Chapter 17: Decision Making Options for Managing Risk
Supplementary Material

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SM17.1 Methodology for the Identification of Adaptation Options per RKR and the Assessment of the Characteristics of each Adaptation Option (Section 17.2, 17.5.1.2)

SM17.1.1 Methodology of the Identification of Adaptation Options

Given the list of Representative Key Risks (RKRs) developed in Chapter 16, the authors of Chapter 17 reviewed the first order draft of the regional chapters, sectoral chapters, and cross-chapters to identify a list of adaptation options relevant to these RKRs. The list was then refined to select three illustrative adaptation options per RKR. This final list of 24 options was selected to ensure a wide diversity of options while also selecting those that had high rates of implementation or discussion in the chapters. Many of the 24 adaptations are relevant to more than one RKR.
The list of adaptation options was then revised based on comments from the Second Order Draft review, as well as comments from representatives from regional chapters, sectoral chapters, and cross-chapter papers.

SM17.1.2 Methodology of the Assessment of the Characteristics of each Adaptation Option Selected

A set of were identified using the expert judgement of authors in Ch17 as being relevant for assessing the decision-making space of each adaptation options. These characteristics assessed are the following:

Formal decisions: Degree to which adaptation options are arrived at through formal decision-making
Public Governance: Percent of documented adaptations managed by the public sector
Private Governance: Percent of documented adaptations managed by the private sector
Community Governance: Percent of documented adaptations managed by the community or by individuals
Extent of benefit to humans: Number of people for whom vulnerability or exposure can be decreased using this option
Extent of benefit to ecosystem services: Benefits of adaptation to reduce climate related pressure/ impacts on ecosystems and ecosystem services
Equity benefits: low-income: Distribution of benefits
Equity benefits: gender: Distribution of benefits
Equity benefits: ethnic groups: Distribution of benefits
Transformational potential: Extent to which actions offer potential to lead to systemic change.
Contribution to GHG emissions: Amount of CO2/ GHG emitted

Each adaptation option was assess for each of the 11 characteristics. To ensure that our synthesis assessment of adaptation options comprehensively assessed the vast literature on adaptation globally, we used several methods to gather literature from the underlying chapters.

First, we created a database of all citations from the regional and sectoral chapters (Chapters 2-15) from sections or sentences in these chapters pertaining to any of the adaptation options identified in 17.1.1. From this database, we reviewed articles that contained information about one or more of the 11 characteristics. If an article contained information about one of these characteristics of the adaptation option being assessed, it was referenced under that adaptation-category combination. For example, an article that included information on a national index-insurance policy for drought risk would be referenced as relevant to the characteristic of "public governance" for the adaptation option of insurance.

Articles were also sourced from a review in Klobus et al. (2021), and from the feasibility assessment (Chapter 17); these were categorized in the same way.
Once all articles were referenced, the team carried out an expert review. An expert in the specific adaptation option (e.g. insurance) reviewed the list of articles under that option and added any missing articles that they were aware of. This person then worked with the Chapter 17 authors to place a final assessment result on each adaptation option + characteristic combination, following the description in the table below.

Table SM17.1: Example of the characteristics "Formal decisions; Public Governance; Private Governance; Community Governance", their definition and assessment categories.

Criteria	**Formal decisions**	**Public Governance**	**Private Governance**	**Community Governance**
Explanation	Degree to which adaptation options are arrived at through formal decision-making. Must meet both criteria: 1. Decision made in the context of a formalized system, e.g., a government, a community group, a company. This excludes decisions made by individuals operating independently. 2. Decision is made by following the procedures and rules of the system/group (e.g., laws, protocols, etc). This excludes decisions made on an ad-hoc basis by people within organizations, which have no official or legal status.	Percent of documented adaptations managed by the public sector (as opposed to private sector and community). The state is taking the lead in the day-to-day management of this adaptation.	Percent of documented adaptations managed by the private sector (as opposed to public sector and community). Firms and companies are doing the day-to-day management of this adaptation.	Percent of documented adaptations managed by the community or by individuals (as opposed to public or private sector). Local groups, NGOs, social movements, etc are doing the day-to-day management of this adaptation.
Category 4	>75%	67-100%	67-100%	67-100%
Category 3	50-75%	33-67%	33-67%	33-67%
Category 2	25-50%	0-33%	0-33%	0-33%
Category 1	<25%	~0%	~0%	~0%

The categories (Table 1) of the judgement of each adaptation option + characteristic are based on expert judgement of authors in Ch17. They are assumed to span the range of potential information while still presenting appropriate information diversity, depth and richness. Note that the final assessment for the three governance characteristics is inter-related; all three governance sectors cannot receive a category 4 at the same time, for example. The final assessment was made with this in mind, to ensure that the results could sum to 100% for any given adaptation option.

Table SM17.2: Example of the characteristics "Extent of benefit to humans; Extent of benefit to ecosystem services; Equity benefits: low-income; Equity benefits: gender; Equity benefits: ethnic groups; Transformational potential; Contribution to GHG emissions", their definition and assessment categories.

