



INTERGOVERNMENTAL PANEL ON climate change

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**ACCEPTANCE OF THE ACTIONS TAKEN AT THE TENTH SESSION OF
WORKING GROUP II**

**Working Group II contribution to the IPCC Fifth Assessment Report (AR5),
Climate Change 2014: Impacts, Adaptation and Vulnerability**

**Changes to the Underlying Scientific-Technical Assessment to ensure consistency
with the approved Summary for Policymakers**

(Submitted by the Co-Chairs of the IPCC Working Group II)

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Chapter	Chapter FGD page number	Chapter FGD paragraph number(s)	Chapter FGD sentence number(s)	Summary of Change
1	4		1-2	delete: "A doubling of the total number of publications on the topic of climate change impacts between 2005 and 2010 and on the topic of climate change adaptation between 2008 and 2010 has occurred (Figure 1-1c). and instead enter this one (taken from the SPM): "The number of scientific publications available for assessing climate-change impacts, adaptation, and vulnerability more than doubled between 2005 and 2010, with especially rapid increases in publications related to adaptation."
1	34	N/A	N/A	Change artwork to match what is in Figure SPM.9. Summary of changes: base in circles is a lat/long projection rather than a map the pathways in the bottom of the opportunity space are labeled "Pathways that Lower Resistance" a legend was added on bottom left for the three colors on the globe, explanation was moved to caption all arrows that tick downward are red, arrows that go up are green
1	12	4	all	Change figure caption to match what is in Figure SPM.9
3	2	1	1	replace "emissions" by "concentrations" in sentence starting with "Freshwater-related risks ..."
3	2	2	2	new: This will intensify competition for water among agriculture, ecosystems, settlements, industry and energy production, affecting regional water, energy and food security (limited evidence, medium to high agreement)[3.5.1; 3.5.2; Box CC-WE]. old: This will exacerbate competition for water among agriculture, ecosystems, settlements, industry and energy production, affecting regional water, energy and food security [3.5.1; 3.5.2; Box CC-WE].
4	5	4	1	Replace: "...especially in the Amazon and Arctic, leading to substantial additional climate change (<i>medium confidence</i>)"
4	30	4	1	Observed global extinctions - Global species extinctions, many of them caused by human activities, are now at rates that approach or exceed the upper limits of observed natural rates of extinction in the fossil record Change to: "...are now occurring at rates..."
5	5	4	all	Figure 5-1 Caption: New text to be consistent with approved definitions: "Climate, just as anthropogenic or natural variability, affects both climate and human related drivers. Risk on coastal systems is the outcome of integrating drivers' associated hazards, exposure and vulnerability. Adaptation options can be implemented either to modify the hazards, exposure and vulnerability or both."
6	110	N/A	Row 2 Column 1	Table 6-6, 2ND RISK: Change 'fishery' to 'fisheries'
6	110	N/A	Row 2 Column 2	Table 6-6, 2ND RISK: Add 'as indicated by their changes in distribution to maintain temperatures' to end of first sentence (ie after 'is limited').
