etc. and the meanings of them. These definitions are commonly used across three WGs.

(b) Integration of adaptation and mitigation
and (d) Sustainable development

- "Expert meetings on the integration of Adaptation, Mitigation and Sustainable Development" was held as follows;
  Sep. 2004 Small planning meeting (Amsterdam, The Netherlands)
  Feb. 2005 Expert meeting (Reunion Island, France)
- 40 authors of WG II and WG III got together in this meeting.
- They confirmed chapter linkages between WG II and WG III concerning "the integration of Adaptation, Mitigation and Sustainable Development" and agreed to continue to have discussions and interactions between WG II and WG III.

(c) Key vulnerabilities (including issues relating to Article 2 of the UN FCCC) (WG II to lead)

- "Expert meetings on The Science to Address UNFCCC Article 2 including Key Vulnerabilities" was held as follows;
  May. 2004 Expert meeting (Buenos Aires, Argentina)
- 44 experts got together in this meeting.
- "Vulnerability" is an important issue in IPCC report and there are a lot of chapters related to this issue in each WG report and SYR.
- Although the meeting concluded that they should identify the thresholds of the GHG concentrations and GHG emissions to prevent dangerous anthropogenic interference with the climate system, they were not identified in AR4.

(e) Regional integration (WG I to lead)

- According to a report of the 2nd scoping meeting in AR4, the regional classification concept paper was delivered to the authors of each WG.
- Different WGs use different regional categories in their report. WG I and WG II use similar categories (but different), although WG III use absolutely different categories. WG III seems to depend on "Annex I / non-Annex I" based or "OECD / non- OECD " based category.

<Regional classification used in each WG>

WG I	WG II	WG III
1.North America	1.North America (NAM)	1.Noth America
2.South America	2.Latin America (LA)	2. Latin America
3.Europe	3.Europe (EUR)	3.Western Europe
4.Africa	4.Africa (AFR)	4.Central & Eastern Europe
5.Asia	5.Asia (AS)	5.Middle East & North Africa
6.Australia	6.Australia and New Zealand (ANZ)	6.Sub Saharan Africa
	7.Polar Regions (PR)	7.EECCA
	8.Small Islands	8.Non-Annex I East Asia
		9. Non-Annex I South Asia
		10.Pacific OECD

(f) Water (WG II to lead)

- It was already decided that Technical Paper on Climate Change and Water should be prepared when they selected water as one of cross-cutting themes in 2003. They released the final report in June 2008.

(g) Technology (WG III to lead)

- They focused on the industrial technologies. The selected sectors are as follows and they discussed how to develop, deploy and transfer them.
  1. Energy-intensive industry (e.g. cement, refining, metals, chemicals)
  2. Energy-intensive consumer goods (e.g. passenger cars, air conditioners and lighting equipment)
  3. Electricity production and energy carriers (e.g.fossil, nuclear, renewables, less carbon intensive fuels, efficient conversion, hydrogen)
- "IPCC Expert Meeting on Industrial Technology Development, Transfer and Diffusion" was held as follows;
  Sep. 2004 Expert meeting (Tokyo, Japan)
  Feb. 2005 South Africa Eskom Meeting (Capetown, South Africa)
- 86 experts from 21 countries attended 1st meeting and 65 participants from 19 countries attended 2nd meeting.
- There is a table explaining the examples of industrial technology in the report of WG III and it must have reflected the result of above meetings. (WG III Table TS. 10)

2. Questionnaire results on CCTs

2.1. Methodology and questions

As described in the introduction of this document, the IPCC Secretariat conducted a questionnaire survey on CCTs filled out by the CCT experts in accordance with the decision adopted by the Panel in the 30th Session.
Methodology of the survey and questions are as follows.

Methodology

The survey was conducted by e-mail. The questionnaire was delivered to the following experts as an attached file in June, 2009 and 16 responses were received by the closing date.

<Number of the experts that are delivered the questionnaire>

Present E-team	: 15 persons
TAR and AR4 Bureau members	: 36 persons
CCT anchors and those who worked on the coordination of the CCTs	: 45 persons

16 responses were received

Questions

The questionnaire delivered to the experts is composed of 4 points of view as shown below.

Q1. How effective do you think the treatment of the cross-cutting themes was in the past WG Reports and SYR?
Q2. Are there some issues or themes that should be treated again in AR5 among those listed above?
Q3. Proposals for new cross-cutting themes in AR5.
Q4. How to improve the handling of cross-cutting themes in AR5?

2.2. Questionnaire results

Q1. How effective do you think the treatment of the cross-cutting themes was in the past WG Reports and SYR?

Result of the evaluation on the treatment of the past CCTs

Figure 2.1 shows the evaluation on the treatment of the past CCTs. Respondents are asked to evaluate the effectiveness of treatment of CCTs by selecting among three levels (High, Mixed, Low) about the themes they are familiar with and the percentages of the answers are shown in this figure.

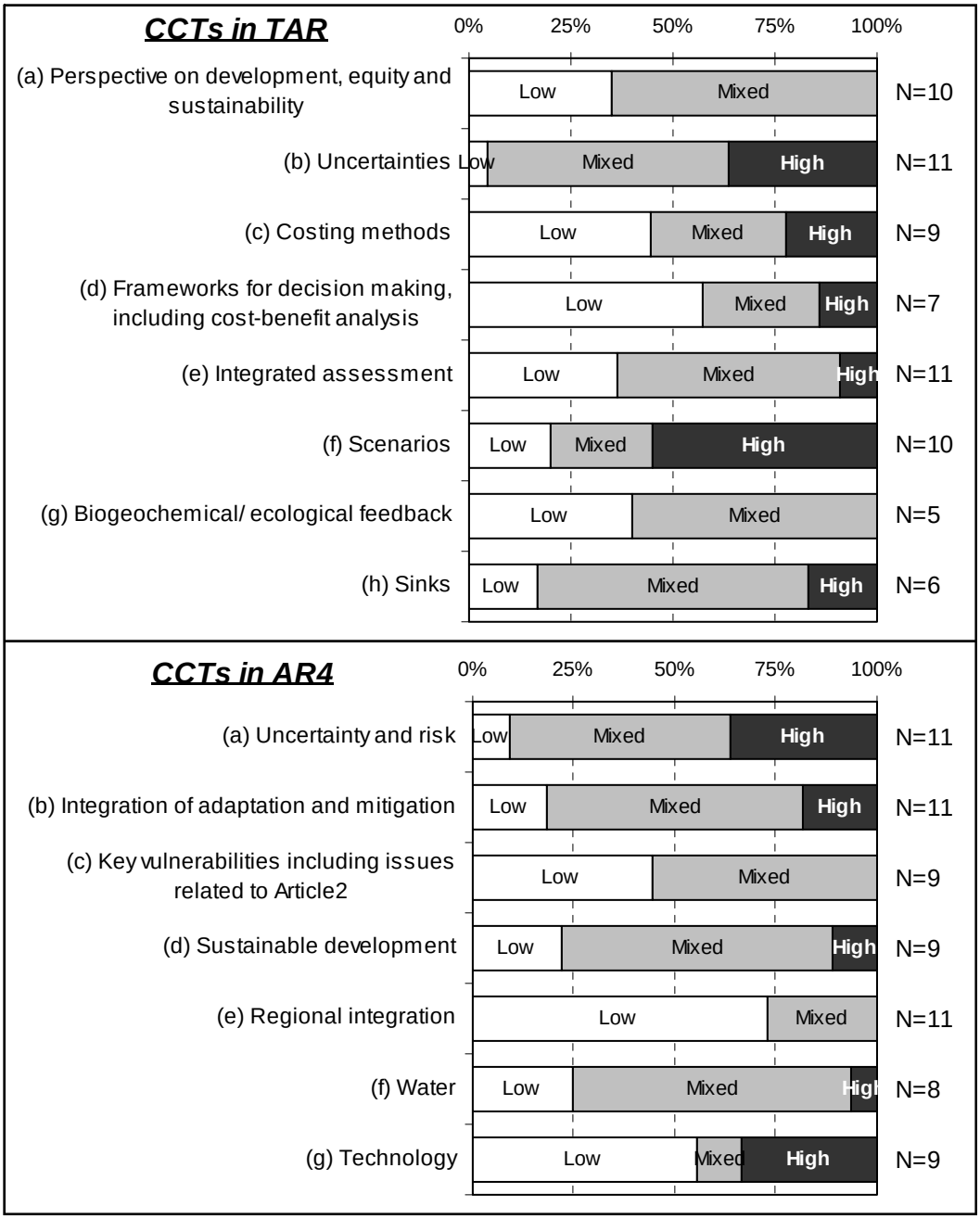


Figure 2.1. Evaluation on the treatment of the past CCTs
("N" means total number of answers)

Summary of comments on each theme

CCTs in TAR

(a) Perspective on development, equity and sustainability

- There was no respondent who evaluated the treatment of this theme as "High". They noted that this theme was not well integrated to be evaluated High because development, equity and sustainability were treated fragmented way and the nexus between them was not fully appreciated.
- There was also a comment that the equity's concept was not dealt with as deeply as necessary.

(b) Uncertainties

- Many respondents answered that this theme was well treated. Guidance paper was delivered to the authors and most of respondents consider this paper to be useful and effective to help the authors understand the concept of uncertainties.
- On the other hand, many respondents also pointed out that there were differences of approach between the WGs (especially WG III) and there was a suggestion that continued effort in this area should be a priority.

(c) Costing methods

- The guidance paper of this theme was delivered to the authors as well as uncertainties and respondents gave high evaluation to some extent on this theme.
- However, most of respondents think that more advanced costing methodologies should be developed.

(d) Frameworks for decision making, including cost-benefit analysis

- More than half of respondents evaluated the treatment of this theme as "Low".
- There were comments from respondents that more analysis is needed on this theme.

(e) Integrated assessment

- Respondents think that this theme was not developed in a cross cutting manner and the treatment of this theme was not effective. There was also a comment that much has been spoke about this theme but little has been done.

(f) Scenarios

- This theme is considered as the most efficiently treated among the CCTs in TAR and AR4. By developing the Special Report on Emission Scenarios (SRES), clear scenarios of future GHG emissions were described and many respondents evaluate this as a significant and successful activity.