Criteria	Extent of benefit to humans	Extent of benefit to ecosystem services	Equity benefits: low-income	Equity benefits: gender	Equity benefits: ethnic groups	Transformational potential	Contribution to GHG emissions
Explanation	Number of people for whom vulnerability or exposure can be	Benefits of adaptation to reduce climate related pressure/ impacts on	Distribution of benefits	Distribution of benefits	Distribution of benefits	Extent to which actions offer potential to lead to systemic change. Criteria: Non-risk-focused actions are taken that - bring positive outcomes as a systems change (for farming, in the urban space etc.)	Amount of GHG emitted

	decreased using this option	ecosystems and ecosystem services				- arose out of recognition that risk-focused actions are (mostly) not feasible anymore. This could entail - discrete actions, such as livelihood diversification - processes that foster systemic rethinking and reconfiguration.	
Category 4	Reduces the exposure or vulnerability for most people in the world; i.e. >5 billion people	Highly beneficial to ecosystems and ecosystem services	Highly beneficial to low-income groups	Highly beneficial to females	Highly beneficial to marginalized ethnic groups	Broad systemic change	Sequestering CO2/ GHG/ Carbon or enhancing carbon sinks
Category 3	Reduces the exposure or vulnerability of some; i.e. <5 billion people but >1 billion people	Moderately beneficial to ecosystems and ecosystem services	Moderately beneficial to low-income groups	Moderately beneficial to females	Moderately beneficial to marginalized ethnic groups	Moderate systemic change	No additionally emitting CO2/ GHG/ Carbon
Category 2	Reduces the exposure or vulnerability of specific groups of people; i.e. <1 billion people.	No clear and different benefits/ harms across ecosystems and ecosystem services	No clear and different benefits for low-income groups	No clear and different benefits for females	No clear and different benefits for marginalized ethnic groups	Small systemic change	Few additional GHG emissions
Category 1	Unlikely to benefit humans	Worsens the situation for ecosystems and ecosystem services	Worsens the situation for low-income groups	Worsens the situation for females	Worsens the situation for marginalized ethnic groups	No systemic change	Substantial additional GHG emissions (above a certain % of local emissions?)

SM17.1.3 Adaptation Option Assessment Results

Table SM17.3: Formal Decisions

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(Byrne et al., 2015) (Ahammad et al., 2013) (Narayan et al., 2020) (Wamsler et al., 2014) (Mycoo, 2014) (Dalimunthe, 2018) (Bowering, 2014) (Mehrotra et al., 2013) (Jeanson et al., 2014) (Laeni et al., 2021) (Rosendo et al., 2018) (Warnken and Mosadeghi, 2018) (Lawrence et al., 2018)
Coastal infrastructure	Category 4, *high confidence* (*high agreement*, *medium evidence*)	(Chow et al., 2017) (Alves et al., 2020) (Sutton-Grier et al., 2015) (Abi Suroso and Firman, 2018) (Lawrence et al., 2018) (Lawrence et al., 2019c)
Strategic/planned retreat	Category 2, *high confidence* (*medium agreement*, *robust evidence*)	(Dannenberg et al., 2019) (Niven and Bardsley, 2013) (Nordstrom et al., 2015) (Bronen and Chapin, 2013) (Albert et al., 2018) (McMichael et al., 2019) (Mortreux et al., 2018) (Fouqueray et al., 2018) (Butler et al., 2016c) (See and Wilmsen, 2020) (Ayeb-Karlsson et al., 2016) (de Koning and Filatova, 2020) (Lawrence et al., 2018) (Kool et al., 2020) (Haasnoot et al., 2021) (Lawrence et al., 2020)
Restoration/creation of natural areas	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Bustamante et al., 2019) (Nunes et al., 2020) (Lei et al., 2016) (Sandholz et al., 2018) (Rahman et al., 2019) (Whitelaw and Eagles, 2007) (Saura et al., 2019) (Woolf et al., 2018) (Bayraktarov et al., 2020) (McKergow et al., 2016) (Mansourian, 2017) (Pires et al., 2017) (Parker and Boyer, 2019)
Minimizing ecosystem stressors	Category 3, *low confidence* (*medium agreement*, *limited evidence*)	(Harris et al., 2018) (Liu et al., 2018b) (Barbeaux et al., 2020) (Saura et al., 2019)