6	110	N/A	Row 2 Column 2	Table 6-6, 2ND RISK: Replace 'or the expansion of aquaculture' with 'the expansion of sustainable aquaculture and the development of alternative livelihoods in some regions'
6	110	N/A	Row 4 Column 2	Table 6-6 4th risk: Subscript 2 of 'CO2'
6	110	N/A	Row 4 Column 2	Table 6-6 4th risk: Subscript 2 of 'CO2'
6	110	N/A	Row 5 Column 1	Table 6-6 5th risk: After 'mortality increases,' insert 'exacerbated by ocean acidification,'
6	110	N/A	Row 5 Column 4	Table 6-6 5th risk: Add '30.3.2.2'
6	110	N/A	Row 5 Column 3	Table 6-6 5th risk: Add symbol for ocean acidification
6	110	N/A	Row 6 Column 1	Table 6-6 6th risk: replace 'sea level rise and intensified precipitation and flood events' with 'sea-level rise, extreme events, changes in precipitation, and reduced ecological resilience'
6	110	N/A	Row 6 Column 2	Table 6-6 6th risk: replace 'and aquaculture' with 'physical destruction, and unsustainable aquaculture'
6	110	N/A	Row 6 Column 2	Table 6-6 6th risk: Delete 'Loss of ecosystems such as sea grass, mangroves and coral reefs can be reduced by'
6	110	N/A	Row 6 Column 2	Table 6-6 6th risk: Add new sentence after third (final) sentence 'Increased mangrove, coral reef and seagrass protection and restoration to protect numerous ecosystem goods and services such as coastal protection, tourist value, and fish habitat.'
7	3	3	1	replace paragraph with "For the major crops (wheat, rice, and maize) in tropical and temperate regions, climate change without adaptation will negatively impact production for local temperature increases of 2°C or more above late-20th-century levels, although individual locations may benefit (medium confidence). [7.4, Figures 7-4] Projected impacts vary across crops and regions and adaptation scenarios, with about 10% of projections for the period 2030-2049 showing yield gains of more than 10%, and about 10% of projections showing yield losses of more than 25%, compared to the late 20th century [Figure 7-5]. After 2050 the risk of more severe impacts increases [Figure 7-5]. Regional chapters 22 (Africa), 23 (Europe), 24 (Asia), 27 (Central and South America) and Box 7-1 show crop production to be consistently and negatively affected by climate change in the future in low latitude countries, while climate change may have positive or negative effects in northern latitudes (high confidence)."
7	3	5	1,2	replace entire paragraph with "Global temperature increases of ~4°C or more above late-20th-century levels, combined with increasing food demand, would pose large risks to food security globally and regionally (high confidence). Risks to food security are generally greater in low-latitude areas.
7	3	6	4	remove rest of paragraph starting on sentence "Positive and negative yield associated..."
8	14	2	3	In the section headed Urban Areas, in the sentence beginning "Heat stress....", add "landslides, air pollution,". so the sentence reads "Heat stress, extreme precipitation, inland and coastal flooding, landslides, air pollution, and drought and water scarcity pose risks in urban areas for people, assets, economies, and ecosystems (very high confidence)"
10	4	6	all	replace complete finding with new SPM language.