(g) Biogeochemical/ ecological feedback

- This theme is one of the themes that are given low evaluation. The process of the treatment of this theme was not explicit to the authors in TAR and it seems that they didn't even know any action was taken to develop this theme.

(h) Sinks

- Comments from respondents on this theme fall into two opinions.

- One is that by developing the Special Report on Land Use, Land-Use Change and Forestry (LULUCF), this theme was well developed in TAR and this means the treatment of this theme was highly effective.
- The other is that although the SR on LULUCF was a successful product, little was transpired or reflected in TAR.

Concluding comments on CCTs in TAR

Two of the CCTs selected for the TAR were particularly considered as well treated: "Uncertainties" and "Scenarios". The preparation of the SR on emission scenarios was an important input in the process, and the guidance paper on uncertainties was considered as a useful move towards a consistent treatment of the issue. "Costing methods" was considered as relatively well treated, thanks to the writing of a guidance paper, but requiring further development. "Sinks" was also considered as well treated, thanks to the writing of the Special Report on LULUCF. The issue of biogeochemical feedback appears to have received little attention as a cross-cutting theme. Finally, most of the respondents did not evaluate the treatment of "Perspective on development, equity and sustainability" and "Integrated assessment" as very efficient.

CCTs in AR4

(a) Uncertainty and risk

- As in TAR, the treatment of this theme is considered as highly efficient. Respondents think that the treatment of uncertainties improved in AR4 in terms of broader treatment and more consistent use among WGs than in TAR.
- On the other hand, respondents pointed out that the treatment of risk was not effective compared to the treatment of uncertainties. There was also a suggestion that continued effort in this area should be a priority.

(b) Integration of adaptation and mitigation

- Some respondents think that this theme was well treated especially in WG II and WGIII. As a result, this theme was one of the themes that are given high evaluation.
- However, there are some respondents noting that the treatment of this theme in AR4 was limited and that more analysis should be conducted in AR5 with strong support from WG II and WG III.

(c) Key vulnerabilities including issues related to Article2

- There is no respondent that evaluated the treatment of this theme as High. The reason presented for this is that no consensus on this theme was created among WGs, in spite of the efforts to develop this theme by WG II.
- Some respondents stressed the need for interconnection with other organization or UN agencies in the field of global environmental change and the need for conversation with governments.

(d) Sustainable development

- Comments from respondents can be classified into two categories.
- One type of response is that this theme was not well defined. In addition to that, there was no literature on this theme and they think some literature should have been produced.
- The other is that this theme was treated well in some individual chapters but not treated in cross cutting manner. There were suggestions that more integrated approach was needed and more space should have been allocated to this theme in AR4.

- As a result, most respondents evaluated the treatment of this theme as Mixed.

(e) Regional integration

- Many respondents evaluated the treatment of this theme as little effective. This theme was given the lowest evaluation among all the CCTs, considering both TAR and AR4.
- Respondents pointed out that the regional boundaries in WGs were different from each other. Some respondents also pointed out that the developing countries' needs weren't taken into account enough.

(f) Water

- There were various kinds of comments from respondents.
- Some respondents pointed out the inconsistencies in treatment between WGs and limited WG III involvement.
- Some respondents valued the treatment of this theme to some extent because this theme led to the development of the Technical Paper on Climate Change and Water. However, there are respondents who noted that the TP was not sufficiently developed and some important issues were missed in the TP in spite of much information provided from other organizations such as the WSSD, the WPC and others.

(g) Technology

- There were few respondents who evaluated the treatment of this theme as "Mixed". One third of the respondents evaluated the treatment of this theme as "High", while more than half of them evaluated it as "Low".
- The expert meeting on this theme was held and the result was reflected in AR4, but there were comments from respondents that the treatment of this theme covered only a small number of issues. On top of it, one of the respondents wonders whether this theme is suitable as a CCT.

Concluding comments on CCTs in AR4

The treatment of "Uncertainty and risk" and "Integration of adaptation and mitigation" were considered as well treated in AR4. "Water" and "Sustainable development" were given similar evaluations in that many respondents considered the treatment of these themes as "Mixed". On the other hand, the evaluation on "Technology" seems to differ depending on the respondent's point of view judging from the result that most of the respondents selected either "Low" or "High". Finally, the treatment of "Regional integration" and "Key vulnerabilities including issues related to Article 2" did not satisfy most of the respondent as no respondent evaluated the treatment of these themes as "High".

Q2. Are there some issues or themes that should be treated again in AR5 among those listed above (=Q1)?

Figure 2.2 shows the number of respondents that suggested the themes to be treated again in AR5.

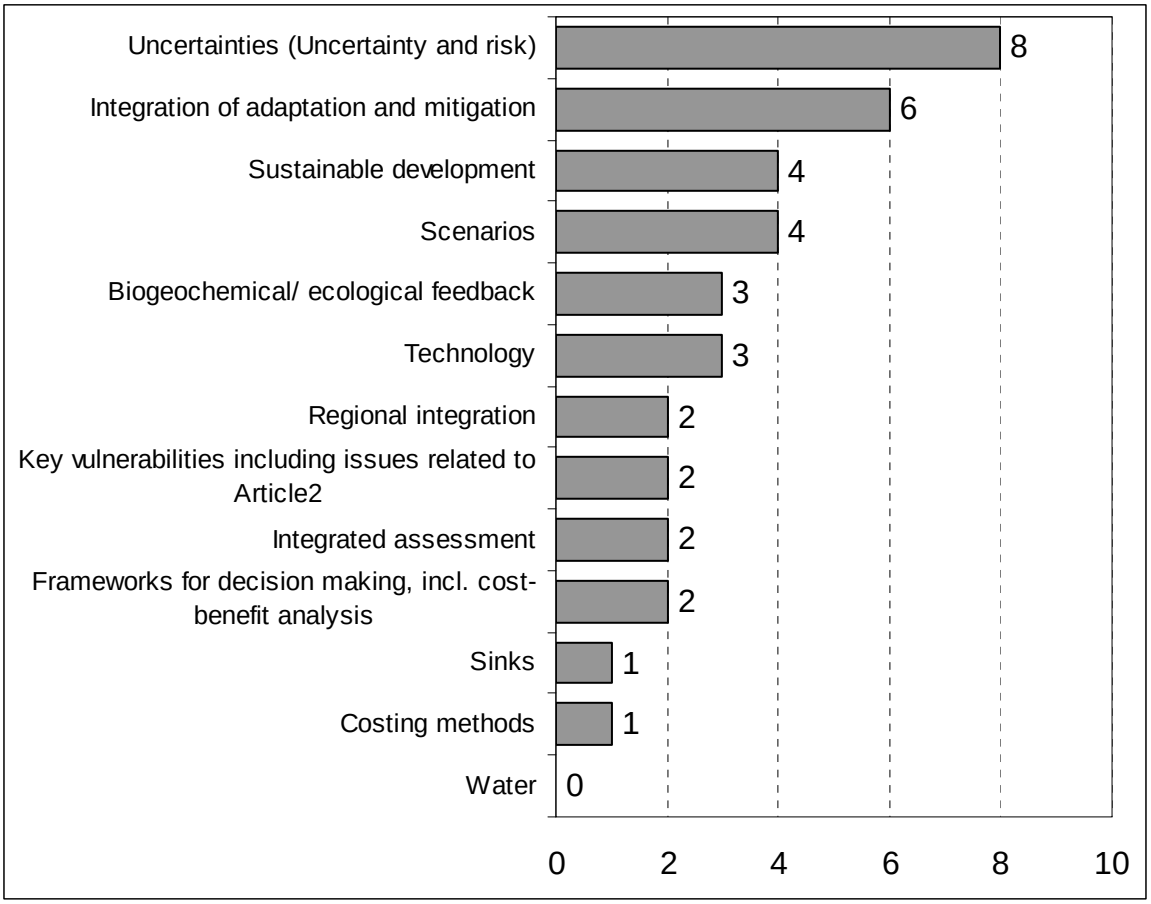


Figure 2.2. Number of respondents that suggested the themes to be treated again in AR5

The result of this question is summarized as follows.

- The most frequently suggested theme in this question is “Uncertainties (or Uncertainty and risk)”, suggested by 8 respondents.
- Although the past treatment of this theme is evaluated as highly effective, respondents think that different measures and indicators of uncertainty were used in the different WGs in TAR and AR4 and this theme is still under development. In particular, developing the treatment of “risk” is considered to be crucial in AR5.

- The second theme is “Integration of adaptation and mitigation”, suggested by 6 respondents.
- Respondents think that this theme should also be developed in AR5 as this theme is crucial in order to clarify the future options to help preventing climate change impacts. There were also some comments from respondents that more literature is emerging in this area and deeper analysis of the available literature is needed.

- The third theme is “Sustainable development”. As shown in question 3 in this paper, most respondents think that this theme wasn’t treated sufficiently and should be developed in AR5.

- The fourth theme is “Scenarios”. Development of a new set of scenarios has already started and the representative concentration pathways (RCPs) were identified in the Expert Meeting on New Scenarios in Noordwijkerhout 2007 as a starting point from which climate and integrated assessment modelers can begin to work toward new integrated scenarios.
- In the comments from respondents, the importance of developing new scenarios, with appropriate storylines and of effectively integrating them consistently in the work of both WGII and WGIII is confirmed.

- As shown in figure 2, there are 5 other themes that were suggested by 2 respondents and 3 themes suggested by 1 respondent.
- “Costing method” was only suggested once. However, in a section described later in this paper, themes related to costing such as “Economics of climate change” are suggested as new CCTs in AR5. In addition, most respondents noted in question 1 that more advanced costing methodologies should be developed.
- The same can be said for “Water”. There was no suggestion on this theme, but “Climate change and integrated water management” is suggested as one of the proposals for new CCTs in AR5.

Q3. Proposals for new cross-cutting themes in AR5

Table 2.1 shows all the themes suggested by the respondents as proposals for new cross-cutting themes in AR5.