		(Whitelaw and Eagles, 2007) (Kostyack et al., 2011) (van Wilgen and Wannenburgh, 2016) (Howell et al., 2015) (Ahilan et al., 2018) (Andres et al., 2019) (Cockerell et al., 2020) (Derolez et al., 2020) (Duarte et al., 2020) (Peteet et al., 2018) (Douglass et al., 2020)
Adaptive ecosystem management	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Zölch et al., 2018) (Vogl et al., 2017) (McVittie et al., 2018) (Wamsler et al., 2020) (Jupiter et al., 2014) (Reyers et al., 2015) (Raymond et al., 2017) (Gulsrud et al., 2018) (Alexandra, 2017) (Gullestad et al., 2017)
Retrofitting	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Liberalesso et al., 2020) (Seltenrich, 2018) (Perini and Sabbion, 2016) (Nguyen et al., 2018) (Ahmed, 2014) (Parry, 2014) (Akbari and Matthews, 2012) (Stewart and Deng, 2015)
Regulatory building codes	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Holloway et al., 2014) (Teo et al., 2019) (Zens et al., 2020) (Rosenthal and Brechwald, 2013) (Akompab et al., 2013) (Marshall and Farahbakhsh, 2013) (Kizer, 2001) (Bronen and Chapin, 2013) (Li et al., 2013) (Dewan, 2015) (Kolen and Helsloot, 2014) (Su et al., 2020) (Fitzgerald and Laufer, 2017) (Van Loon-Steensma and Vellinga, 2019) (Li, 2013) (Barton, 2013) (Balaban and de Oliveira, 2017)
Spatial planning	Category 4, *high confidence* (*high agreement*, *medium evidence*)	(Slätmo et al., 2019) (Mahlkow and Donner, 2017) (Thacker et al., 2019) (Belčáková et al., 2019) (Liu et al., 2014) (Meerow, 2019) (Serre and Heinzlef, 2018)
Insurance	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Broberg, 2019) (Loisel et al., 2020) (Su et al., 2020) (Porrini et al., 2019) (Edwards et al., 2019)

		(Mutaqin and Usami, 2019) (Surminski, 2014) (Akter et al., 2017) (Jin et al., 2016) (Patel et al., 2017) (Hansen et al., 2019a) (Xinhua et al., 2017) (Kim and Pongthanapanich, 2016) (Dewi et al., 2018) (Shively, 2017) (Greatrex et al., 2015) (Kattumuri et al., 2017) (John et al., 2019) (Müller et al., 2017) (Matsuda et al., 2019) (Bagstad et al., 2007) (Solecki and Friedman, 2021) (Valente et al., 2019)
Livelihood diversification	Category 2, *medium confidence* (*medium agreement*, *robust evidence*)	(Kelman et al., 2019) (Rahman and Hickey, 2019) (Manoj and Shreya, 2019) (Galappaththi et al., 2017) (Cline et al., 2017) (Robinson et al., 2020) (Sain et al., 2017) (Dayamba et al., 2018)
Social safety nets	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Godfrey-Wood and Flower, 2018) (McClymont Peace and Myers, 2012) (Hardee and Mutunga, 2010) (Maini et al., 2017) (Mersha and van Laerhoven, 2018) (Lemos et al., 2016) (Su et al., 2020) (Lassa et al., 2019a) (Porter and Goyal, 2016) (Mesquita and Bursztyn, 2016)
Health prerequesites	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Berry et al., 2018) (Zens et al., 2020) (Marshall and Farahbakhsh, 2013) (Seltenrich, 2018) (Kizer, 2001) (Chersich and Wright, 2019) (Hatvani-Kovacs et al., 2018)
Access to healthcare services	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Rosenthal and Brechwald, 2013) (Akompab et al., 2013) (Atun et al., 2015) (Tonmoy et al., 2020) (Bowen et al., 2014) (Filipe et al., 2017) (Ebi and del Barrio, 2017) (Gilfillan, 2018)
Disaster early warning systems	Category 4, *high confidence* (*high agreement*, *medium evidence*)	(Bronen and Chapin, 2013) (Li et al., 2013) (Dewan, 2015) (Kolen and Helsloot, 2014) (Calvello et al., 2015) (Barrett, 2013) (Chisadza et al., 2013)

		(McGregor et al., 2015)
Farming & Fishing practices	Category 2, *high confidence* (*medium agreement*, *robust evidence*)	(Ho and Shimada, 2019) (Chen et al., 2014) (Negra et al., 2014) (Muchuru and Nhamo, 2017) (Aggarwal et al., 2018) (Lee et al., 2014) (Mumby et al., 2017) (Blasiak and Wabnitz, 2018) (Boonstra and Hanh, 2015) (Freduah et al., 2018) (Webber et al., 2014) (Wilson et al., 2018) (Cradock-Henry et al., 2020) (Wassmann et al., 2019) (Jennings et al., 2016)
Food storage and distribution	Category 3, *low confidence* (*medium agreement*, *limited evidence*)	(Lassa et al., 2019a) (Glover and Poole, 2019) (Li et al., 2017b) (Kochar, 2005)
Food related behavioural changes	Category 1, *high confidence* (*high agreement*, *medium evidence*)	(Wood et al., 2019) (He et al., 2019) (Rose et al., 2019) (Lang and Mason, 2018) (Li et al., 2017b)
Water capture/storage	Category 3, *low confidence* (*low agreement*, *limited evidence*)	(BenDor et al., 2018) (Bekele et al., 2018) (Andrew and Sauquet, 2017)
Lowering water demand	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(White et al., 2006) (Lee and Tansel, 2013) (Bruneau et al., 2013) (Kang et al., 2017) (Wheeler et al., 2020b) (Du et al., 2019) (Stavenhagen et al., 2018) (Zhang et al., 2017) (Al-Nory et al., 2014) (Nguyen et al., 2019)
Water supply/distribution	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Tzanakakis et al., 2020) (Zhao et al., 2017) (Negra et al., 2014) (Brouwer et al., 2013) (Alvarez-Garreton et al., 2019) (Jensen and Nair, 2019) (Pandey et al., 2019) (Ziervogel et al., 2019)
Seasonal/temporary mobility	Category 1, *high confidence* (*high agreement*, *medium evidence*)	(Radel et al., 2018) (Joshi et al., 2013) (Birkenholtz, 2014) (Rignall and Kusunose, 2018) (Zickgraf, 2019) (Barnett and McMichael, 2018) (McAdam, 2015)

