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## **PROGRESS IN THE PREPARATION OF FIFTH ASSESSMENT REPORT (AR5)**

### **Synthesis Report Progress Report**

(Submitted by the Chair of the IPCC)

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## PROGRESS IN THE PREPARATION OF THE AR5 Synthesis Report Progress Report

### Part I. Progress since IPCC-35 (June 2012)

Since the 35<sup>th</sup> Session of the IPCC<sup>1</sup> the development of the Synthesis Report (SYR) has gone according to the planning thanks to the great enthusiasm and dedication of the SYR authors. This was a challenge, given the fact that the SYR is developed in parallel with the Working Group (WG) reports. The continued financial support from the Norwegian and Dutch Governments, and the substantive in-kind contributions from The Energy and Resources Institute (TERI) and the IPCC Secretariat have enabled the SYR TSU to support the SYR author team. The Chair and SYR Technical Support Unit (TSU) would like to specially thank the IPCC Secretariat and WMO for hosting the first Core Writing Team (CWT-1) meeting in 2012, and to the Norwegian Climate and Pollution Agency (now called Norwegian Environmental Agency) for hosting the second CWT meeting this year.

#### *Actions taken since IPCC-35:*

- *The First Core Writing Team Meeting* was held at WMO, Geneva, Switzerland, from 11-13 June 2012, hosted by the IPCC Secretariat at WMO. At this meeting, the members of the CWT made an initial distribution of their writing tasks. Revisions were made to details of the outline of the SYR as it had been approved by the Panel at IPCC-32 (see Part II of this document). Two “Topic Facilitators” were appointed for each Topic and 2 “Box Facilitators” were appointed to the Box on “Information relevant to Article 2 of UNFCCC”. Their facilitating role is to keep the Topic groups moving forward and ensure good communication among themselves, the Chair and the SYR TSU. The CWT agreed to a work plan, an initial page allocation, and a style guide.
- *The Zero Order Draft (ZOD)* was written after CWT-1 with internal iterations and with guidance from the Chair. The ZOD was completed by 2 April 2013, based on the Second Order Draft (SOD) of WG I, the First Order Drafts (FODs) of WGs II and III and to some extent on the very recent SODs of WG II and III.
- *An internal review of the SYR ZOD* was held between 2 April - 3 May 2013. The SYR CWT, a selection (by WG Co-Chairs) of WG authors, and Bureau members (including Government Representatives) were invited to participate in this internal review. This review delivered 2306 internal comments from 21 CWT members, 31 WG authors, 3 Bureau Members, and 7 government representatives in the Bureau. The SYR TSU also invited the SYR Review Editors to informally consider these review comments and identify crunch issues for the authors to work on for their next version.
- *The Second Core Writing Meeting* was held at the Norwegian Climate and Pollution Agency (now called Norwegian Environmental Agency), from 10-12 June 2013, Oslo, Norway. The ZOD review results were discussed, and an intensive dialogue took place between the CWT authors from the 3 WGs with a view to synthesize their findings. The new Final Draft of WG I and the SODs of WG II and WG III provided new inputs to consider observations, projections, and the subjects of adaptation and mitigation in an integrated manner. Based on the review results and these discussions, the SYR outline was further revised (see Part II), and a work plan was made leading up to CWT-3. The meeting drew the attention of the Norwegian Press, and made prime-time television news in Norway.

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<sup>1</sup>[http://www.ipcc.ch/meetings/session35/doc7\\_syr\\_progressreport.pdf](http://www.ipcc.ch/meetings/session35/doc7_syr_progressreport.pdf)

- *Other meetings:* Many electronic meetings have been held to monitor progress and discuss the writing of the Zero Order Draft. The SYR TSU participated in the 3rd and 4th Lead Author meetings of WG II and WG III. This was extremely helpful in getting an oversight of the development of both WG reports. In the margins of those meetings some discussions were held between available SYR authors. At these meetings, some presentations were given about the SYR in order to make this IPCC product more known among the WG writing teams.

#### *Evolution of the SYR author team*

Since IPCC-35 some changes were made in the CWT while maintaining the geographical balance:

- Dr Kevin Urama from Kenya, left the CWT due to other commitments. Dr Yacob Mulugetta from Ethiopia, CLA in WG III chapter 7, has joined the CWT in his place.
- Dr Kristie Ebi left as the representative of the WG II TSU and was initially replaced by Dr Katharine Mach from the WG II TSU.
- Dr Petra Tschakert, CLA in WG II 13, joined the CWT while Dr Katharine Mach withdrew as a CWT member, due to other commitments. Dr Mach remains involved in the SYR as an Extended Writing Team (EWT) member. Dr Tschakert will bring in human dimensions of climate change from a WG II perspective.
- Prof. Gary Yohe, WG II, who was initially a CWT member, switched roles with Prof. Michael Oppenheimer from WG II, who was initially appointed as an EWT member.
- Prof. Jean Palutikof, RE in WG II chapter 1, joined as an extra Review Editor, given the expected extra workload for WG II.