Name of Issue	Reason of suggestion
Attribution	Key issue linking WGI and WGII assessment of observed changes; high public and policy interest
Earth system feedbacks	Key issue of public and policy interest that spans WGI and II
Cross-scale interactions	Understanding interactions across temporal scales and across spatial scales are critical for advancing climate change science. See draft paper by Averyt et al, which synthesizes discussions from the IPCC expert meeting held in Fiji in 2007.
Observations and Information	Because one of the most potentially useful functions of an IPCC Assessment is to identify information shortfalls and the needs for future assessments
Geo-engineering	Should the suggestion made under Technology, for inclusion of geo-engineering, not accepted, the IPCC should assume the responsibility of this CCT, with its implications on the environment and human health. The reference on photochemical reactions, in the atmosphere, between gases rules by the Montreal Protocol, creating hazards on the human health and adverse implications on ecosystems and biomes would enable to present a chapter dealing with the adverse effects of some human actions on the atmosphere and oceanic domains. Find information on legal aspects and history of weather modification.
Extreme climate change	Assess signs that climate may change faster than assessed in AR4 and how this would affect current mitigation and adaptation options (includes overshoot scenarios, technical, economic and ethical aspects of geo-engineering, etc.)
Cross system interactions	Cross system interactions, including feedbacks to the climate system, and interactions between physical, ecological, and human systems are current areas of weakness in our understanding of climate change risks. See draft paper by Averyt et al, which synthesizes discussions from the IPCC expert meeting held in Fiji in 2007.
Short-term and long-term scenarios	The world recession 2008- may affect not only the level of CO2 emissions 2008-2012, but also the long-term growth rate. The potential for very different transition pathways (e.g. substantial reductions in the early years) associated with “green New Deals” implies that the scenarios need co-ordination across AR5.
Social drivers for change and the role of behavior management	Emerging issue identified in AR4, relevant for both WGII and III

Table2.1. Proposals for new cross-cutting themes in AR5

Name of Issue	Reason of suggestion
Non-technological solutions	Emphasis in earlier reports is on technological solutions, mostly incremental improvements of existing technologies; more attention to system changes (integrated energy-food-water systems, structural economic changes, behavioral changes)
Consumption patterns and lifestyles	The AR4 recognized that while much of the focus of policy action lies towards the supply-side and production sectors, fundamental changes in consumption patterns, lifestyles and conceptions of how economic growth leads to improvement in well-being will be essential for meeting developmental and climate change goals. There is now an emerging literature on this topic including on sustainable production-consumption systems. Increased attention to this topic is highly warranted.
Non-climate policies and climate	Non-climate policies may have a greater effect on mitigation/adaptation than explicit climate policy
Implementation science & practice	One of the critical policy needs is guidance on best practices and mechanisms for implementation of adaptation & mitigation responses, including the role of finance, technology transfer and multilateral mechanisms. Particularly in the case of adaptation, issues such as mainstreaming and integration have been highlighted as challenges. While literature is still limited, a focus on this topic may help in accelerating learning from past experience and the new pilot adaptation interventions.
Co-benefits and multiple benefits	Public and political will for action may be strengthened through improved understanding and quantification of the interrelationships between adaptation and mitigation responses to climate change and other social, and economic developmental goals. In practice, most policy actions and interventions are motivated by, and affect multiple goals, and high-lighting the potential tradeoffs and synergies between these objectives may be a valuable contribution.
Equity	Both intragenerational (distributional) and intergenerational equity are central issues in climate policy. A clear understanding of the equity-related implications of various climate response policies is becoming increasingly important in the policy process.
Biological resources	Beyond biofuels in current renewable SR: including competition with other non-food and food produce, sinks role, climate and C-cycle feedbacks, etc.
Interaction between climate change and air pollution	Decarbonisation of economies also provides benefits in terms of reduced air pollution. The climate and health sciences and economics are complex and a cross-cutting approach will help to locate the literature in the appropriate sections in AR5.

Table2.1. Proposals for new cross-cutting themes in AR5

Name of Issue	Reason of suggestion
Climate Change and Integrated Water Management	The effect of Climate Change on the water issue as a whole, is already the cause of the most critical impacts on ecosystems and the natural and managed environs, on a host of human activities and on regional security . The potential use of other than potable fresh water needs guidance. There is an ample room for further analyses of precipitation regimes under a new climate system. This topic brings the consideration of human security, under long drought´s conditions and floods. Further, a full analysis of the water issue, as a CCT, will serve to better define the potential of biofuel ´s production vis â vis of agricultural production for humans and their herds In this regard, a segment of this CCT shall be devoted to studies on the different irrigation techniques and on the minimum and optimal water requirements fro different basic crops.
Economics of climate change	This is an area that is difficult to handle well because traditional economics does not cover the length of time necessary when assessing climate change issues.
Communication	Greater attention and resources need to be given by the IPCC to the problem of communicating climate change science to diverse audiences and through intermediaries. See draft paper by Averyt et al, which synthesizes discussions from the IPCC expert meeting held in Fiji in 2007.
Research needs	Because the Lead Authors of an assessment are uniquely equipped to advise on future research needs

Table2.1. Proposals for new cross-cutting themes in AR5

Q4. How to improve the handling of cross-cutting themes in AR5?

Respondents were also asked to suggest ideas on how to improve the handling of cross-cutting themes in AR5.
Suggestions from the respondents are classified broadly into the following categories. (See also Appendix for comments from the respondents)

(1) Treatment of CCTs should be well scheduled.

- Most of respondents think that the treatment of CCTs should be well scheduled and the development process of CCTs should start as early as possible. They noted that the early start of the CCTs coordination would make it easy to have a consistent set of results from WGs.
- For example, the following suggestions were proposed from the respondents concerning a desirable schedule of CCTs treatment.
  - Expert meetings, workshops and summary reports from all cross-cutting themes should all be completed before the first AR5 LA meetings.
  - An approach that can deal with this is to first produce reviews from expert meetings etc on the themes before the LA meetings, and to then produce a separate short set of recommendations for all LAs that brings in structures and issues raised in their first LA meetings for each WG.
  - I think if we begin immediately after the PAOs (Plenary Agreed Outline) are available to identify key authors for which each CCT would directly be relevant, we could get some coordination in advance that might eliminate some downstream problems when different WGs move down different pathways on connected themes.

(2) CCTs should be carefully handled, using guidance papers and/or meeting reports for every CCT.

- Respondents wrote a lot of comments on how CCTs should be treated in AR5. There were various kinds of comments and we can summarize them as follows.
- First of all, CCTs should have a clear goal and should be carefully handled. It should be developed with support from WGs to promote consistency across Working Groups and to be balanced with non-cross cutting works in WG reports.
- Besides, respondents stressed that guidance papers or expert meeting (workshop) reports need to be produced for every CCT.
- There was also a note from a respondent that says “Too much time was spent on cross cutting in AR4 that did not have products, and this was ineffective”. Many other respondents made the same kind of comments in the first question of this questionnaire on effectiveness of the treatment of past CCTs.

(3) WGs need to be fully involved, with implication of key WGs members and improved cross WG coordination.

- Many respondents think that WGs need to be fully involved and key members of WGs should have a certain role in developing CCTs in order to prevent the situation in which too few authors are involved and the CCTs end up as add-ons to the reports.
- Some of the respondents pointed out that past efforts to address cross-cutting themes have tended to be separated from the working group assessment processes and effective coordination between WGs needs further improvement. One respondent mentioned the use of the E-team to regularly discuss progress and issues with CCTs, and decide on actions to address them.
- There were many comments on the need to involve key members of WGs in developing CCT, with various shades of meaning:
  - Some CCTs can only be effective if they have respected champions within the relevant WGs and LA teams.
  - Appoint vice-chairs with the specific objective to submit review comments across all WGs to ensure consistent application of CCT guidance.

- Give authors in crosscutting teams clear mandate or assign CLAs in those teams
- All cross-cuts should flow bottom-up from the WGs, not top-down from some central viewpoint or process.
- For each CCT, identify the chapters from each WG that are critical for a comprehensive and holistic treatment. Engage at least one author and one review editor from each of these chapters to participate in a team to develop, execute, and coordinate a plan to address the theme in a holistic manner.
- The terms of reference for each CCT shall be submitted to the comment of the CLAs of the different chapters of each WG, to request their inputs comments.

(4) CCTs development should be closely linked to the SYR development process,

- Some respondents also stressed the need for CCTs development to be closely linked with the SYR development. They think that both CCTs and SYR need to be developed in a cross cutting manner and that CCTs can be developed through the development of the SYR, which provides a process to get authors from different WGs talking to each other.

(5) Other suggestions

- One respondent expressed that the treatment of CCTs needs different approaches, with attention to ensure that the most appropriate treatment is selected for each issue. Another respondent suggested to categorize CCTs into a few groups (e.g. guidance to authors, issues for synthesis etc.) and choose the approaches appropriate the nature of the themes group.

- There was also a comment that says there cannot be too many cross-cuts and 7 themes in AR4 were too many.

Appendix 1 : Questionnaire on past cross-cutting themes

Please fill out your name and your function in TAR or AR4.

Name:

Function in TAR:

Function in AR4:

1. How effective do you think the treatment of the Cross-cutting issues was in the past WG Reports and SYR?

(you may consider for example the consistency of treatment of the issue across working groups, how comprehensively the issue was covered, whether the SYR provided a synthetic view on the issue with tables and graphics as appropriate, etc.)

Please specify the reason for your judgment. If you have some suggestions that could have improved the treatment of each issue, please indicate.

You need not answer about the issues that you aren't familiar with.

1.1 Cross-cutting issues in TAR

Issue	Effectiveness of treatment	Please specify or comment on possible improvements
(a) Perspective on development, equity and sustainability	1. High 2. Mixed 3. Low => Answer:	
(b) Uncertainties	1. High 2. Mixed 3. Low => Answer:	
(c) Costing methods	1. High 2. Mixed 3. Low => Answer:	
(d) Frameworks for decision making, including cost-benefit analysis	1. High 2. Mixed 3. Low =>Answer:	
(e) Integrated assessment	1. High 2. Mixed 3. Low => Answer:	
(f) Scenarios	1. High 2. Mixed 3. Low => Answer:	
(g) Biogeochemical/ ecological feedback	1. High 2. Mixed 3. Low => Answer:	
(h) Sinks	1. High 2. Mixed 3. Low => Answer:	

1.2 Cross-cutting themes in AR4

Themes	Effectiveness of treatment	Please specify or comment on possible improvements
(a) Uncertainty and risk	1. High 2. Mixed 3. Low => Answer:	
(b) Integration of adaptation and mitigation	1. High 2. Mixed 3. Low => Answer:	
(c) Key vulnerabilities including issues related to Article2	1. High 2. Mixed 3. Low => Answer:	
(d) Sustainable development	1. High 2. Mixed 3. Low => Answer:	
(e) Regional integration	1. High 2. Mixed 3. Low => Answer:	
(f) Water	1. High 2. Mixed 3. Low => Answer:	
(g) Technology	1. High 2. Mixed 3. Low => Answer:	

2. Are there some issues or themes that should be treated again in AR5 among those listed above (sections 1.1 and 1.2)?

Please specify the reason that you suggest the issue and comment on how to deal with it. (e.g. Expert meeting, Workshop, Guidance paper, Checklists for authors etc.)