Cooperative governance	Category 4, *very high confidence* (*high agreement*, *robust evidence*)	(Di Gregorio et al., 2019) (Zen et al., 2019) (Walsh, 2019) (Xie and Jia, 2017) (Dinar et al., 2019) (Dinar et al., 2015) (Yoo and Kim, 2016) (Kreft, 2017) (Rieu-Clarke and Spray, 2013) (Unger et al., 2020) (Park and Lee, 2019) (Spicer, 2016) (Carlson and Koremenos, 2021) (Blair and Janousek, 2013) (Furumo and Lambin, 2020) (Bertana, 2020) (Pinsky et al., 2018) (Lee et al., 2020) (Ahmed, 2019) (Hassib and Nounou, 2016) (Papin, 2019) (Timmerman et al., 2017)
Permanent migration	Category 3, *medium confidence* (*low agreement*, *robust evidence*)	(Burney et al., 2014) (Sahin Mencutek, 2021) (Kortendiek, 2021) (Lenner and Turner, 2019) (Fakhoury, 2017) (Birk and Rasmussen, 2014) (Hauer et al., 2020) (McNamara and Des Combes, 2015) (Schwan and Yu, 2018) (Bordner et al., 2020)

Table SM17.4: Public governance

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 3, *very high confidence* (*high agreement*, *robust evidence*)	(Byrne et al., 2015) (Ahammad et al., 2013) (Narayan et al., 2020) (Wamsler et al., 2014) (Mycoo, 2014) (Dalimunthe, 2018) (Bowering, 2014) (Mehrotra et al., 2013) (Freduah et al., 2018) (Matos Silva and Costa, 2016) (Jongman, 2018) (Fidelman et al., 2017) (Laeni et al., 2021) (Pérez-Cayeiro and Chica-Ruiz, 2015) (Rahman et al., 2019) (Sultana and Mallick, 2015) (Alam et al., 2015) (Adelekan, 2016) (Villamizar et al., 2017) (Elrick-Barr et al., 2016) (Torabi et al., 2018) (Renaud et al., 2015) (Aerts et al., 2014)

		(Hérivaux et al., 2018) (Kool et al., 2020)
Coastal infrastructure	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(Freduah et al., 2018) (Dewan, 2020) (Wiryomartono, 2020) (Wade, 2019) (Hellman and van Voorst, 2018) (Carmo, 2018) (Foti et al., 2020) (Wang et al., 2018a) (Hérivaux et al., 2018) (Abi Suroso and Firman, 2018) (Harvey, 2019) (Lawrence et al., 2019c)
Strategic/planned retreat	Category 3, Very *high confidence* (*high agreement*, *robust evidence*)	(Dannenberg et al., 2019) (Niven and Bardsley, 2013) (Nordstrom et al., 2015) (Maldonado et al., 2013) (Albert et al., 2018) (McMichael et al., 2019) (Mortreux et al., 2018) (McNamara et al., 2012) (Noy, 2020) (Vandenbeld and MacDonald, 2013) (Mach et al., 2019) (Hino et al., 2017) (Butler et al., 2016c) (McMichael et al., 2019) (See and Wilmsen, 2020) (Marino, 2018) (Wingfield et al., 2019) (Hérivaux et al., 2018) (Lawrence et al., 2020)
Restoration/creation of natural areas	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(Bustamante et al., 2019) (Kodikara et al., 2017) (Nunes et al., 2020) (Khan et al., 2019b) (Kim et al., 2019b) (Thomas et al., 2015) (Lei et al., 2016) (Sandholz et al., 2018) (Rahman et al., 2019) (Nigussie et al., 2018) (Wang et al., 2019c) (Wodehouse and Rayment, 2019) (Tieguhong et al., 2019) (Sirakaya et al., 2018) (Woolf et al., 2018)
Minimizing ecosystem stressors	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Liu et al., 2018b) (Barbeaux et al., 2020) (Luo et al., 2020) (Kostyack et al., 2011) (Hall et al., 2012) (Liebowitz et al., 2016) (Ahilan et al., 2018) (Cockerell et al., 2020) (Derolez et al., 2020) (Duarte et al., 2020)