To date, 10 EWT members are now involved in the SYR, bringing specific expertise to the CWT:

- Prof. Reyer Gerlagh, WG III, on historical transformations;
- Prof. Howard Kunreuther, WG III, on Risks in decision making;
- Prof. Gary Yohe, WG II. on attribution, and risks and uncertainties;
- Prof. Jae Edmonds, WG III, on mitigation scenarios and strategies;
- Prof. Detlef van Vuuren, WG III, on Representative Concentration Pathways;
- Prof. Diana Urge –Vorsatz, WG III, on sectoral mitigation policies;
- Prof. Ralph Sims, WG III, on sectoral mitigation policies;
- Dr Michael Mastrandrea, WGI II TSU, on risk management;
- Dr Katie Mach, WG II TSU, on crosscutting issues from WG II perspective;
- Kristin Seyboth MSc, WG III TSU, contributing to Topics 2 and 4 from a WG III perspective.

#### *Schedule for 2014*

CWT-3	7-10 January	De Bilt, Netherlands
CWT-3bis	14-15 April	Berlin, Germany
Government/Expert review	21 Apr -13 June	
CWT-4	30 June-3 July	Kuala Lumpur, Malaysia
Govt consideration Final Draft	25 Aug- 10 Oct	
CWT-5 and Approval Session	24-25 and 27-31 Oct	Copenhagen, Denmark

## Part II: Evolution of the outline of the AR5 Synthesis Report

This Part describes the development of the outline of the Synthesis Report since the 32nd Session of the IPCC, Busan, Republic of Korea, October 2010 (IPCC-32), as well as in the most recent SYR CWT-meeting (CWT-2, Oslo, Norway, 10-12 June 2013), and provides the rationales for these developments. The original outline can be found in the final report of IPCC-32<sup>2</sup> and is also provided in this document as Appendix I. The IPCC-32 report contained the following important decision of the Panel:

*“The topic and box headings and the structure for the SYR, outlined here, are agreed. However, flexibility is provided to the SYR writing team in the development of the proposed content (list of bullets) provided here as guidance, and not as a constraint. All bullets will be considered by the core writing team (CWT). The coverage of the bullets will depend on the assessment of the literature by the authors, cognizant of the page length restrictions. The IPCC Chair will report to the Panel on the evolution of the outline of the SYR after the zero order draft has been produced. The core writing team may note submissions by governments containing their views and questions on the SYR, including IPCC-XXXII/INF.3 and IPCC-XXXI/INF.5. The SYR would be based exclusively on material contained in the three Working Group Reports and Special Reports produced during the 5th or previous Assessment Cycles. Cross Cutting Themes and Methodologies (CCT and CCM) need to be given careful attention throughout the report, and particular attention must be paid to specific issues requiring consistent treatment in the SYR.”*

Each bullet of the original outline of IPCC-32 has been considered by the SYR Core Writing Team seriously. Based on the mandate given at IPCC-32, the details of the outline underwent several changes as the work of the CWT progressed. These changes were made to obtain a better logical flow of the text for the readers, and to ensure consistency with the development of the contents of the three Working Group drafts. To that end, some bullets have been merged, overlaps have been removed, and sequences have been re-ordered.

The changes are explained in tabular form below. Some key changes are highlighted here:

- Adjustment of the title of Topic 2: from “Future climate changes, impacts and risks” to “Future climate changes, risks and impacts” in order to follow the WG2 workflow, treating risks, then impacts;
- Exchanging the order of the original Topic 3 (Adaptation and Mitigation Measures) and the original Topic 4 (Transformations and Changes of Systems), providing a more logical flow for the reader – now going from general/system level to specific/operational level;
- Removing overlaps between Topic 3 and 4;
- Adding 6 Boxes on the following subjects: risk and uncertainty (in Introduction); recent temperature trends and their implications (in Topic 1); valuation - ethics and economics (location TBD); co-benefits (in new Topic 3); geoengineering (in new Topic 3); GHG metrics (under consideration); transformation pathways (in new Topic 3).

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<sup>2</sup> [http://www.ipcc.ch/meetings/session32/final\\_report\\_32.pdf](http://www.ipcc.ch/meetings/session32/final_report_32.pdf), Annex 4 page 40 – 43

**TABLE 1. Evolution of the Synthesis Report Outline since IPCC-32**

The left column contains the original title and (sub)bullets as listed by IPCC-32. The middle column explains the evolution of each bullet, and the right column represents the current outline. The Topics and bullets of the original outline and the current outline have both been numbered – please consult Appendix I and II to this document for an overview. Please note: for readability reasons, the numbering of the original bullets in the left column is not kept fully sequential. This is due to re-ordering, combining and rephrasing of original bullets to the current outline.