Name of Issue	Reason that you suggest the issue in the left column	How to deal with the issue

3. Proposals for <u>new</u> cross-cutting themes in AR5?

Please specify the reason that you suggest the issue and comment on how to deal with it. (e.g. Expert meeting, Work shop, Guidance paper, Checklists for authors etc.)

Name of Issue	Reason that you suggest the themes in the left column	How to deal with the themes

4. How to improve the handling of cross-cutting themes in AR5?

(Possible issues to consider : the process of treatment of these themes, including how to help the authors to keep the issues in mind and review that guidelines have been taken into account, how to catalyse the necessary cooperation and coherence between working-groups, how to produce synthesis graphics and tables relating to the cross-cutting themes, …)

Appendix 2 : Comments from the respondents

1. Comments on the treatment of the past CCTs

1.1. CCTs in TAR

(a) Perspective on development, equity and sustainability

From the respondents who chose "Mixed"

- Did not seem to be well integrated with main issues in WGs.
- Could be much more effective than it was. Perhaps, if after the Plenary Agreed Outline (PAO) is done, CCT on this theme is built to provide upstream guidance to already targeted chapter teams based on PAO requiring attention to this perspective.
- These issues, while they received greater attention in the TAR and AR4 compared to earlier reports, are treated in a fragmented way that is tangential to the foci of the IPCC reports. Sustainable development should be a central framework around which the AR5 is constructed. See further comments in section 2 below.
- The understanding of the nexus between development and climate change was not yet fully appreciated. There was a suggestion to have a SR but this was felt to be premature and a TP was proposed an as alternative but this was not taken up.
- These issues aren't seen as very important to the OECD countries. Consequently they are not discussed in full in IPCC documents.
- The treatment given to this issue has been incomplete. The equity ´s concept (from the human point of view) was not dealt with as deeply as necessary. WG2-AR4 Chapter 20 provides a good insight; however does not deal with equity. The new concept of Climate Change Ethics (see Broome John, SCIAM June 2008) and the increasing number of UN ´s body and NGO´s declaration on the size of the world population means that a renewed treatment of this issue is a must. AR 4 WG III chapters, namely 12, provide good information.

From the respondents who chose "Low"

- concentrated in few chapters
- Had little impact
- The problem with this CCT was that while its importance was unquestionable, it was less clear about how it would be practically addressed in individual chapters, particularly in WG 2. Partly it is also a lack of literature developing these ideas.

(b) Uncertainties

From the respondents who chose "High"

- A useful summary of consistent approaches for dealing with uncertainties that then led to further developments for the AR4.
- This CCT was very effective in those working groups and chapters that followed it in TAR and AR4, less so for those that followed it much less. Maybe more clear statements about the necessity of consistent use of language with uncertainties attached as well as a clear requirement that all important conclusions have some indication of author confidence attached will get even better compliance with this guidance in the AR5. Also, there could be a small team who could read all SODs and advise authors when inconsistent uncertainties guidance has been used, as sometimes not all lead authors understand the concepts of subjective confidence assessment, nor do all reviewers. So some internal consistency reader team might be a remedy on this all critical topic, since consensus is often more on the confidence in a spectrum of conclusions than in the conclusions themselves.
- I understand that even with limitations imposed by difficulties in correct evaluation IPCC has been leading this important aspect of evaluation.

From the respondents who chose "Mixed"

- WG1-2 yes but different, WG3 no

- The IPCC has made good progress in how it treats uncertainties. But the assessment of confidence levels is not as widely applied as it could be and sometimes it has been unsystematic and somewhat ad hoc. Continued effort in this area should be a priority.
- Despite some good work the application by WG scientists was often either not understood or applied inconsistently. The communication of uncertainties would seem to be important for decision-makers but there was little engagement from governments.
- Although this issue has been treated quite well, there are differences of approach between the IPCC WGs. Further, there is little being said with respect to the "uncertainties" regarding climate projections and the "reliability and real value" of socio-economic scenarios. After the Budapest ´s decision to have new set of scenarios for AR 5 plus the poor capacity to downgrade the scenarios to regional and sub-regional scales, action is necessary to emphasize the climate projections ´ limitations, particularly regarding the water issue.
- Useful but widely mis-understood in the community.
- Variable treatment across chapters & Working groups.

(c) Costing methods

From the respondents who chose "Mixed"

- WG3 yes, WG2 no
- Very good report prepared for the TAR, but not widely followed in my recollection. Again, after PAO some guidance to authors of particularly relevant chapters might be undertaken once it is known who must write on related themes.
- There is significant effort of IPCC to analyse costs. Nevertheless, the issue could be carried out with more care.

From the respondents who chose "Low"

- Somehow the IPCC has had difficulties engaging first-rate economists and having a constructive discussion with those are do get involved. Perhaps the Stern Report will change this.
- As far as the reading of what has been circulated during and after TAR, we need a far more better costing methodology. Otherwise the essence of adaptation will fail.
- Little impact

(d) Frameworks for decision making, including cost-benefit analysis

From the respondents who chose "Mixed"

- CBA well treated in SAR
- Taken up in some quarters

From the respondents who chose "Low"

- The treatment of benefit-cost analyses and optimization frameworks in the TAR and AR4 have been too uncritical. There are significant limitations of these tools for addressing distributional and equity considerations that are substantial when dealing with a global problem. Chapter 2 by Ken Arrow et al in the WG3 SAR has a very useful assessment of these frameworks and their limitations as decision tools for an inherently global problem. Unfortunately, the TAR and AR4 lost site of these.
- I had minimal involvement with this cross-cutting issue.
- As far as my perception this issue falls under the same comment above. This situation is critical because both issues also concern to CLAs /Las drafting the IPCC Reports.

(e) Integrated assessment

From the respondents who chose "Mixed"

- There seemed to be too little basis for cross-WG cooperation to make this issue useful in the TAR. More specific approaches arising from common scenarios for the AR5 are clearly better.

- mainly in WG3 and synthesis reports
- Some impact
- Not quite clear what we do with integrated assessment as a CCT.

From the respondents who chose “Low”

- Ditto above comment, but individual chapters with particular responsibilities in this regard—eg, Chaps 19/20 in WG 2 AR4—did have pretty thorough airing of strengths and weaknesses of such approaches. . Post PAO coordination here valuable too I think.
- To my understanding this has only really been taken up by modellers.
- "Much has been spoke about integrated assessments; however, little has been done. The multiplication of reports on issues such as the MEA and other done by NGOs on ecosystems with a poor reference to the IPCC reports and vice-versa might be the kernel of this serious shortcoming.
- As expressed in many occasions, the fact that IPCC is too much devoted to the UNFCCC is the cause of leaving out real integration. To some extent it also happened with the water issue and with the parallel, non-convergent treatment given to the climate change issue by the WMO Climate Programme and IPCC"

(f) Scenarios

From the respondents who chose “High”

- Did not solve all the issues but did lead to better consistency in WG I and then lead to better strategies for cross-disciplinary concerns in the AR4.
- Last two times scenarios were very clearly described, and were fully explained in TS of all WGs. This time I have deep concerns about the way the process is evolving with RCPs, since there is no unique mapping backward from a radiative forcing scenario to a socio-technological evolution that would create it. Thus doing vulnerability analysis becomes very problematic since adaptive capacity depends on development pathway, but any RCP implies non-unique pathways (an infinite number); it makes doing vulnerability analysis very difficult. Hard to see how anything “robust” could emerge from such a framework. Also, current scenarios proposal is missing what I believe to be the most probable 21st century scenario: a large mid-century concentration overshoot (~500-600ppm) followed by steep decline back to maybe 400ppm stabilization by 2100. This makes the climate change and related impacts issues a transient process—scientifically difficult to do and hard to find literature on it in impacts world—nevertheless, should we be neglecting what is perhaps the most probable scenario because current tools are inadequate to produce it very confidently? Why not do a decision analytic elicitation on scenarios and not just follow limited models as our priors? I will argue to broaden this perspective in Venice, and look forward to a lively discussion on this all critical CCT.
- The SRES has clearly been significant and served the IPCC process well. However, it has been correctly recognized that this should be driven by the scientific and scholarly communities and not the IPCC.
- Very successful activity. IPCC scenarios are always referred in other studies and taken as serious.

From the respondents who chose “Mixed”

- link WG2-WG3 missing
- The social and economic aspects of scenarios, and their application in the study of vulnerability and adaptation, is a fundamental weakness.
- Much work and a lot of discussions were devoted to this issue. The IPCC Budapest ´session concluded that new scenarios are needed. Logically, this does not invalidate the huge work done; however, as discussed in the limited meeting held in Budapest, it is urgent to have the new set and, as it is known, in conditions to regionalize and approach the socio-economic future to lower scales. Downgrading is a pending issue.

From the respondents who chose “Low”

- Massively misunderstood and misrepresented

(g) Biogeochemical/ ecological feedback

From the respondents who chose “Mixed”

- treated, but somewhat hidden/not explicit
- Our scientific understanding is still incomplete and we are continually surprised.