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10	34	4	last sentence	replace worsen with "accelerate". New sentence is "Impacts accelerate for larger warming, and estimates diverge. The new estimates have slightly widened the uncertainty about the economic impacts of climate"
10	34	4-5	all	Summary of Change: Adjust text as appropriate, given changes to ES already described.
11	3	4	1 (last dot point)	change "improvements in cold-related mortality" to "reductions in cold-related mortality"
11	4	2	4	delete "raising doubt about the habitability of", so the sentence reads "If this occurs, the combination of high temperatures and high humidity will compromise normal human activities including growing food or working outdoors in some areas for parts of the year."
11	3	4	1 (last dot point)	insert "increasingly" after "these positive effects will be"
11	3	4	1	delete "until mid-century"
11	4	4	1	replace "the most effective adaptation measures for health" with "the most effective measures to reduce vulnerability"
11	4	4	1	insert "and improve" after "implement"
13	2	2 (counting from start of ES)	_1-2	replace the first two sentences with the following: Climate-related hazards exacerbate other stressors, often with negative outcomes for livelihoods, especially for people living in poverty (<i>high confidence</i>).
13	3	5	1	Replace: "low-, medium, and high-income countries (LICs, MICs, and HICs)" with "developing and developed countries" wherever this occurs.
13	3	6	1	Replace: "LICs and lower MICs" with "most developing countries"
13	3	6	2	Replace "upper MICs and HICs where inequality is on the rise" with "countries with increasing inequality, in both developed and developing countries"
13	3	11	1	Replace: "LICs and MICs" with "developing countries"
13	6	1	between 2nd and 3rd	insert the following sentence after the second sentence (i.e. Before the sentence starting with: In 1990...): "In the remainder of the text, we use the World Bank income-based poverty categories for countries (low-income countries, lower-middle-income countries, upper-middle-income countries, and high-income countries); these categories are more precise and more accurate for describing climate change impacts on poverty than the terminology adopted in the SPM and the chapter ES (developing and developed countries). Moreover, much of the assessed literature is based on these categories.
15	3	2	1 to 2	"diverse and context dependent nature of" to "diverse, and place and context dependent nature of"
15	3	2	9 to 10	"but also to the context specificity of adaptation." to "but also to the geographic and context specificity of adaptation."
15	4	1	8	"As the diverse, complex and context" to "As the diverse, complex, and place and context"
17	3	6	all	Replace this ES finding with the new ES finding: "Limited evidence indicates a gap between global adaptation needs and the funds available for adaptation (medium confidence). There is a need for a better assessment of global adaptation costs, funding, and investment. Studies estimating the global costs of adaptation are characterized by shortcomings in data, methods, and coverage (high confidence)." [Suggested reference: 14.2, 17.4, Tables 17-2 & 17-3]
18	28-29	6-8/1-2	last sentences	for tables 18-5 to 18-9, insert "reported since AR4" in first sentence after "observed impacts of climate change", and add "Absence of climate change impacts from this table does not imply that such impacts have not occurred." at the end of each caption
18	77	table 18-5	Asia	Changed "Shrinking mountain glaciers across Asia" to "Shrinking mountain glaciers across most of Asia"
18	78	table 18-6	Asia	Changed "Increased flow in many rivers due to shrinking glaciers in the Himalayas & Central Asia" to "Increased flow in four rivers due to shrinking glaciers in the Himalayas & Central Asia"
18	78	table 18-6	North America	Deleted "decreases in Southern state", changed Northwestern to Northeastern: New statement: Runoff increases in the Midwestern and Northeastern US
18	79	table 18-6	South and Central America	for "Changing discharge patterns in the Western Andes", "role of climate" was changed from minor to major
18	80	table 18-7	Africa	inserted "Western" in front of Sahel: Tree density decreases in Western Sahel and semi-arid Morocco
18	80	table 18-7	Asia	deleted "growth decline in Mongolian larches", statement now reads "Invasion of Siberian larch forests by pine and spruce during recent decades"
18	81	table 18-7	North America	entry on forest fires changed to: "Increase in wildfire activity, fire frequency and duration, and burnt area in forests of the western US and boreal forests in Canada "
18	83	table 18-8	Africa	created a row for Africa, inserted "Decline in coral reefs in tropical African waters" baseline: decline due to human impacts (High Confidence, Major contribution from climate change)
18	83	table 18-8	Asia	deleted "and large seaweeds" and "and in the coastal waters of Japan", statement now reads: Decline in coral reefs in tropical Asian waters
18	83	table 18-8	Asia	corrected "Northward range extension of coral reefs & predatory fish in Sea of Japan" to read "Northward range extension of corals in the East China Sea and western Pacific, and a predatory fish in the Sea of Japan"
18	86	table 18-9	South and Central America	changed "confidence in detection" column: from "high" to "medium" for entry "More vulnerable livelihood trajectories for indigenous Aymara farmers in Bolivia, due to water shortage"
18	92	figure 18-3	reflection of assessment changes	Africa: insertion of a marine symbol with high confidence at the East Coast of Africa