Original outline as agreed at IPCC-32	Evolution since IPCC-32	Current outline
<b>INTRODUCTION</b>		
0.1 Rationale	-	0.1 Rationale
0.2 Framing the climate and human systems	-	0.2 Framing the climate and human systems
0.3 Major challenges	-	0.3 Major challenges
0.4 Treatment of confidence, risk and uncertainty	<i>This bullet will become a new Box</i>	BOX: Concepts in risk and uncertainty and its relationship to risk management
<b>TOPIC 1 – OBSERVED CHANGES AND THEIR CAUSES</b>		
-		1.1 Introduction (explaining the structure of this topic)
1.1 Pre-instrumental environmental changes, their effects and their causes	<i>Old bullets 1.1 and 1.2 will be merged into new bullet 1.2.</i>	1.2 Observed changes in the climate system and recent climate change in the context of Earth history
1.2 Recent observed changes in the climate system		
1.4 Past and recent drivers of climate change	<i>This old bullet 1.4 will be the new bullet 1.3.</i>	1.3 Past and recent drivers of climate change
1.6 Human activities affecting climate drivers	<i>This old bullet 1.6 was overlapping with past and recent drivers and will therefore be merged into the new bullet 1.3.</i>	
1.3 Observed effects and impacts	<i>Observed impacts are moved and merged into new 1.4 attribution; first covering attribution in WG1 with direct cross connection to WG 2, then further attribution to climate.</i>	1.4 Attribution
1.5 Attribution of climate changes, impacts, effects and drivers	<i>This old bullet 1.5 will be the new bullet 1.4. This new 1.4 will be split into two sub sections.</i>	1.4.1 Attribution of climate changes, impacts, effects
1.8 Observed vulnerability to shifts in extreme-events and other climatic changes	<i>This old bullet 1.8 is revised into the new bullet 1.5. This section should cover vulnerability to both extremes and means.</i>	1.4.2 Observed impacts attributed to climate change
1.7 Historical transformational dynamics of societies and lessons to be learned	<i>The issue of Transformations will be dealt with in the new Topic 3. The Topic 1 group felt that 'adaptation experience' should be considered explicitly ( final location in the report to be determined).</i>	1.5 Vulnerability, exposure and extreme events
-	<i>The 'hiatus' in global warming will receive specific attention in a Box given the development of the WG I report</i>	1.6 Adaptation experience
		BOX 1.1: Recent temperature trends and their implications

TOPIC 2 - FUTURE CLIMATE CHANGES, RISKS, AND IMPACTS		
<i>Topic 2 title changes from “Future climate changes, impacts and risks” to “Future climate changes, risks and impacts” in order to follow the WG2 workflow, treating risks first and then impacts.</i>		
Original outline as agreed at IPCC-32	Evolution since IPCC-32	Current outline
2.1 Description of Representative Concentration Pathways (RCPs) and scenarios used in AR5 (including comparison with the Special Report on Emissions Scenarios (SRES) and previous Assessment Reports).	<i>The new 2.1 deals with the content of old 2.2 , the new 2.1 deals with the content of the old 2.1. Titles are changed to be shorter and clearer.</i>	2.1 Drivers of future climate change
2.2 Anthropogenic (primarily) and physical factors that lead to a change in climate (e.g., emissions, land- use change, population, etc.)		2.2 The scenarios used for projections
2.3 Earth system, vulnerabilities, impacts, and economic models, and their validity	<i>The old 2.3 is split and reworded into the new 2.3.1 and 2.3.2.</i>	2.3 The methods used to make projections 2.3.1 Models of the Earth System: atmosphere, ocean and land 2.3.2 Models and methods for estimating the risks, vulnerability and impacts of climate change
2.4 Uncertainty and confidence	<i>The title of the old 2.4 has been changed into “Confidence in projections”, but uncertainty will also be addressed.</i>	2.4 Confidence in projections
<b>Projections of future changes and risks</b>	<i>The old bullets 2.5, 2.6 and 2.7 are now merged into new the 2.5 and partially into the new 2.7. The new bullet 2.5 is now split into 2.5.1 near term and 2.5.2 long term. “committed climate change” is taken up under new 2.5.1; “high impact/low probability events” will be in new 2.6 and 2.7</i>	2.5 Projected changes in the climate system
2.5 Climate futures: mean, variability, and extremes		2.5.1 Near-Term Climate projections
2.6 Committed climate change, abrupt changes, irreversibility		2.5.2 Long-Term Climate Projections [2.5 also to include material on relationship of levels, timing, pathways, cumulative emissions and stabilization of emissions to temperatures, sea levels and impacts]
2.7 High impact / low probability events		
		2.6 Future risks and impacts caused by a changing climate 2.6.1 Introduction 2.6.2 Ecosystems in the oceans, coasts, freshwater and land
2.8 Changes and impacts on systems, sectors, and regions	<i>The old bullets 2.8 and 2.9 are now merged together into the new 2.6., split into 2.6.1 introduction, 2.6.2 Ecosystems in the oceans, coasts, freshwater and land</i>  <i>2.6.3 Food and urban systems, human health, security and livelihoods</i>	2.6.3 Food and urban systems, human health, security and livelihoods
2.9 Ecosystems, food production, and sustainable economic development (Article 2 of the UNFCCC)		[2.6 also to include material on relationship of levels, timing, pathways, cumulative emissions and stabilization of emissions to temperatures, sea levels and impacts]