From the respondents who chose “Low”

- Beautiful title, no action

(h) Sinks

From the respondents who chose “High”

- as consequence LLCUF Special Report

From the respondents who chose “Mixed”

- The SR/LUCF was a successful product that did assist the intergovernmental negotiating process.
- It is a very important area for consideration. Maily in the case of biomass sinks deserve more attention.
- This issue, treated in the SR LULUCF covers aspects arising from Article 3.4 (KP), wisely referring the soil CO2 stocking capacities also to developing countries, In Chapter 6 refers what should be done regarding the necessary improvement and regular up-dating of the IPCC Guidelines for Inventories. Much has been done; however, little has transpired in both SYRs (TAR & RA4). Assuming that AR5 SYR has to be a vademecum for decision makers, next step would be to include better the activities of the Inventory Task Force in providing guidance.
- Some impact

1.2. CCTs in AR4

(a) Uncertainty and risk

From the respondents who chose “High”

- Over two years we got more cross-WG interactions, including contributions from many LAs, on this theme than in any other. It led to WG III using standard uncertainty terminology for the first time thanks to their engagement in the issues and to our policy of not letting any single WG dominate the approach.
- This CCT was very effective in those working groups and chapters that followed it in TAR and AR4, less so for those that followed it much less. Maybe more clear statements about the necessity of consistent use of language with uncertainties attached as well as a clear requirement that all important conclusions have some indication of author confidence attached will get even better compliance with this guidance in the AR5. Also, there could be a small team who could read all SODs and advise authors when inconsistent uncertainties guidance has been used, as sometimes not all lead authors understand the concepts of subjective confidence assessment, nor do all reviewers. So some internal consistency reader team might be a remedy on this all critical topic, since consensus is often more on the confidence in a spectrum of conclusions than in the conclusions themselves.
- I understand that even with limitations imposed by difficulties in correct evaluation IPCC has been leading this important aspect of evaluation.

From the respondents who chose “Mixed”

- "Reasonably well handled, although implementation in specific instances was not as good as it could have been (i.e. use of combined uncertainty terminology in some key statements that made their interpretation difficult; preponderance for use of same category of uncertainty terminology across entire WG report weakened the original intent of being able to distinguish types of uncertainty).
- Despite the title, the treatment of “risk” as compared to uncertainty was very inconsistent and ineffective across WGs, and even across chapters."
- broader treatment than in TAR and now all WGs, but limited to SPM and communication could have been better.
- An improvement over the TAR but the application was again inconsistent. The involvement of WGIII still could be improved.
- Some commonality achieved on adopted terms.
- Thorough but still widely misunderstood
- Variable treatment across chapters and working groups. Greater attention to formalizing subjective judgement needed (perhaps formal expert elicitation protocols for particular judgements)

(b) Integration of adaptation and mitigation

From the respondents who chose “High”

- in WG2 special chapter, in WG3 integrated in various chapters
- Well done.

From the respondents who chose “Mixed”

- Good efforts in individual chapters, but key messages did not come forward into WG SPMs and TSs, and there was insufficient robust material to allow a solid treatment in the SYR, although some advance was made with regard to avoided damages.
- The initial ideas for this only developed partially. It would be worth pursuing again but would probably need strong support from WG II and WG III co-chairs.
- Treated well by WGII and WGIII in their individual contributions to the AR4 but still limited by the amount of literature available. This is much more complicated that some imagine.
- Average connections between WGs II and III, but weak with WGI.
- Tended to be restricted to the single chapter on this issue – needed to be actually picked up in different sector & region chapters, and across WG 2 and 3, which did not really happen.

From the respondents who chose “Low”

- AR 4 WGIII report and Chapters 4 and 5 of the SYR-AR4 cover aspects of this issue. It calls for deeper analysis of the available literature for a better understanding of this issue. It must be an AR 5 task.
- Not understood in the community.

(c) Key vulnerabilities including issues related to Article2

From the respondents who chose “Mixed”

- Discrepancies in assessment and interpretation of key issues by WGI and WGII, requiring a lot of work to resolve in SYR. In the end very valuable conclusions were reached in the SYR but only thanks to hard work by authors across the two WGs in the SYR Core Writing Team.
- A worthwhile effort but still leaving a lot to be desired. This is where we really need a good dialogue with governments since science can only provide partial answers.
- This issue is more important to developing countries. Limited interest of OECD imposes constraints in the full consideration.
- Only focussed on by WGII; lack involvement by WGI and III.
- "This issue stemmed from a classical SBASTA ´s request and so it was considered by WG 2.
- As mentioned above, more inter-connection with other matters related to the global environmental change, of which Climate Change is only a component may be, or not, taken by the IPCC. The yes or not depends on the IPCC integration with UN agencies and non-governmental organizations ´ programmes regarding, for instance, the key vulnerabilities of ecosystems, or the problem of sustainability (Already treated in WG 2 Chapter 17 to 20 but still poor in what concerns the management of resources, particularly water, under climate change. A missed issue."

From the respondents who chose “Low”

- Did not seem to produce any consensus on issues and an expert meeting seemed to be quite ineffective.
- because of separation WGs.
- Has left many readers very confused . Should go back to the basic ratioale for the Convention and address in the context of both science and policy

(d) Sustainable development

From the respondents who chose “High”

- Remarking 1. High, does not mean that the IPCC has completed its work. The above mentioned lack of integrated analysis, maybe through environmental-social & economic matrix analyses calls for a more “integrated approach” to the sustainability issue. The WRI publication on People & Ecosystem – the Fraying Web of Life (2000-2001) brings IPCC into the focus of a transcendent issue. It might be identify as Analysis of Integrated Sustainable Development.

From the respondents who chose “Mixed”

- Good treatment within individual chapters and WG reports, but very limited success in treatment across WGs and only weak synthesis in SYR.
- because of lack of literature, access social sciences?
- Chapter 20 of the WGII contribution to the AR4 is perhaps the most policy-relevant element of the whole AR4; it should be required reading for all government policy-makers.
- The issue is considered. More space for it would be useful.
- OK but SD has become too overused to retain much credibility in an IPCC Report

From the respondents who chose “Low”

- never well defined.

- Partly because it was never clear (and still is not!) exactly how and in what form this would be addressed in individual chapters.

(e) Regional integration

From the respondents who chose “Mixed”

- focus on impacts, regional mitigation absent.
- The regional chapters of the WGII contribution to the AR4 were a definite improvement over the TAR but there now needs to be much more involvement with WGI and WGIII.
- Due difficult in collecting information this aspect isn’t discussed as deep as needed.

From the respondents who chose “Low”

- Inconsistent treatment of regional attribution, mixed success of use of regional projections. Limited information on regional mitigation issues. As a result, no coherent picture for climate change issues as a whole in individual regions. Different regional boundaries in WGs.
- This is an important theme but was not pursued as intended due to difficulties in getting WG I and WG II to agree on a compatible approach. That may have been due to a lack of time at critical phases of developing the WG outlines. It should be attempted again for the AR5.
- never defined.
- "This issue was not treated as it should.
- Only a few short meetings were held and the written material, which is available (at least to me) never took the form of a decent draft."
- Very confusing. Needs a major emphasis in the AR5 on both capabilities and limitations.
- Was never sure about the basic objective of this CCT.

(f) Water

From the respondents who chose “Mixed”

- Was a useful cross-WG area and led to a later Special Report but the field is quite straightforward and did not really need to be a theme.
- little WG3 involvement?
- The TP on Water was a bit of a disappointment – little real synthesis. There is a strong, vocal and well-organized water community and the IPCC must be careful not to be manipulated by them. Water is connected to so many other issues.
- "The bureaucracy killed the idea to develop a SR on this issue. Now, from 2008 an IPCC Technical Paper VI on Climate Change and Water is available. Issues like
  · Water management under climate stress,
  · Studies ion water requirements for different crops
  · Need to develop evapotranspiration formulas for different geophysical, geomorphological and edaphological environments to cope with the productivity problems min different regions of the world, etc

  Are not even mentioned."
- Follow-up report helped a lot

From the respondents who chose “Low”

- Inconsistencies in treatement between WGI and WGII; no systematic treatment across WGII chapters; very limited consideration in WGIII. Hence very limited ability to synthesise in SYR.
- This topic had a technical paper devoted to it.

(g) Technology

From the respondents who chose “High”

- maybe too little emphasis on non-technological solutions!

From the respondents who chose “Mixed”

- We need to find the IPCC's role in technology. I'm not convinced we should simply produce SR's on individual technology sectors – this tends to serve some governments agendas at the expense of others.

From the respondents who chose "Low"

- Not adequately included in chapter outlines of WGI or II, hence not able to be handled effectively as CCT. Probably not suitable as a CCT across WGs. Was handled reasonably well within WGIII though.
- The original ideas on this were interesting but the time pressure and limited number of contributors whittled things down to a small number of issues which did not really go beyond existing summaries in the TAR.
- never dfefined.
- Needs more emphasis in AR 5

2. Comments on CCTs that should be treated again in AR5

(a) Uncertainties (or Uncertainties and Risk)

(Suggested by 8 respondents)

Reason of suggestion	How to deal with the issue
Consistent use of uncertainty terminology across WGs is crucial. New and related issue is looking at climate change as risk management issue, which requires consideration of low probability/high impact events (or high impact events with unknown probability) in neutral yet relevant way. If risk is excluded, there is potential that low probability or low confidence findings are given too low priority for effective treatment in a risk framework. Authors will require guidance on how to handle such issues without overstating potential high impact events about which very little is known.	Expert workshop and guidance paper for authors on dealing with uncertainty, including in the context of risk assessment. Issue of "risk" should also be considered specifically during scoping meeting
This is an area that is still under development and IPCC leads the way in developing approaches to uncertainties that are truly cross-disciplinary.	Following the approaches used in the AR4 again would be justified. I.e. an expert meeting representing all WGs, a report from that, and a brief summary of approaches recommended to all LAs.
Communicate reasons for diversity; start earlier – beyond SPM for deeper treatment; explore boundaries of climate change (outer ends of range rather than middle range), deal with issues like probabilities or impossibility to assign probabilities	Require proper treatment from FOD, establish team ("uncertainty police") including communication specialist(s)
Assessment of uncertainties and confidence levels is a necessary part of science assessment that aspires to be useful to decision makers.	Needs continued, ongoing engagement of authors from all 3 working groups – starting with the scoping of the assessment, continuing through the writing and review of report drafts, and culminating in the synthesis of AR5. A more systematic, transparent process is needed for the assessment of confidence levels.
Still need better dialogue with governments and under standing by scientists.	Workshops with WG authors across WG's.
This is a very important co-ordination issue because different measures and indicators of uncertainty are used in the different WGs in TAR and AR4.	Expert meeting to recommend AR5 treatment
It is fundamental and not well understood	
Consistent and clear treatment of uncertainty remains an important issue.	A guidance paper would be desirable. I would also strongly recommend that the assessment process adopt a formal system for expert elicitation that should underlie all key subjective judgements. Such an explicit recognition of subjective probabilities is an important step in making the judgements about uncertainty transparent and consistent.