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18	92	figure 18-3	reflection of assessment changes	Asia: removal of the water drop from the continental major box, insertion of a major role high confidence water drop symbol to the East of the Himalayas
18	92	figure 18-3	reflection of assessment changes	North America: remove minor role hydrology symbol from continental box, place on map over NorthCentral US
18	92	figure 18-3	caption	"Insert "reported since AR4" in first sentence after "Global patterns of observed climate change impacts", and add "Absence of climate change impacts from this table does not imply that such impacts have not occurred." at the end of the caption"
19	5	1	1	Harmonize with KR 1 in the SPM.
19	5	2	1	Harmonize with KR 5 in the SPM, and reorder to match SPM ordering.
19	5	3	1	Harmonize with KR 2 in the SPM, and reorder to match SPM ordering.
19	5	4	1	Harmonize with KR 6 in the SPM, and reorder to match SPM ordering.
19	5	5	1	Harmonize with KR 3 in the SPM, and reorder to match SPM ordering.
19	5	6	all	Harmonize with KR 7 in the SPM, and reorder to match SPM ordering.
19	5	7	all	Harmonize with KR 8 in the SPM, and reorder to match SPM ordering.
19	5	8	all	Harmonize with KR 4 in the SPM, and reorder to match SPM ordering.
19	5	11	1	"global mean warming of 1°C" changes to "global mean warming of around 1°C"
19	5	12	1	"moderate at recent temperatures" changes to "moderate near recent temperatures"
19	5	12	2	"Risk is high at 1°C warming" changes to "Risk is high with 1°C additional warming"
19	5	12	all	Add sentence at the end: "Risks associated with some types of extreme events (e.g., extreme heat) increase further at higher temperatures (high confidence)."
19	5	13	1	"Risk associated with the distribution of impacts is generally greatest in low-latitude, less developed areas, but because vulnerability is unevenly distributed within countries, some populations in developed countries are highly vulnerable." becomes "Risk associated with the distribution of impacts is unevenly distributed and is generally greater for disadvantaged people and communities in countries at all levels of development."
19	5	13	2	"Risk is moderate at recent temperatures" becomes "Risk is moderate near recent temperatures"
19	6	1	3-4	Replace with "Risks of global aggregate impacts are moderate for additional warming between 1-2°C, reflecting impacts to both Earth's biodiversity and the overall global economy (medium confidence). Extensive biodiversity loss with associated loss of ecosystem goods and services results in high risks around 3°C additional warming (high confidence). Aggregate economic damages accelerate with increasing temperature (limited evidence, high agreement) but few quantitative estimates have been completed for additional warming around 3°C or above." as in the SPM.
19	6	2	1	insert a colon after "large-scale singular events" and insert the SPM wording verbatim thereafter.
19	7	1	2	Figure 1 Caption: Change the sentence: "It underscores that risks... to climate-related hazards on the other." to "It underscores that risks... to climate-related hazards (including hazardous events and trends) on the other." Align caption to figure SPM.1 caption where necessary.
19	7	1	4	Figure 1 Caption: Change "development processes" to "socioeconomic processes"
19	7	1	all	Other alignments of caption to figure SPM.1 caption where necessary.
19	9	Box 19-2	all	Harmonize these definitions with those in the SPM, verbatim.
19	26	2	lines 3 and 4	delete "making potentially large areas seasonally uninhabitable for". Substitute "seasonally compromising". Change "11.8" to "Chapter 11 ES"
19	26	2	4	remove high confidence
19	33	3	all	Harmonize this list of KR's with the altered version in the ES (based on the SPM), as needed.
19	34	all	all	Harmonize this list of KR's with the altered version in the ES (based on the SPM), as needed.
19	35	1-2	all	Harmonize this list of KR's with the altered version in the ES (based on the SPM), as needed.
19	39-40	all	all	Various changes to harmonize RFC 1 with changes made to ES (based on the SPM)
19	40-41	all	all	Various changes to harmonize RFC 2 with changes made to ES (based on the SPM)
19	42-43	all	all	Various changes to harmonize RFC 3 with changes made to ES (based on the SPM)
19	43-44	all	all	Various changes to harmonize RFC 4 with changes made to ES (based on the SPM)
19	44-46	all	all	Various changes to harmonize RFC 5 with changes made to ES (based on the SPM)
19	104	Figure 19-4	N/A	Alter figure art to match Box SPM4 Figure 1; Align caption to the Box SPM.4 Figure 1 caption where necessary.
19	38	Figure 19-4	N/A	Align caption to the Box SPM.4 Figure 1 caption where necessary.
20	3	4	2	Replace: "Transformations in political, economic, and socio-technical systems can contribute to enhanced climate responses, both for mitigation and adaptation." With: Transformations in economic, social, technological and political decisions and actions can enable climate-resilient pathways
20	3	5	2	Replace: "Actions at the present time will emphasize cobenefits and iterative learning, with risk management strategies and capacities refined continually on the bases of growing evidence, knowledge, and experience. [20.6.2]" With: "Transformations to sustainability benefit from iterative learning, deliberative processes and innovation [20.4]."
20	3	6	4	Replace: "Current actions will emphasize climate risk management, iterative learning, innovation and transformation, on the basis of growing evidence, knowledge, and experience. [20.4; 20.6.2]" With: "Current actions will emphasize climate risk management strategies informed by growing evidence, knowledge, and experience. [20.6.2]"
20	23	2	between 5-6	Add the following sentence after the sentence ending with "Smith and Sterling, 2010)." : "At the national level, transformation is consid