Adaptive ecosystem management	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Salgado and Martinez, 2017) (Vogl et al., 2017) (McVittie et al., 2018) (Wamsler et al., 2020) (Jupiter et al., 2014) (Malenab et al., 2018) (Morris et al., 2019) (Kostyack et al., 2011) (Liebowitz et al., 2016) (Luo et al., 2020) (Rudolf, 2019)
Retrofitting	Category 2, *medium confidence* (*medium agreement*, *robust evidence*)	(Yang et al., 2019) (Beaudoin and Gosselin, 2016) (Norton et al., 2015) (Walker et al., 2015) (Perini and Sabbion, 2016) (Nguyen et al., 2018) (Collado and Wang, 2020) (Parry, 2014) (Akbari and Matthews, 2012) (Mitra et al., 2017) (Tauhid and Zawani, 2018)
Regulatory building codes	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Holloway et al., 2014) (Slätmo et al., 2019) (Teo et al., 2019) (Liberalesso et al., 2020) (Akompab et al., 2013) (Naipospos and Paramita, 2019) (Vedeld et al., 2016) (Dewan, 2015) (Johns, 2019) (Eisenberg, 2016) (Garsaball and Markov, 2017) (Shapiro, 2016)
Spatial planning	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Wang et al., 2020) (Mahlkow and Donner, 2017) (Yiannakou and Salata, 2017) (Belčáková et al., 2019) (Culwick et al., 2016) (Simpson et al., 2019) (Serre and Heinzlef, 2018) (Carter et al., 2018b) (Jabareen, 2015)
Insurance	Category 2, *high confidence* (*high agreement*, *robust evidence*)	(Booth and Williams, 2012) (Surminski, 2014) (Taylor, 2016b) (Loisel et al., 2020) (Su et al., 2020) (Budhathoki et al., 2019) (Glaas et al., 2017) (Surminski et al., 2015) (Hansen et al., 2019a) (Xinhua et al., 2017) (Kim and Pongthanapanich, 2016) (Jensen and Barrett, 2017) (Isakson, 2015) (Adiku et al., 2017) (Alam et al., 2020a) (Annan and Schlenker, 2015)

		(Budhathoki et al., 2019) (Dewi et al., 2018) (Shively, 2017) (Joyette et al., 2015) (Surminski and Thieken, 2017) (Greatrex et al., 2015) (Kattumuri et al., 2017) (Telesetsky and He, 2016) (Schäfer et al., 2019) (Prabhakar et al., 2018) (Aryal et al., 2020) (Linnerooth-Bayer et al., 2019) (Linnerooth-Bayer and Hochrainer-Stigler, 2015)
Livelihood diversification	Category 2, *high confidence* (*medium agreement*, *robust evidence*)	(Kelman et al., 2019) (Rahman and Hickey, 2019) (Himes-Cornell and Hoelting, 2015) (Galappaththi et al., 2017) (Pham, 2020) (Fabinyi, 2020) (Niles and Brown, 2017) (Rahman and Hickey, 2019) (Sain et al., 2017) (Liu and Lan, 2015) (Zheng et al., 2018) (Simpson, 2019) (Stein et al., 2018) (Lemahieu et al., 2018) (Satterthwaite et al., 2020)
Social safety nets	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Schwan and Yu, 2018) (Mesquita and Bursztyn, 2016) (Haug and Kg Wold, 2017) (Slater et al., 2015) (Mesquita and Bursztyn, 2017) (Hansen et al., 2019a) (Havemann et al., 2020) (Su et al., 2020) (Haque et al., 2014a) (Lemos et al., 2016) (Hossain and Rahman, 2018) (Lassa et al., 2019a) (Porter and Goyal, 2016) (Rao and Li, 2019) (Narayanan and Gerber, 2017) (Acosta et al., 2018)
Health prerequesites	Category 3, *medium confidence* (*medium agreement*, *robust evidence*)	(Austin et al., 2019) (Albright et al., 2020) (Naipospos and Paramita, 2019) (Perry et al., 2020) (Ebi et al., 2018) (Gilfillan, 2019) (Rudolph et al., 2020) (Tonmoy et al., 2020) (Mahlkow and Donner, 2017) (Runkle et al., 2018) (Späth and Rohracher, 2015) (McIver et al., 2014) (Van Loenhout et al., 2016) (Gilfillan et al., 2017) (Rychetnik et al., 2018)