(b) Integration of adaptation and mitigation

(Suggested by 6 respondents)

Reason of suggestion	How to deal with the issue
Key policy issue that has to draw from several WGs. Focus on global scale, as regional scale integration becomes very political very quickly	Detailed discussion during scoping meeting; standing expert group drawn from lead authors and WG Co-chairs/TSUs to discuss during drafting process
The new approaches to common scenarios to be used in the AR5 by all WGs is leading to more consistent structures for looking at future options in WG II and WG III.	This would justify selection of some key contributors in both WG II and WG III and a major workshop early in the development of the AR5. Some WG I involvement in the workshop would be useful but this is mainly an issue for the other two WGs.
More literature is emerging	Cross-WG team
This was not achieved in AR4, mainly because mitigation scenarios developed in WGIII were not analysed in WG1 and so could not be translated into impacts avoided/unavoided nor into adaptation requirement (by WGII).	Needs iterative analysis of: a) emissions strategies by WGIII, translated into b) climate outcomes by WGI, and then into c) consequent impact/adaptation futures for each strategy (by WGII)
Although this is mainly a mitigation issue, there are parallels with adaptation so there needs to be some co-ordination	Guidance paper, drawing on AR4 agreed treatment
What the IPCC has been able to say up to AR4 justifies to activate a CCT on this issue	There is sufficient new literature on the issue

(c) Sustainable development

(Suggested by 4 respondents)

Reason of suggestion	How to deal with the issue
Key issue for integrating climate change into development programmes	Consideration during scoping meeting; guidance paper
Little concrete treatment in Tar/ar4, rename in “development” or “climate change and non-climate policies”	include more social scientists, go beyond “SD” literature and include trade, finance, development cooperation, etc.
How to move toward a more sustainable path for development ultimately is why climate change is one of the major problems of our generation and future generations. Its treatment has been too fragmented and tangential in past reports.	Make sustainable development a central organizing framework for the AR5. Identify a small number of overarching questions for all three working groups to address. For example:
Need for better “mainstreaming” of climate change response options.	A well-prepared IPCC conference.

(d) Scenarios

(Suggested by 4 respondents)

Reason of suggestion	How to deal with the issue
Consistent use of RCP scenarios where possible, and relationship to SRES scenarios where older literature is used	Consideration during scoping meeting; expert workshop and guidance paper
The considerable amount of work already done in reaching agreement on the Reference Concentration Pathways is now a basis for the AR5. However, further development of consistent approaches and greater use of scenarios in a WG II context is still well justified.	Again mainly a WG II – WG III issue but requiring some interactions with WGI as well. An early expert meeting followed by some ongoing interaction between some LAs would be valuable.
Already on the way	
The concept is fundamental to understanding the IPCC Asssessments yet there is massive confusion on what they are	

(e) Biogeochemical/ ecological feedback

(Suggested by 3 respondents)

Reason of suggestion	How to deal with the issue
Don't recall guidance on it before, but needs some coordination for sure in AR 5 in WG 1 and WG 2, given both have good expertise, even if with different orientation, to address this important issue.	Again, post-PAO would identify key actors who need to coordinate.
The performance of integrated assessment calls for a better information on the implications of climate change and its feeders on biogeochemical and ecological processes and their feedbacks	This issue may be linked to the first one mentioned here, i.e. Integrated Assessment
The idea of full radiative forcing has gained much visibility in recent years. It would be good to obtain a clear picture of the interactions between biogeochemical, biophysical and ecological feedbacks that may be both positive and negative in nature. This is becoming particularly important for land-based mitigation options.	While individual chapters in working groups 1 and 2 may cover the issue, perhaps a synthesis product may be attempted for the synthesis report through an expert meeting.

(f) Technology

(Suggested by 3 respondents)

Reason of suggestion	How to deal with the issue
One obvious cross-cutting theme is technology.	
The technological gap between developed and developing countries needs reduction.	Enough information available.
Technology remains a central part of adaptation and mitigation responses, and a focus on technology change and innovation would be quite policy-relevant. This may also be a good opportunity to review and assess the recent literature pertaining to technology transfer and innovation support mechanisms. The IPCC special report on tech transfer came out almost a decade ago, and the technology landscape has changed quite substantially in the interim.	While individual chapters (mostly in Working group 3) would address technology issues, it would be good to have a separate chapter that particularly looks at international & national technology transfer and policy issues.

(g) Regional integration

(Suggested by 2 respondents)

Reason of suggestion	How to deal with the issue
Regional lens is important perspective for policy makers, more relevant than WG boundaries. Need to be careful to avoid policy-prescriptiveness to creep into regional perspectives about priorities.	Consideration during scoping meeting to assist with chapter definition; cross-WG meetings as necessary to define regional boundaries and clarify whether same boundaries can work for WGI/II and WGII/III interaction, and how to handle the situation if they cannot use the same boundaries
As commented above in relation to the AR4, this is a very useful area for consistency across WG I and WG II. It is also important to get a good allocation of the assessment of the underlying science between these two WGs	A very early expert meeting and some follow up strategy supported by LAs to allocate the issues being assessed between WGs I and II and to keep in place some interactions on the development of their two reports.

(h) Key vulnerabilities including issues related to Article2

(Suggested by 2 respondents)

Reason of suggestion	How to deal with the issue
Key policy-relevant issue that has to draw from several WGs	Consideration of approach during scoping meeting; expert workshop; note link with “risk” concept
Integration did not work well in AR4 due to strict boundaries between WGs	From start on, in Synthesis Team that has mandate to go beyond cutting and pasting from WGs

(i) Integrated assessment

(Suggested by 2 respondents)

Reason of suggestion	How to deal with the issue
Full integration has not been achieved for the large climate models, but the literature is advancing and an overview of how it fits into the structure of AR5 is important, especially considering the different disciplines involved and the problems of communicating between them (e.g. economics and climate science)	Workshop
Although climate events are, let us say, more visible and impacting than those affecting biodiversity, the water management, combined flooding events, etc, the Panel is obliged to provide to decision making and the endangered human society with complete, integrated and reliable information on the consequences of the use/abuse of natural resources and the drivers of the planet changes.	The re-reading of the UNEP, US NASA and WB publication: Protecting our Planet, Securing our Future (November 1998) opens the door to integration. Furthering of the UNPF (Population Agency) puts emphasis on some political questions authors should know a the ongoing ideas to produce biofuels against producing for feeding more that 1 billon people with hunger, 1.5 with no sure water, calls for a deep integrated assessment exercise, but interconnected with the other global environmental issues.

(j) Frameworks for decision making, including cost-benefit analysis

(Suggested by 2 respondents)

Reason of suggestion	How to deal with the issue
Key policy issue	Consideration during scoping meeting; expert workshop
Evaluation of climate policy at various levels requires the use of normative and positive approaches. This CCT should also address the question of multiple numeraries & evaluation metrics.	Perhaps as a separate chapter in Working group 3.

(k) Sinks

(Suggested by 1 respondents)

Reason of suggestion	How to deal with the issue
Don't recall guidance on it before, but needs some coordination for sure in AR 5 in WG 1 and WG 2, given both have good expertise, even if with different orientation, to address this important issue.	Again, post-PAO would identify key actors who need to coordinate.

(k) Costing methods

(Suggested by 1 respondents)

Reason of suggestion	How to deal with the issue
The lack of sufficient literature to found on the adaptation strategies which are already necessary result from the fact that much of the economic and social information on climate disasters is not standardized. Therefore, representative costs and values of input to solve the consequences of severe events are not comparable and, when produced by different actors, tend to confound decision actions. IPCC normative on costing would serve the purpose of clarifying the actions to be taken, knowing costs and evaluating benefits, data on which decent adaptation planning can be build-up	These is sufficient bibliography on which to found this CCT

3. Comments on proposals for new CCTs

Name of Issue	Reason of suggestion	How to deal with the issue
Attribution	Key issue linking WGI and WGII assessment of observed changes; high public and policy interest	Small expert group during scoping meeting; expert workshop clarifying definition, terminology, and approaches across WGs; guidance paper
Earth system feedbacks	Key issue of public and policy interest that spans WGI and II	Consideration during scoping meeting; Expert workshop
Cross-scale interactions	Understanding interactions across temporal scales and across spatial scales are critical for advancing climate change science. See draft paper by Averyt et al, which synthesizes discussions from the IPCC expert meeting held in Fiji in 2007.	
Observations and Information	Because one of the most potentially useful functions of an IPCC Assessment is to identify information shortfalls and the needs for future assessments	Include a subsection on 'Observational /information gaps and future needs'in every relevant chapter
Geo-engineering	Should the suggestion made under Technology, for inclusion of geo-engineering, not accepted, the IPCC should assume the responsibility of this CCT, with its implications on the environment and human health. The reference on photochemical reactions, in the atmosphere, between gases rules by the Montreal Protocol, creating hazards on the human health and adverse implications on ecosystems and biomes would enable to present a chapter dealing with the adverse effects of some human actions on the atmosphere and oceanic domains. Find information on legal aspects and history of weather modification.	Search in : UNESCO ´s activities on sea-ocean acidification, already presented in AR4 needs furtherance. WMO ´s action on weather modification. .Legal aspects of Weather modification (,i.e. Weather Modification and the Law, Editor HowardTaubenfeld, Oce
Extreme climate change	Assess signs that climate may change faster than assessed in AR4 and how this would affect current mitigation and adaptation options (includes overshoot scenarios, technical, economic and ethical aspects of geo-engineering, etc.)	Propose Special Report (because of urgency) or assign WG1-WG2-WG3 team with clear mandate for the WGs to take up their recommendations
Cross system interactions	Cross system interactions, including feedbacks to the climate system, and interactions between physical, ecological, and human systems are current areas of weakness in our understanding of climate change risks. See draft paper by Averyt et al, which synthesizes discussions from the IPCC expert meeting held in Fiji in 2007.	