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20	24	2	1	Replace: "Transformation is defined as a change in the fundamental attributes of a system, often based on altered paradigms, goals, or values. It can occur in technological, biological or financial systems, or regulatory, legislative, or administrative regimes (see glossary)." With: glossary definition and definition in Box 2 in SPM
22	105	Table 22-6	All	Harmonize text of key risks to match those in SPM table.
23	84	Table 23-5	All	Harmonize text of key risks to match verbatim those in the SPM summary key risk table. Additionally, change art rendering of two of the risk bars to the right.
24	24	4	1	Changes made to Assessment Box SPM.2 Table 1. (Asia) during the Plenary do not require changes in the underlying text except for "Economic diversification", which was inserted as an adaptation option, with two additional references. [for revised text: Livelihood and economic diversification have been suggested as important adaptation options for buffering climate change impacts on certain kinds of livelihoods (Selvaraju et al., 2006; Nguyen, 2007; Agrawal and Perrin, 2008; IFAD, 2011; Keskinen et al., 2010; Uy et al., 2011; World Bank, 2010; Ambani and Nicholles, 2012. The diversification should occur across assets, including productive assets, consumption strategies and employment opportunities (Agrawal and Perrin, 2008). REFERENCES Ambani, M. and N. Nicholles, 2012: Why community based adaptation makes economic sense. CARE Policy Brief, July 2012. London, UK: CARE. The World Bank, 2010: Economics of adaptation to climate change: A synthesis report. Washington D.C., USA: The World Bank.]
25	5	3	5	replace "...towards the upper end of projected changes" with "...towards the upper end of projected sea-level-rise ranges"
25	96	8	N/A	within Table (7th row, sea level rise, first column describing the key risk), replace: "Widespread damages to coastal infrastructure and low-lying ecosystems in Australia and New Zealand (high confidence)" with "Increasing risks to coastal infrastructure and low-lying ecosystems in Australia and New Zealand, with widespread damage towards the upper end of projected sea-level-rise ranges (high
27	4 to 5	last paragraph page 4, lines 1 to 2 page 5	last paragraph page 4, lines	We use this new text: In South and Central America, more than 600 weather and extreme events occurred 2000–2013, resulting in 13,500 fatalities, 52.6 million people affected, and economic losses of US\$45.3 billion (www.emdat.be)
27	40	2	6 to 9	We have added a couple of lines (in red) regarding the issues of indigenous knowledge and mother earth or madre tierra: Research on adaptation and the scientific understanding of the various processes and determinants of adaptive capacity is also mandatory for the region, with particular emphasis on increasing adaptation capacity involving the traditional knowledge of ancestral cultures and how this knowledge is transmitted. Linking indigenous knowledge with scientific knowledge is important. The concept of "mother earth" (madre tierra in Spanish) as a living system has been mentioned on the recent years, as a key sacred entity on the view of indigenous nations, and as a system that may be affected and also resilient to climate change. Although some adaptation processes have been initiated in the recent years dealing with this and other indigenous knowledge, there is no literature discussing these subjects so far.
27	97	Figure caption 27.1	Figure caption	At the end of the caption: Replace: Further details are given in Box 21-3. by Further details are given in Table SM21-5
27	96	Table 27-8	text in table	text on the text has changed and one icon (extreme rains) have been added on the table for water resources. Dave Dokken took note of those changes in the figure of the SPM for C and S America, and those changes have to be reflected on this table in Chapter 27.
29	23	3	N/A	Table 29-4: In the first of the three key risks a couple more words were added eg Ecological services, economic stability. Similarly in the first 'Adaptation issues and prospects. A third dot point was added between the first and second dot points.
30		Table 30-3	Row 2 Column 1	Change 'fishery' to 'fisheries'
30		Table 30-3	Row 2 Column 2	Add 'as indicated by their changes in distribution to maintain temperatures' to end of first sentence (ie after 'is limited').
30		Table 30-3	Row 2 Column 2	Replace 'or the expansion of aquaculture' with 'the expansion of sustainable aquaculture and the development of alternative livelihoods in some regions'
30		Table 30-3	Row 4 Column 2	Subscript 2 of 'CO2'
30		Table 30-3	Row 4 Column 2	Subscript 2 of 'CO2'
30		Table 30-3	Row 5 Column 1	After 'mortality increases,' insert 'exacerbated by ocean acidification,'
30		Table 30-3	Row 5 Column 4	Add '30.3.2.2'
30		Table 30-3	Row 5 Column 3	Add symbol for ocean acidification
30		Table 30-3	Row 6 Column 1	replace 'sea level rise and intensified precipitation and flood events' with 'sea-level rise, extreme events, changes in precipitation, and reduced ecological resilience'
30		Table 30-3	Row 6 Column 2	replace 'and aquaculture' with 'physical destruction, and unsustainable aquaculture'
30		Table 30-3	Row 6 Column 2	Delete 'Loss of ecosystems such as sea grass, mangroves and coral reefs can be reduced by'

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30		Table 30-3	Row 6 Column 2	Add new sentence after third (final) sentence 'Increased mangrove, coral reef and seagrass protection and restoration to protect numerous ecosystem goods and services such as coastal protection, tourist value, and fish habitat.'
TS	all	all	all	All TS elements which have an exact counterpart in the SPM will updated to exactly reflect any changes made to the SPM. All other TS elements will be carefully considered and updated as necessary to ensure consistency with the approved SPM.
Glossary	all	all	all	All definitions which overlap with the SPM terminology box will be updated to precisely reflect the wording agreed upon in plenary
Glossary	12	After "Environmenta l migration"	N/A	Add definition: "Environmental services: See Ecosystem services"