		(Araos et al., 2016b)
Access to healthcare services	Category 3, *high confidence* (*medium agreement*, *robust evidence*)	(Akompab et al., 2013) (Haque et al., 2013) (Ebi et al., 2013) (Bell et al., 2013) (Codjoe et al., 2020) (Collyer and White, 2011) (Basu et al., 2012) (Liu et al., 2013) (de Oliveira and Doll, 2016) (Schmeltz et al., 2016) (Newnham et al., 2020) (Alonso et al., 2019) (Stokes et al., 2015) (Austin et al., 2015) (Austin et al., 2019)
Disaster early warning systems	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(Kolen and Helsloot, 2014) (Sari and Prayoga, 2018) (Calvello et al., 2015) (Yakubu, 2020) (Senaratna et al., 2014) (Nahayo et al., 2017) (Vedeld et al., 2016) (Dewan, 2015) (Defra, 2018) (Mersha and van Laerhoven, 2018) (Nkiaka et al., 2019) (Hess et al., 2020) (Dhiman and Sarkar, 2017) (Codeço et al., 2016)
Farming & Fishing practices	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Ho and Shimada, 2019) (Chen et al., 2014) (Negra et al., 2014) (Muchuru and Nhamo, 2017) (Wardropper and Rissman, 2019) (Álvarez-Berríos et al., 2018) (Lee et al., 2014) (Zougmoré et al., 2016) (Bausch et al., 2018) (Mosquera-Losada et al., 2018) (Ojea et al., 2017) (Gaines et al., 2018) (Ampaire et al., 2017) (Tiwari et al., 2014) (Verschuuren, 2018) (Iese et al., 2020) (Chakrabarti et al., 2017) (Álvarez-Berríos et al., 2018) (Rodriguez-Solorzano, 2014) (Hussain et al., 2019) (Cradock-Henry et al., 2020)
Food storage and distribution	Category 3, *high confidence* (*medium agreement*, *robust evidence*)	(Hassan et al., 2020) (Godfray et al., 2018) (Lassa et al., 2019a) (Hussain et al., 2019) (Porter and Goyal, 2016) (HLPE, 2019) (Glover and Poole, 2019) (Kochar, 2005)

Food related behavioural changes	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Derqui et al., 2020) (Rose et al., 2019) (Lang and Mason, 2018) (El Bilali and Ben Hassen, 2020) (Ajani et al., 2013) (Reynolds et al., 2019b)
Water capture/storage	Category 3, *medium confidence* (*medium agreement*, *limited evidence*)	(Ndeketeya and Dundu, 2019) (Tingey-Holyoak et al., 2013) (Mees et al., 2014) (Sharma et al., 2020) (Sletto et al., 2019) (Choi et al., 2017)
Lowering water demand	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(White et al., 2006) (Zou et al., 2013) (Du et al., 2019) (Lee and Tansel, 2013) (Bruneau et al., 2013) (Kang et al., 2017) (Yang and Yang, 2020) (Wheeler et al., 2020b) (Tortajada and Joshi, 2013) (Lavee et al., 2013) (Stavenhagen et al., 2018) (Lasserre, 2015) (Kayaga and Smout, 2014) (Dilling et al., 2019b) (Adem Esmail and Suleiman, 2020) (Kachani et al., 2020) (Matikinca et al., 2020) (Booysen et al., 2019a)
Water supply/distribution	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Seo, 2011) (Hill, 2013) (Tzanakakis et al., 2020) (Jussah et al., 2020) (Li et al., 2020) (Zhao et al., 2017) (Bhullar, 2013) (Everard et al., 2020) (Alvarez-Garreton et al., 2019) (Lavee et al., 2013) (Clarvis and Engle, 2015) (Luker and Harris, 2019)
Seasonal/temporary mobility	Category 2, *medium confidence* (*high agreement*, *limited evidence*)	(Lindegaard, 2020) (Voigt-Graf and Kagan, 2017) (Barnett and McMichael, 2018) (McAdam, 2015)
Cooperative governance	Category 4, *high confidence* (*medium agreement*, *robust evidence*)	(Di Gregorio et al., 2019) (Zen et al., 2019) (Dinar et al., 2015) (Yoo and Kim, 2016) (Crépeau and Atak, 2016) (Kuusipalo, 2017) (Unger et al., 2020) (Blair and Janousek, 2013) (Barton et al., 2015) (Iorns Magallanes, 2020) (Sanchez et al., 2018b) (Bordner et al., 2020) (Pinsky et al., 2018) (Lee et al., 2020)

		(Levin et al., 2018) (Ross et al., 2019) (Timmerman et al., 2017)
Permanent migration	Category 3, *high confidence* (*medium agreement*, *robust evidence*)	(Scheffran et al., 2012) (Islam et al., 2014) (Bisong, 2019) (Lenner and Turner, 2019) (Pianezzi and Grossi, 2020) (Birk and Rasmussen, 2014) (Albert et al., 2018) (Schwan and Yu, 2018) (Bordner et al., 2020) (Dannenberg et al., 2019)