2.10 Direct and aggregate costs	<i>The old bullet 2.10 is now moved to the new Topics 3 - Transformations (3.3, 3.5) and Topic 4 - Adaptation and Mitigation Measures (4.3), because damage costs are always linked to some degree of adaptation</i>	-
2.11 Relationships between risks and vulnerabilities with temperature, levels, timing, and pathways for stabilization of greenhouse gas concentrations / cumulative emissions	<i>The old bullet 2.11 is now merged into the new 2.5 and 2.6. Not a separate bullet anymore.</i>	
-	<i>The new bullet 2.7 combines a part of old 2.6 and 2.7 ( high impact/low probability events)</i>	2.7 Irreversibility and abrupt change
-	<i>This new box is intended as an introduction to Topic 3 and 4 – final location still to be determined. It will capture information on the diversity of value systems and issues of equity and ethics.</i>	BOX 2.1: Valuation: ethics and economics.

### TOPIC 3 - TRANSFORMATIONS AND CHANGES IN SYSTEMS

Note: This topic takes a systems perspective in addressing climate change response strategies and policies.

*There are two primary motivations for the proposed structure of Topics 3 and 4. The first motivation is to improve the logic of the flow of information from Topic 3 through Topic 4. It is more intuitive to a reader to move from the general to the specific; that is, from a discussion of the space of possible transformation pathways to specific response options and policies, institutional arrangements and finance options available at different scales. This will enhance an intuitive understanding by the reader and a natural flow of the text.*

*The second motivation is to enable a concise and informative AR5 SYR by avoiding repetition. The bullet points agreed by governments for the content of the Topics included a range of different repetitions of subject areas, and adopting those bullets as structural elements would have resulted in duplication while at the same time reducing the depth of the discussion. This is particular important given the tight page limitations of SYR.*

*Through careful deliberations the Core Writing Team (CWT) made sure that the bullets from the government outline are adequately addressed in the new outline, whilst enabling a concise, clear and user-friendly SYR that meets the high expectations of policymakers.*

#### *The structural changes across Topics 3 and 4/ Switching the order between topics 3 and 4*

*In developing the outline and structure of Topics 3 and 4, the Core Writing Team focused on delivering as clearly as possible on each of the bullets agreed by governments for each topic.*

- The order of Topics 3 and 4 was switched in an effort to provide an overview of transformation pathways first before discussing more specific response options. Topic 3 is now called “Transformations and Changes in Systems” and Topic 4 is now called “Adaptation and Mitigation Measures”.*
- Authors interpreted the overall content requested by governments for the two topics such that topic 3 would focus on strategic, high-level and broad-scale interventions, while topic 4 would focus more on the operational/tactical and sector-specific space. This does not necessarily mean a separation into long- and near-term issues, since some strategic choices have near-term implications, while some operational measures nonetheless have long lifetimes. As an example of such a distribution of an issue across the two topics, the operational and tactical dimensions of “Benefits and Co-Benefits, trade-offs and spillover effects” will be covered in topic 4 (4.4), while strategic and longer term interactions will be covered in Topic 3 (3.6).*
- Where bullets agreed by governments are identical across the two topics (such as “Governance and institutional arrangements”), the author team will consider whether there is a logical split between strategic and tactical dimensions. Where such a split appears artificial or highly likely to lead to an incoherent or duplicative treatment, the author team will ensure a comprehensive discussion in one topic only. At this stage we expect that most issues related to policy, governance and institutional arrangements will be covered in topic 4 since it appears inefficient if not impossible to separate the discussion between the two topics. Issues that are of direct relevance for the conceptual framing of human responses to climate change will be largely covered in topic 3.*