Name of Issue	Reason of suggestion	How to deal with the issue
Short-term and long-term scenarios	The world recession 2008- may affect not only the level of CO2 emissions 2008-2012, but also the long-term growth rate. The potential for very different transition pathways (e.g. substantial reductions in the early years) associated with “green New Deals” implies that the scenarios need co-ordination across AR5.	Scenarios workshops
Social drivers for change and the role of behaviour management	Emerging issue identified in AR4, relevant for both WGII and III	Consideration during scoping meeting; Expert workshop
Non-technological solutions	Emphasis in earlier reports is on technological solutions, mostly incremental improvements of existing technologies; more attention to system changes (integrated energy-food-water systems, structural economic changes, behavioural changes)	Propose Special Report (urgency) or assign WG2-WG3 team with clear mandate for the WGs to take up their recommendations
Non-climate policies and climate	AR5 observed that non-climate policies may have a greater effect on mitigation/adaptation than explicit climate policy	Assign WG2-WG3 crosscutting group
Consumption patterns and lifestyles	The AR4 recognized that while much of the focus of policy action lies towards the supply-side and production sectors, fundamental changes in consumption patterns, lifestyles and conceptions of how economic growth leads to improvement in well-being will be essential for meeting developmental and climate change goals. There is now an emerging literature on this topic including on sustainable production-consumption systems. Increased attention to this topic is highly warranted.	While issues of consumption patterns & lifestyles may be covered in different chapters, it may be useful to have a separate chapter devoted to this topic, which could be placed either in Working Group 3 or 2.
Implementation science & practice	One of the critical policy needs is guidance on best practices and mechanisms for implementation of adaptation & mitigation responses, including the role of finance, technology transfer and multilateral mechanisms. Particularly in the case of adaptation, issues such as mainstreaming and integration have been highlighted as challenges. While literature is still limited, a focus on this topic may help in accelerating learning from past experience and the new pilot adaptation interventions.	Individual sector and regional chapters in Working groups 2 & 3 should identify literature pertaining to implementation issues, including constraints, barriers, opportunities and best practices. A synthesis chapter may be an option.

Name of Issue	Reason of suggestion	How to deal with the issue
Co-benefits and multiple benefits	Public and political will for action may be strengthened through improved understanding and quantification of the interrelationships between adaptation and mitigation responses to climate change and other social, and economic developmental goals. In practice, most policy actions and interventions are motivated by, and affect multiple goals, and high-lighting the potential tradeoffs and synergies between these objectives may be a valuable contribution.	Individual sector and regional chapters in Working groups 2 & 3 should identify literature pertaining to co-benefits particularly potential tradeoffs and complementarities among them. A synthesis chapter may be an option.
Equity	Both intragenerational (distributional) and intergenerational equity are central issues in climate policy. A clear understanding of the equity-related implications of various climate response policies is becoming increasingly important in the policy process.	Individual sector and regional chapters in Working groups 2 & 3 should identify literature pertaining to equity issues & implications of climate response policies. A synthesis chapter may be an option.
Biological resources	Beyond biofuels in current renewable SR: including competition with other non-food and food produce, sinks role, climate and C-cycle feedbacks, etc.	Propose Special Report (urgency) or assign WG1-WG2-WG3 team with clear mandate for the WGs to take up their recommendations
Interaction between climate change and air pollution	Decarbonisation of economies also provides benefits in terms of reduced air pollution. The climate and health sciences and economics are complex and a cross-cutting approach will help to locate the literature in the appropriate sections in AR5.	Expert meeting

Name of Issue	Reason of suggestion	How to deal with the issue
Climate Change and Integrated Water Management	The effect of Climate Change on the water issue as a whole, is already the cause of the most critical impacts on ecosystems and the natural and managed environs, on a host of human activities and on regional security . The potential use of other than potable fresh water needs guidance. There is an ample room for further analyses of precipitation regimes under a new climate system. This topic brings the consideration of human security, under long drought´s conditions and floods. Further, a full analysis of the water issue, as a CCT, will serve to better define the potential of biofuel ´s production vis â vis of agricultural . production for humans and their herds In this regard, a segment of this CCT shall be devoted to studies on the different irrigation techniques and on the minimum and optimal water requirements fro different basic crops.	A workshop with the participation of specialists from the different IPCC Regions will permit to expand the approach the IPCC has taken from its inception, leaving much of the droughts problematic without a deep analysis. The Workshop conclusions would b
Economics of climate change	This is an area that is difficult to handle well because traditional economics does not cover the length of time necessary when assessing climate change issues.	This needs a very early expert meeting bringing together experts who have worked on the AR4 with others working on economics in a policy context who have not contributed to IPCC before. Such a meeting should take place with open discussion of both WG II a
Communication	Greater attention and resources need to be given by the IPCC to the problem of communicating climate change science to diverse audiences and through intermediaries. See draft paper by Averyt et al, which synthesizes discussions from the IPCC expert meeting held in Fiji in 2007.	
Research needs	Because the Lead Authors of an assessment are uniquely equipped to advise on future research needs	Include a subsection on 'Future research needs' in every relevant chapter

4. Comments on how to improve the handling of CCTs in AR5

Following comments were made by the respondents.

1	Treatment of CCTs has to be appropriate to the issue, hence we should not use the same approach for all CCTs. This will allow a greater number of CCTs to be handled effectively, but requires careful attention to ensure the most appropriate treatment is selected and relevant individuals or teams charged with implementation. The notion of "CCT" should not be seen as giving special status to an issue within the IPCC, as there are many other issues that are not CCTs but equally policy-relevant. Crucial that all CCTs are considered in some form during the scoping meeting so that they can be reflected as necessary in chapter outlines and form part of conversations with relevant authors from the beginning. Some CCTs can only be effective if they have respected on-going champions within the relevant WGs and LA teams – consideration for co-chairs in appointing authors. Use E-team to regularly discuss progress and issues with CCTs, and decide on actions to address them. Some CCTs will not need active champions but only consistent application of accepted principles (e.g. for uncertainty terminology). Appoint vice-chairs with the specific objective to submit review comments across all WGs to ensure consistent application of CCT guidance (where such guidance has been developed)
2	Expert meetings, workshops and summary reports from all cross-cutting themes should all be completed before the first AR5 LA meetings in order to avoid the time pressures that will increase steadily once preparation of the AR5 gets underway. However, in some cases it will also be valuable to allow a final revision of cross-WG strategies and standards after the first LA meetings so that these can become well aligned with the issues being developed at the WG levels. An approach that can deal with this is to first produce reviews from expert meetings etc on the themes before the LA meetings, and to then produce a separate short set of recommendations for all LAs that brings in structures and issues raised in their first LA meetings for each WG. That is effectively the approach we used for the treatment of uncertainties in the AR4 and in my view was very productive because of the two stages involved. Unfortunately this may be more difficult in the AR5 because of the big time gap between WG I and WGs II and III, but it is still worth using as a valuable strategic approach and can remain very effective for interactions between WG II and WG III.
3	• Organize joint LA meetings between WGs (same location and time), especially the 1st one • Give authors in crosscutting teams clear mandate or assign CLAs in those teams (previously sometimes "weak" team members) • Increase emphasis on Special Reports because of urgency and maintaining policy relevance (AR5 late) • Start Synthesis Process very early • Involve graphical artists/communication specialists in Synthesis Team from the start and provide feedback to WGs; possibly also in WGs at the time of SPM development • Give the crosscutting teams the role of providing concrete review comments from their perspective that cannot be ignored (beyond discussion group); expand mandate of review editors: also to ensure that the recommendations from the cross-cutting teams are taken into account

	The process to define cross-cutting themes needs to be very carefully designed. There should be no cross-cuts for which a well defined literature is not available. IPCC doesn't do research; IPCC assesses published research. This standard should apply to all cross cuts just as it does in the WG processes and materials. There should be no cross-cuts for which a clear and appropriately documented and reviewed outcome cannot be obtained. The demands of IPCC are already extremely severe, and activities that are not subject to documentation and review are of very little benefit to the process. Too much time was spent on cross cutting in AR4 that did not have products, and this was ineffective.
4	To be useful, a cross cut should have a clear goal: a workshop and a workshop report, or reviewed supplementary material by joint authors. All such products should be subject to rigorous review. No cross cut should involve meetings with no output; this takes a great deal of time and doesn't provide a tangible and useful outcome. No cross cut should produce un-reviewed products since there is no way for the authors to do much without appropriate review. All cross-cuts should flow bottom-up from the WGs, not top-down from some central viewpoint or process. This is essential to safeguard the integrity of the IPCC process and to ensure that IPCC' procedures (which place all judgements for what to include in a report in the hands of the authors of that report) are followed in spirit as well as intent. I believe that this approach as not been sufficiently explored: there is actually significant enthusiasm among the authors for doing good cross cutting work, and there is little point in imposing themes for which there is no bottom-up enthusiasm nor time. Cross cutting work has to be balanced with non-cross cutting work, and only the Co-chairs can do this. To ensure that any cross-cutting work is effective and complementary to the other key activities within WGs, the WG cochairs need to provide governance to the process: this cannot be done by others. Further, there cannot be too many cross-cuts. I would say 7 as in AR4 was far too many.
	As mentioned often in first matrix above, I think if we begin immediately after the PAOs are available to identify key authors for which each CCT would directly be relevant, we could get some coordination in advance that might eliminate some downstream problems when different WGs move down different pathways on connected themes—which happened a few times in AR4, like on sea level—though that was well resolved at Synthesis after considerable effort. So the more we do upstream to coordinate on CCTs the easier it will be to have a consistent set of results from different WGs to synthesize at the end of the process. Also, as I suggested in Matrix1 above, might want a small team of uncertainties advisers to look over the SODs to be sure uncertainties guidance is consistently applied across all writing in the AR5.
5	**Scenarios**. Let me just paste in most of what I said above in this summary matrix, since I see this as a potentially problematic issue unless dealt with soon in scoping. Last two times scenarios were very clearly described, and were fully explained in TS of all WGs. This time I have *deep concerns* about the way the process is evolving with RCPs, since there is no unique mapping backward from a radiative forcing scenario to a socio-technological evolution that would create it. Thus doing vulnerability analysis becomes very problematic since adaptive capacity depends on development pathway, but any RCP implies non-unique pathways (an infinite number); it makes doing vulnerability analysis very difficult. Hard to see how anything "robust" could emerge from such a framework. Also, current scenarios proposal is missing what I believe to be the most probable 21st century scenario: a large mid-century concentration overshoot (~500-600ppm) followed by steep decline back to maybe 400ppm stabilization by 2100. This makes the climate change and related impacts issues a transient process—scientifically difficult to do and hard to find literature on it in impacts world—nevertheless, should we be neglecting what is perhaps the most probable scenario because current tools are inadequate to produce it very confidently? Why not do a decision analytic elicitation on scenarios and not just follow limited models as our priors? I will argue to broaden this perspective in Venice, and look forward to a lively discussion on this all critical CCT.