Table SM17.5: Private Governance

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Randy et al., 2015) (Dalimunthe, 2018) (Laeni et al., 2021) (Adelekan, 2016) (Gain et al., 2017) (Torabi et al., 2018)
Coastal infrastructure	Category 3, *medium confidence* (*high agreement*, *medium evidence*)	(Wiryomartono, 2020) (Wade, 2019) (Hellman and van Voorst, 2018) (Bisaro and Hinkel, 2018) (Meerow, 2017) (Harvey, 2019)
Strategic/planned retreat	Category 2, *medium confidence* (*high agreement*, *limited evidence*)	(Noy, 2020) (See and Wilmsen, 2020) (Wingfield et al., 2019)
Restoration/creation of natural areas	Category 2, *low confidence* (*medium agreement*, *limited evidence*)	(Mayer, 2019) (Tieguhong et al., 2019)
Minimizing ecosystem stressors	Category 3, *low confidence* (*low agreement*, *limited evidence*)	(Orchard et al., 2016) (Constantine et al., 2017) (Mimet et al., 2020) (Basnou et al., 2015) (Kostyack et al., 2011) (Ramírez et al., 2018) (Andres et al., 2019)
Adaptive ecosystem management	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Vogl et al., 2017) (McVittie et al., 2018) (Wamsler et al., 2020) (Reyers et al., 2015) (Goldstein et al., 2019) (Vogl et al., 2017)
Retrofitting	Category 3, *high confidence* (*medium agreement*, *robust evidence*)	(Yang et al., 2019) (Loosemore et al., 2014) (Codjoe et al., 2020) (Seltenrich, 2018) (Meerow, 2017) (Perini and Sabbion, 2016) (Ahmed, 2016)
Regulatory building codes	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Naipospos and Paramita, 2019) (Liberalesso et al., 2020) (Tardy and Lee, 2019) (Van Loon-Steensma and Vellinga, 2019) (Tonmoy et al., 2020)

		(Lu, 2019) (Hallegatte et al., 2019)
Spatial planning	Category 2, *low confidence* (*high agreement*, *limited evidence*)	(Meerow, 2017) (Leck et al., 2018)
Insurance	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Booth and Williams, 2012) (Surminski, 2013) (Akter, 2012) (Peterson, 2012) (Taylor, 2016b) (Matsuda et al., 2013) (Surminski, 2014) (Penning-Rowsell et al., 2016) (Jensen and Barrett, 2017) (Hansen et al., 2019a) (Xinhua et al., 2017) (Kim and Pongthanapanich, 2016) (Isakson, 2015) (Taylor, 2016b) (Adiku et al., 2017) (Alam et al., 2020a) (Dewi et al., 2018) (Surminski and Eldridge, 2017) (Surminski and Thieken, 2017) (Di Marcantonio and Kayitakire, 2017) (Jin et al., 2016) (Greatrex et al., 2015) (Surminski and Thieken, 2017) (Glaas et al., 2017) (Schäfer et al., 2019) (Johnson et al., 2019)
Livelihood diversification	Category 3, *medium confidence* (*high agreement*, *medium evidence*)	(Himes-Cornell and Hoelting, 2015) (Ojo and Baiyegunhi, 2020) (Barbier, 2015) (Allen et al., 2018) (Dayamba et al., 2018) (Torell et al., 2017) (Simpson, 2019)
Social safety nets	Category 1, *medium confidence* (*high agreement*, *medium evidence*)	(de la Poterie et al., 2018) (Slater et al., 2015) (Havemann et al., 2020)
Health prerequesites	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Naipospos and Paramita, 2019) (Ducrot, 2017) (Loosemore et al., 2014) (Marshall and Farahbakhsh, 2013) (Seltenrich, 2018) (Kizer, 2001)
Access to healthcare services	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(Codjoe et al., 2020) (Collyer and White, 2011) (Basu et al., 2012) (Newnham et al., 2020)
Disaster early warning systems	Category 3, *medium confidence* (*high agreement*, *limited evidence*)	(Braman et al., 2013) (Yang et al., 2020) (Semenza et al., 2017)
Farming & Fishing practices	Category 2, *high confidence* (*medium agreement*, *robust evidence*)	(Fisher et al., 2015) (Budiman et al., 2016) (Pereira, 2013) (Barrett et al., 2017) (Agrawala et al., 2011) (Lee et al., 2014) (Bonzanigo et al., 2016)

		(Chinangwa et al., 2017) (Westengen et al., 2018) (Hazen et al., 2018) (Hobday et al., 2018) (Lim-Camacho et al., 2015) (Daly-Hassen et al., 2019) (Jennings et al., 2016)
Food storage and distribution	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Lang and Mason, 2018) (Pereira, 2013) (Munden-Dixon et al., 2018) (Lim-Camacho et al., 2015) (Gautier et al., 2016)
Food related behavioural changes	Category 3, *low confidence* (n/a agreement, *limited evidence*)	(Lang and Mason, 2018) (Reynolds et al., 2019b)
Water capture/storage	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Yamashita et al., 2016)
Lowering water demand	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Nunes et al., 2018)
Water supply/distribution	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Vázquez-Rowe et al., 2017) (Li et al., 2020) (Saha et al., 2018) (Zheng and Ayotte, 2015) (Bozzola and Swanson, 2014) (Keessen and Ernst, 2015) (Everard et al., 2020)
Seasonal/temporary mobility	Category 3, *low confidence* (*medium agreement*, *limited evidence*)	(Opondo, 2013) (Gabriel and Macdonald, 2018)
Cooperative governance	Category 2, *medium confidence* (*high agreement*, *medium evidence*)	(Fidelman et al., 2017) (Groutsis et al., 2015) (Cranston et al., 2018) (Panizzon and van Riemsdijk, 2018) (Goh et al., 2017) (Klein et al., 2018) (Lee et al., 2020)
Permanent migration	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Scheffran et al., 2012) (Himes-Cornell and Hoelting, 2015) (Groutsis et al., 2015) (Fenton et al., 2017)