Original outline as agreed at IPCC-32	Evolution since IPCC-32	Current outline
4.1 Overview of transformation pathways		
4.1.6 Societal changes	<i>The new section 3.1 introduces the concept of transformation and includes a discussion of the relationship to “societal changes” (old 4.1.6 and 4.2.2)</i>	3.1 Human responses – an integrated approach
4.2.2 Societal changes		
4.2.6 Equity and ethical dimensions	<i>The new section 3.2 section introduces of how climate change can be framed from a risk management perspective. It covers discussions on the fundamentals of decision-making including “equity and ethical dimensions” and “diversity of values and priorities”(old 4.2.6 and 4.2.7). As an introduction, Topic 2, will have a separate Box “valuation: ethics and economics” capturing information on the diversity of value systems and issues of equity and ethics (location still to be decided).</i>	3.2 Decision making in a complex environment
4.2.7 Diversity of values and priorities		
4.1.1 Interpreting scenarios and their pathways including regional and sectoral aspects across different stabilization levels (timeframes and emission pathways for different stabilization levels)	<i>The new section 3.3 describes the core elements of mitigation pathways toward long-term climate goal. It includes portions of old 4.1.1 “Interpreting scenarios and their pathways including regional and sectoral aspects across different stabilization levels”, the mitigation portion of old 4.1.2 “Mitigation and adaptation strategies - characteristics and risks“ and old 4.1.3 “Systems, costs, investment strategies, and trade and financial flows”</i>	3.3 Characteristics and risks of (evolving) mitigation pathways
4.1.3 Systems, costs, investment strategies, and trade flows		
4.1.2 Mitigation and adaptation strategies - characteristics, risks and interactions		
	<i>The new section 3.4 will describes core elements of adaptation pathways. It complements 3.3 and includes the adaptation portion of “Mitigation and adaptation strategies - characteristics and risks” (old 4.1.2).</i>	3.4 Characteristics and risks of (evolving) adaptation pathways
4.1.4 Avoided damages under adaptation and mitigation	<i>The new section 3.5 discusses the relationship between mitigation, adaptation and residual climate impacts from a risk perspective. It includes all important elements of “Avoided damages under adaptation and mitigation” (old 4.1.4)</i>	3.5 Climate-change risks reduced by mitigation and adaptation
-	<i>The new section 3.6 addresses the broad interactions between mitigation, adaptation, other societal priorities, and other relevant transformations. It is the venue where the discussion will address concepts such as “climate resilient pathways” that view the future from a holistic perspective.</i>	3.6 Interactions among mitigation, adaptation, and sustainable development
3.1.4 Geo-engineering – possible role, options, risks and status	<i>The new Box 3.1 covers the old 3.1.4</i>	BOX 3.1: Geo-engineering – possible role, options, risks and status



4.1.5 Benefits and co-benefits, tradeoffs and spillover effects (mitigation, adaptation and sustainable development); Possible reference to Millennium Development Goals (MDGs)	<i>The new Box 3.2 covers old 4.1.5 and 4.2.8</i>	BOX 3.2: Co-benefits
4.2.8 Co-benefits, tradeoffs, obstacles and barriers		
-	<i>Authors are currently exploring the potential merit of a box on GHG metrics, which would integrate issues relevant to both transformation pathways and specific mitigation potentials and policies, based on the underpinning assessment by WGI (chapter 8) and WGIII (chapters 3 and 6).</i>	BOX 3.3: GHG metrics and transformation pathways
4.2 Strategic approaches: common and specific systemic changes across the pathways	<i>These aspects are taken up in 4.6 "Policies" of the new Topic "Adaptation and Mitigation Measures" because technology, governance, and finance aspects could better be treated in the context of policies and measures</i>	
4.2.1 Technology change (RD&D, technology transfer, role of private sector)	<i>Taken up under new 4.6 "Policies"</i>	
4.2.3 Policy, governance and institutional (including international) arrangements	<i>Taken up under new 4.6 "Policies"</i>	
4.2.4 Investment and finance	<i>With old 4.1.3 taken up in 3.3 on a system level. and in Topic 4.6 "Policies" on an operational level</i>	
4.2.5 Capacity building: mechanisms and strategies	<i>Taken up under new 4.5 'constraints, limits, and enabling factors'</i>	