6	Past efforts to address cross-cutting themes have tended to be separated from the working group assessment processes, with the result that too few authors are involved and the cross-cutting issues end up as add-ons to the reports, are not well integrated, and the treatment can be spotty and not holistic. I recommend that IPCC not set up structures to coordinate the treatment of cross cutting themes that are separate from the working groups. The working groups **and their authors** need to have a role in identifying which cross-cutting are to be selected as themes for AR5 and have ownership of how these issues are treated. For each of the cross-cutting themes, identify early in the process the chapters from each working group that are critical for a comprehensive and holistic treatment. Engage at least one author and one review editor from each of these chapters to participate in a team to develop, execute, and coordinate a plan to address the theme in a holistic manner. These teams of authors should be empowered to decide what means are needed to accomplish their task. They should also be given resources to support these means – e.g. cross-working group meetings, expert meetings, guidance papers, etc
7	The focus for dealing with cross-cutting issues or themes should be through the development of the SyR. It is through this process that we need to get authors across WG's talking to each other. Experience has shown that this is not easy as the authors have strong commitments to their WG's. Overcoming this has to be done sympathetically. It could be lead by the Chairman or one of the Vice-chairs but it is essential that they have the full confidence of the WG co-Chairs.
8	The most important thing AR5 could do to improve the integration of AR5 is to do the scoping of the Synthesis report BEFORE deciding on the working group report outlines and to organise a process of building the SYR along side the writing of the WG reports. The reason for this is that knowing the building blocks of the SYR would help enormously to enable a full integrated synthesis in SYR. Coordination of the SYR building blocks between the Working Groups during the writing process would then go naturally.
9	It would be helpful to have a systematic set of Guidance Notes on various cross-cutting issues that have emerged in TAR and AR4 to provide guidance for AR5. Hopefully they could be updated versions of earlier Guidance Notes, drawing on the agreed text of AR4.
10	The experience of the CCTs was not very successful in the AR4. The process started well, with CCTs being identified along with co-chairs. The co-chairs were asked to write a document on how to approach the CCT, which to my knowledge was done at least for most CCTS (certainly for mine). However seemingly the process somewhat stopped there and there was really not an in depth discussion and implementation of the CCTs themselves. The CCTs were supposed to enhance the cross WG communication and interaction, but I would say that in fact this interaction was rather weak, maybe even weaker than in previous reports. The problem was that there was no process in place to make sure the CCTs were being followed up and thus work on these really did not happen following a plan shared by all WGs but was based on the initiative of individuals. My suggestion is that if the CCTs are to be successful then a plan should be put in place to make sure approaches and decisions are implemented or at the least followed up on, otherwise there is really not much point in formalizing the CCTs.

The interest and enthusiasm awoken with the insertion of the initial “cross cutting issues”, when the first set of four (4) CCIs /CCTs(Preparatory TAR Meeting in Bad Mustereiffel) were considered for inclusion in TAR, did not progress enough during the third assessment reporting period.
In fact, the CCTs ´ s nature, their scientific and technological background and their socio-economic implications, though embodied in the Working Groups ´ terms of reference did not flowed to the authors responsible for developing each issue, as they should. This shortcoming was registered in TAR.
When the AR 4 CCTs were selected, the IPCC Bureau agreed that the responsibility for completing, reviewing and the actions leading to the approval of the authors ´ work and conclusions, should be assigned to the co=chairs of the WGs involved. So,

Uncertainty + Risk and Regional Integration were put under the WG1 co=chairs
Key Vulnerabilities (Art 2 UNFCCC) and Water under WG 2 co chairs
Adaptation ¨+ Mitigation and Technology, under WG III co chairs

The three working groups tightly linked to obtain the best possible outcome, as the state of the art would permit.As already mentioned in the treatment of previous questions, the outcome was not that initially expected.

The bigger problem resulted from the treatment of the CCT Water.
IPCC 20th agreed that water should be given more prominent and integrated attention in AR4 than it was in the TAR. In the years 2000 and 2001, actions by the WCP Water, the Dialogue on Water , the results of the WSSD (Johannesburg, 2002) and those of the Third World Water Conference (Japan 2003), the reactivation of the Agenda 21 added, provided more momentum to the water issue.
The exacerbation of extreme events, bringing the three water founded inconveniences, i.e. too much, too less and too dirty (which have had already pointed out in TYAR SYR, Question 8), added some value to this CCT.However, the IPCC decided that a Technical Paper on Climate Change and Water would answer the initial request, presented to the Panel by the WCP Water and the Dialogue on Water.The expected interactions between the three IPCC WGs did not show, and what have had the value to bring to the IPCC the crucial water world problem, only resulted in the organized presentation of the AR 4 main conclusions on the issue, very particularly, those of WG 2, in a Technical Paper.
The highly transcendent question of the water management under the heat stress (arising from climate change) was not treated. Other matters, like the integrated evaluation of water resource uses, particularly in the very moment that the generation of biofuels was already on the portfolio of energy enterprisers was marginally considered.

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Another poor outcome resulted from the CCTs on Regional Integration and Technology. In this regard, the Panel must take into account the developing countries ´ needs on these issues, but particularly in what concerns Technology. The draft made available to WG II did not tackle these countries ç problems.
The CCT on Technology should cover the host of issues running from observation methods and procedures (in this case quoting what is available in the UN Specialized Agencies and other institutions ´ literature?. Summarising the aim of such a CCT, we could say: devices can be a part of technology, but devices on their own do not define a technology.

In view of the above, the IPCC Panel decision to assign CCTs to the three WGs shall be kept. However, as hinted in many of the Bureau meetings on these issues, effective coordination between WGs needs further improvement. Moreover, as it has happened in an informal manner, each CCT shall have two designated responsible CLAs (one from developed and other from developing countries).
The terms of reference for each CCT shall be submitted to the comment of the CLAs of the different chapters, of each IPCC WG, to request their inputs comments.
Following the IPCC procedures, RE for each CCT shall be named.
Last but not least, the search of appropriate bibliography cannot obviate the consideration of the different governmental and non governmental agencies, programmes and¨ projects in similar and complementary scientific and technological fields.

While handling cross-cutting themes, it is worth grouping them into two categories: guidance to authors and issues for synthesis.

In the first category are themes that are largely in the nature of guidance to authors with regard to the assessment and presentation of results & findings from the literature. Uncertainty is a classic example from this category, others might be themes such as co-benefits, equity and technology. For these themes we need to ensure that they are addressed in a consistent fashion, to permit comparison, contrast and synthesis across chapters within and between working groups. The process to address them might be to fashion a guidance document (as in the case of the uncertainty guidance paper), and then ensure that there is clarity early in the process (as early as the first meeting of each working group) on how and what would be done with that guidance in individual chapters. Addressing this early in the process is essential if we are to have any impact. Addressing these themes helps to ensure a certain level of quality and consistency across the assessment.

The second category consists of themes that reflect cross-cutting *issues* – topics that may be covered in many chapters or that go beyond specific chapters or working groups. Examples in this category might include issues such as consumption patterns & lifestyles (several chapters of working groups 2 & 3), positive & negative feedbacks or integration between adaptation & mitigation. The best way of dealing with these themes might be to have specific placeholders for them in individual working groups (perhaps in the form of separate chapters), but then ensure that the treatment of the theme does not get limited to the particular chapter. For example, biophysical & ecological feedbacks may be covered in different chapters of working groups 1 and 2, so that even if there is a separate chapter on
12 feedbacks, it gets connected with the relevant chapters in the assessment. Such "synthesis" chapters could form an important part of the Synthesis report.

A general approach might be to have a workshop mid-way through the assessment process where coverage of the theme in different chapters may be pulled together and consolidated. When the author teams for chapters where these CCT's will be covered are assembled; specific LA's may be tasked with following that theme in the chapter.

For both types of cross-cutting themes it will be necessary to have a well-defined process, including the identification of individual experts who would perhaps facilitate and lead the coverage of these themes in the AR5. If the earlier practice of "anchoring" particular themes with particular working groups is followed, perhaps the TSU's of the working groups should be suitably strengthened so that the themes do not fall through the cracks.

In many ways, the cross-cutting themes reflect the part of the AR5 that connects rather closely with the policy process and the policy debate. For example, there is a critical need for us to move forward with putting adaptation into practice. The suggested cross-cutting theme of "implementation science & practice" addresses this urgent need.

Over the course of the years, the IPCC has moved from the question of Why (should we do anything)? that was central in the SAR, TAR and to some extent in the AR4; to the question of What (will happen & what can we do about it)? that was important in the AR4. While the What question still remains, we now need to increasingly turn to the question of How (do we go about doing what needs to be done)? This evolution perhaps needs to be reflected through the choice and treatment of the cross-cutting themes and of course in the synthesis report.

Acknowledgment

We would like to offer our sincere gratitude to the 16 respondents to the questionnaire, who took the time to share their experience and expertise:

Dr. Terry Barker, Dr. Osvaldo Canziani , Dr. Jae Edmonds, Dr. Filippo Giorgi, Dr. Neil Leary, Dr. Bert Metz , Dr. Martin Parry , Dr. Anand Patwardhan, Dr. Martin R Manning, Dr. Andrew Reisinger, Dr. José Roberto Moreira, Dr. Susan Solomon, Dr. Rob Swart, Dr. Stephen Schneider, Dr. John Stone, Dr. John Zillman

We would also like to thank Dr. Philippe Marbaix, who assisted Prof. Jean-Pascal van Ypersele in reviewing the drafts.