TOPIC 4 - ADAPTATION AND MITIGATION MEASURES		
Original outline as agreed at IPCC-32	Evolution since IPCC-32	Current outline
-	<i>The introduction will address: Distinguish topic 4 from topic 3; Short-term requirements for long-term transformations; Multiple entry points for adaptation and mitigation; inclusion of material addressing the bullet, as far as not already covered in topic 3</i>	4.1 Introduction
3.1 Response options	<i>New 4.2 will provide an overview of sectoral and regional responses, to the extent possible based on WGII report</i>	4.2 Response Options for Adaptation
3.1.2 Adaptation and mitigation responses (including regional and sectoral perspectives)	<i>New 4.3 will provide an overview of sectoral and regional responses, to the extent possible based on WGIII report</i>	4.3 Response options for mitigation
3.1.2.5 Cross-cutting issues and aggregate responses	<i>To cover tactical and operational aspects of adaptation and mitigation in the context of multiple objectives, particularly sustainable development; includes old bullets: old 3.1.2.5 "Cross-cutting issues and aggregate responses", old 3.1.3 "Interactions between adaptation, mitigation, and development", old 3.1.2.3 "Co-benefits, trade-offs and spill-over effects", "Adaptation, mitigation, and development, including equity and ethics". NB there will be separate Boxes on equity and ethics (Box 2:1 valuation: ethics and economics), and Box 3.2 (Co-benefits).</i>	4.4 Adaptation and mitigation in the context of multiple objectives
3.1.3 Interactions between adaptation, mitigation, and development, including equity and ethics		
3.1.2.3 Costs and benefits, including co-benefits, trade-offs, and spillover effects		
3.1.2.4 Barriers, constraints, and limits, including inertia	<i>To cover constraints, enabling factors and underlying trends affecting the effectiveness and implementation of adaptation and mitigation responses. To include bullet: "Enabling factors including changes in lifestyles and behavioral patterns". Will also cover generic "capacities and their determinants" (old 3.2, 3.1.2.2, and 3.2.4)</i>	4.5 Constraints, limits and enabling factors
3.2 Enabling factors and addressing barriers, constraints, and limits including regional considerations (Note: this part should address only the factors related to specific options but not address systemic aspects)		
3.1.2.2 Capacities and their determinants		
3.2.4 Changes in lifestyles and behavioural patterns		
3.2.1 International and regional collaboration	<i>The new section "Policies" will cover old bullets 3.2.1, 3.2.2, 3.2.3, 3.2.5 and 3.2.6, and old bullets 4.2.1, 4.2.3 and 4.2.4, to the extent possible given space constraints and available information in the underlying WG reports</i>	4.6 Policies
3.2.2 Governance and institutional arrangements		
3.2.3 Investment, finance and financial instruments		
3.2.5 Innovation, and technology research, development, deployment, diffusion and transfer		

3.2.6 Information, monitoring and evaluation to support decision-making		
3.1.1 Observed responses		
3.1.1.1 Drivers, outcomes and implications	<i>Drivers and consequences will be treated in 1.3 “past and recent drivers of climate change” and 2.1 “drivers of future climate change”.</i>	-
3.1.2.1 Options, including technologies, and related policies and measures	<i>Old 3.1.2.1 will be addressed in 4.2 “response options for mitigation” and 4.3 “response options for adaptation”</i>	-
<b>BOX – INFORMATION RELEVANT TO ARTICLE 2 OF THE UNFCCC</b>		
Note: this box will not duplicate information presented in former topics; cross-references should be made to the corresponding data in previous topics.		
<b>Original outline as agreed at IPCC-32</b>	<b>Evolution since IPCC-32</b>	<b>Current outline</b>
Preamble preventing prescriptive interpretation	<p>The content was re-organized in view of the following:</p> <ul style="list-style-type: none"> <li>- move related issues close to each other, and make the logical flow of items more apparent</li> <li>- avoid duplications within the Box and overlaps with the Topics, as requested in the agreed outline. This was especially important in relation to topic 2.</li> </ul> <p>For those reasons, it was decided to follow a simple structure: 1. introduction, considering the issue of preventing prescriptive interpretation, 2. impacts-related aspects and 3. Mitigation-related aspects.</p> <p>Care was taken that all aspects from Article 2 remain included (requirements for stabilization pathways, ecosystems, food, and economic development).</p> <p>The inclusion of a sentence or note on geoengineering is being considered; the intention is to adopt the viewpoint of “dangerous anthropogenic interference” and refer to the box on geoengineering in topic 3, avoiding duplications.</p>	
Relationship of risks and key vulnerabilities to levels, timing and pathways for stabilization of greenhouse gas concentrations (including regional information)		1. Providing scientific information relevant to Art. 2 of the UN Framework Convention on Climate Change (UNFCCC)
Relationship to cumulative emissions and budgets		2. Risks, vulnerability, and adaptation - including of risks related to ecosystems, food (and water), and development
Timeframes and pathways for stabilization of greenhouse gas concentrations		3. Mitigation and socio-economic aspects of stabilisation pathways, and development including cumulated emissions
<i>Ecosystems, Food Production and Sustainable Economic Development</i>		[Placeholder: geo-engineering in the context of dangerous anthropogenic interference]
Allowing ecosystems to adapt naturally		
Ensuring food production is not threatened		
Enabling economic development to proceed in a sustainable manner (including regional information)		
<b>ANNEXES</b>		
User guide and access to more detailed information	-	User guide and access to more detailed information
Glossary	-	Glossary
Acronyms, chemical symbols; scientific units; country groupings	-	Acronyms, chemical symbols; scientific units; country groupings
List of Authors	-	List of Authors
List of Reviewers and Review Editors	-	List of Reviewers and Review Editors
Index	-	Index
List of all publications of the IPCC	-	List of all publications of the IPCC

## **APPENDIX 1: Numbered Outline of the AR5 Synthesis Report as agreed by the 32<sup>nd</sup> Session of the IPCC, 11-14 October 2010, Busan, Republic of Korea<sup>3</sup>**

### **INTRODUCTION**

- 0.1 Rationale
- 0.2 Framing the climate and human systems
- 0.3 Major challenges
- 0.4 Treatment of confidence, risk and uncertainty

### **TOPIC 1 – OBSERVED CHANGES AND THEIR CAUSES**

- 1.1 Pre-instrumental environmental changes, their effects and their causes
- 1.2 Recent observed changes in the climate system
- 1.3 Observed effects and impacts
- 1.4 Past and recent drivers of climate change
- 1.5 Attribution of climate changes, impacts, effects and drivers
- 1.6 Human activities affecting climate drivers
- 1.7 Historical transformational dynamics of societies and lessons to be learned
- 1.8 Observed vulnerability to shifts in extreme-events and other climatic changes

### **TOPIC 2 – FUTURE CLIMATE CHANGES, IMPACTS, AND RISKS**

#### ***Drivers of future climate change***

- 2.1 Description of Representative Concentration Pathways (RCPs) and scenarios used in AR5 (including comparison with the Special Report on Emissions Scenarios (SRES) and previous Assessment Reports)
- 2.2 Anthropogenic (primarily) and physical factors that lead to a change in climate (e.g., emissions, land-use change, population, etc.)

#### ***Basis of projections***

- 2.3 Earth system, vulnerabilities, impacts, and economic models, and their validity
- 2.4 Uncertainty and confidence

#### ***Projections of future changes and risks***

- 2.5 Climate futures: mean, variability, and extremes
- 2.6 Committed climate change, abrupt changes, irreversibility
- 2.7 High impact / low probability events
- 2.8 Changes and impacts on systems, sectors, and regions
- 2.9 Ecosystems, food production, and sustainable economic development (Article 2 of the UNFCCC)
- 2.10 Direct and aggregate costs
- 2.11 Relationships between risks and vulnerabilities with temperature, levels, timing, and pathways for stabilization of greenhouse gas concentrations / cumulative emissions

### **TOPIC 3 – ADAPTATION AND MITIGATION MEASURES**

#### **3.1 *Response options***

- 3.1.1 Observed responses
  - 3.1.1.1 Drivers, outcomes and implications
- 3.1.2 Adaptation and mitigation responses (including regional and sectoral perspectives):

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<sup>3</sup> [http://www.ipcc.ch/meetings/session32/final\\_report\\_32.pdf](http://www.ipcc.ch/meetings/session32/final_report_32.pdf), Annex 4 page 40 – 43

- 3.1.2.1 Options, including technologies, and related policies and measures
- 3.1.2.2 Capacities and their determinants
- 3.1.2.3 Costs and benefits, including co-benefits, trade-offs, and spillover effects
- 3.1.2.4 Barriers, constraints, and limits, including inertia
- 3.1.2.5 Cross-cutting issues and aggregate responses
- 3.1.3 Interactions between adaptation, mitigation, and development, including equity and ethics
- 3.1.4 Geo-engineering – possible role, options, risks and status

### **3.2 *Enabling factors and addressing barriers, constraints, and limits including regional considerations***

Note: this part should address only the factors related to specific options but not address systemic aspects

- 3.2.1 International and regional collaboration
- 3.2.2 Governance and institutional arrangements
- 3.2.3 Investment, finance and financial instruments
- 3.2.4 Changes in lifestyles and behavioural patterns
- 3.2.5 Innovation, and technology research, development, deployment, diffusion and transfer
- 3.2.6 Information, monitoring and evaluation to support decision-making

## **TOPIC 4 – TRANSFORMATIONS AND CHANGES IN SYSTEMS**

Note: This topic takes a systems perspective in addressing climate change response strategies and policies.

### **4.1 *Overview of transformation pathways***

- 4.1.1 Interpreting scenarios and their pathways including regional and sectoral aspects across different stabilization levels (timeframes and emission pathways for different stabilization levels)
- 4.1.2 Mitigation and adaptation strategies - characteristics, risks and interactions
- 4.1.3 Systems, costs, investment strategies, and trade flows
- 4.1.4 Avoided damages under adaptation and mitigation
- 4.1.5 Benefits and co-benefits, tradeoffs and spillover effects (mitigation, adaptation and sustainable development); Possible reference to Millennium Development Goals (MDGs)
- 4.1.6 Societal changes

### **4.2 *Strategic approaches: common and specific systemic changes across the pathways***

- 4.2.1 Technology change (RD&D, technology transfer, role of private sector)
- 4.2.2 Societal changes
- 4.2.3 Policy, governance and institutional (including international) arrangements
- 4.2.4 Investment and finance
- 4.2.5 Capacity building: mechanisms and strategies
- 4.2.6 Equity and ethical dimensions
- 4.2.7 Diversity of values and priorities
- 4.2.8 Co-benefits, tradeoffs, obstacles and barriers

## **BOX – INFORMATION RELEVANT TO ARTICLE 2 OF THE UNFCCC**

Note: this box will not duplicate information presented in former topics; cross-references should be made to the corresponding data in previous topics.

- 5.1 Preamble preventing prescriptive interpretation
- 5.2 Relationship of risks and key vulnerabilities to levels, timing and pathways for stabilization of greenhouse gas concentrations (including regional information)
- 5.3 Relationship to cumulative emissions and budgets
- 5.4 Timeframes and pathways for stabilization of greenhouse gas concentrations

## ***Ecosystems, Food Production and Sustainable Economic Development***

- 5.5 Allowing ecosystems to adapt naturally
- 5.6 Ensuring food production is not threatened
- 5.7 Enabling economic development to proceed in a sustainable manner (including regional information)

## **Annexes**

- A1. User guide and access to more detailed information
- A2. Glossary
- A3. Acronyms, chemical symbols; scientific units; country groupings
- A4. List of Authors
- A5. List of Reviewers and Review Editors
- A6. Index
- A7. List of all publications of the IPCC

## **APPENDIX 2: Numbered outline of the AR5 Synthesis Report as reported to the 37<sup>th</sup> Session of the IPCC, Batumi, Georgia, 14-18 October 2014**

### **INTRODUCTION**

- 0.1 Rationale
- 0.2 Framing the climate and human systems
- 0.3 Major challenges

BOX: Concepts in risk and uncertainty and its relationship to risk management

### **TOPIC 1 – OBSERVED CHANGES AND THEIR CAUSES**

- 1.1 Introduction.
- 1.2 Observed changes in the climate system and recent climate change in the context of Earth history
- 1.3 Past and recent drivers of climate change
- 1.4 Attribution
  - 1.4.1 Attribution of climate changes, impacts, effects
  - 1.4.2 observed impacts attributed to climate change
- 1.5 Vulnerability, exposure and extreme events
- 1.6 Adaptation experience

BOX 1.1: Recent temperature trends and their implications

### **TOPIC 2 - FUTURE CLIMATE CHANGES RISKS, AND IMPACTS**

- 2.1 Drivers of future change in climate
- 2.2 The scenarios used for projections
- 2.3 The methods used to make projections
  - 2.3.1 Models of the Earth System: atmosphere, ocean and land
  - 2.3.2 Models and methods for estimating the risks, vulnerability and impacts of climate change
- 2.4 Confidence in projections
- 2.5 Projected changes in the climate system
  - 2.5.1 Near-Term Climate Projections
  - 2.5.2. Long-Term Climate Projections
- 2.6 Future risks and impacts caused by a changing climate
  - 2.6.1 Introduction
  - 2.6.2 Ecosystems in the oceans, coasts, freshwater and land
  - 2.6.3. Food and urban systems, human health, security and livelihoods
- 2.7 Irreversibility and abrupt change

BOX 2.1: Valuation: ethics and economics

## **TOPIC 3 – TRANSFORMATIONS AND CHANGES IN SYSTEMS**

- 3.1 Human responses – an integrated approach
- 3.2 Decision making in a complex environment
- 3.3 Characteristics and risks of (evolving) mitigation pathways
- 3.4 Characteristics and risks of (evolving) adaptation pathways
- 3.5 Climate-change risks reduced by mitigation and adaptation
- 3.6 Interactions among mitigation, adaptation, and sustainable development

BOX 3.1: Geo-engineering – possible role, options, risks and status

BOX 3.2: Co-benefits

BOX 3.3: GHG metrics and transformation pathways

## **TOPIC 4 - ADAPTATION AND MITIGATION MEASURES**

- 4.1 Introduction
- 4.2 Response Options for Adaptation
- 4.3 Response options for mitigation
- 4.4 Adaptation and mitigation in the context of multiple objectives
- 4.5 Constraints, limits and enabling factors
- 4.6 Policies

## **BOX – INFORMATION RELEVANT TO ARTICLE 2 OF THE UNFCCC**

- 5.1. Providing scientific information relevant to Article 2 of the UN Framework Convention on Climate Change (UNFCCC)
- 5.2. Risks, vulnerability, and adaptation - including of risks related to ecosystems, food (and water), and development
- 5.3. Mitigation and socio-economic aspects of stabilisation pathways, including cumulated emissions and development

[Placeholder: geo-engineering in the context of dangerous anthropogenic interference]

## **ANNEXES**

- A1. User guide and access to more detailed information
- A2. Glossary
- A3. Acronyms, chemical symbols; scientific units; country groupings
- A4. List of Authors
- A5. List of Reviewers and Review Editors
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