Table SM17.6: Community governance

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Ahammad et al., 2013) (Narayan et al., 2020) (Nunn et al., 2014) (Mercer et al., 2012) (Lin, 2015) (Lin, 2019) (Fakhruddin and Rahman, 2015) (Freduah et al., 2018) (Laeni et al., 2021) (Dhar and Khirfan, 2016) (Alam et al., 2015) (Adelekan, 2016) (Torabi et al., 2018) (Sultana and Mallick, 2015) (Renaud et al., 2015)

		(Lawrence et al., 2018)
Coastal infrastructure	Category 2, *medium confidence* (*high agreement*, *medium evidence*)	(Fakhruddin and Rahman, 2015) (Bott and Braun, 2019) (Putra et al., 2019) (Betzold and Mohamed, 2017) (Lawrence et al., 2018)
Strategic/planned retreat	Category 3, *medium confidence* (*medium agreement*, *robust evidence*)	(Dannenberg et al., 2019) (Bronen and Chapin, 2013) (Maldonado et al., 2013) (Albert et al., 2018) (Maldonado, 2014) (McMichael et al., 2019) (McMichael and Katonivualiku, 2020) (Ayeb-Karlsson et al., 2016) (Butler et al., 2016c) (See and Wilmsen, 2020) (Lawrence et al., 2018) (Lawrence et al., 2020)
Restoration/creation of natural areas	Category 3, *high confidence* (*medium agreement*, *robust evidence*)	(Green et al., 2016) (Rahman et al., 2019) (Turbay et al., 2014) (Ros-Tonen et al., 2014) (Mayer, 2019) (Wang et al., 2019c) (Ranjan, 2020) (e Sousa and Ríos-Touma, 2018) (Hartman et al., 2016)
Minimizing ecosystem stressors	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Duarte et al., 2020)
Adaptive ecosystem management	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Zinia and McShane, 2018) (Giffin et al., 2020) (Zölch et al., 2018) (Vogl et al., 2017) (McVittie et al., 2018) (Wamsler et al., 2020) (Uy and Shaw, 2013) (Jupiter et al., 2014) (Madrigal-Ballestero and Naranjo, 2015) (Buckwell et al., 2020) (Gulsrud et al., 2018) (Lavorel et al., 2019) (Harvey et al., 2017) (Reid, 2016)
Retrofitting	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(Shah et al., 2017) (Beaudoin and Gosselin, 2016) (Lapointe et al., 2020) (Collado and Wang, 2020) (Ahmed, 2014) (Ahmed, 2016) (Yu et al., 2016) (Tauhid and Zawani, 2018) (NA, 2013)
Regulatory building codes	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(González Rivas et al., 2014) (Späth and Rohracher, 2015) (Niven and Bardsley, 2013) (Laldjebaev et al., 2018) (Birtchnell et al., 2019) (Xu and Grumbine, 2014)
Spatial planning	Category 2, *high confidence* (*high agreement*, *limited evidence*)	(Simon et al., 2020) (da Cunha et al., 2020)

Insurance	Category 2, *high confidence* (HIgh agreement, *medium evidence*)	(Broberg and Romera, 2020) (Di Marcantonio and Kayitakire, 2017) (Fisher et al., 2019) (Linnerooth-Bayer et al., 2019) (Xinhua et al., 2017) (Cradock-Henry et al., 2015) (Schäfer et al., 2019) (Le Quesne et al., 2017) (Schäfer et al., 2016)
Livelihood diversification	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(Oppong-Kyeremeh and Bannor, 2018) (Dasgupta and Baschieri, 2010) (Simonelli, 2016) (Andersson and Gabrielsson, 2012) (Rao et al., 2020) (Mkuna et al., 2020) (Gentle et al., 2018) (Jannat et al., 2021) (Karki et al., 2020) (Tran et al., 2020) (Galappaththi et al., 2017) (Barnes et al., 2020a) (Cline et al., 2017) (Blair and Momtaz, 2018) (Young et al., 2019b) (Pham, 2020) (Fabinyi, 2020) (Hossain et al., 2018a) (Mashizha, 2019) (Ahmed and Haq, 2019b) (Ferdous et al., 2019) (Young and Ismail, 2019) (Rahman and Hickey, 2019) (Shackleton et al., 2013) (Hansen et al., 2019a) (Baird and Hartter, 2017) (Deb and Haque, 2016) (Haque et al., 2014a) (Goulden et al., 2013) (Daw et al., 2009) (Lowe et al., 2019) (Agyeman, 2019) (Kupika et al., 2019) (Bishu et al., 2018) (Stein et al., 2018) (Satterthwaite et al., 2020) (Kistner et al., 2018) (Bell et al., 2019) (Nawrotzki and DeWaard, 2016) (Gray and Wise, 2016) (Lemahieu et al., 2018) (Matera, 2016)
Social safety nets	Category 2, *medium confidence* (*high agreement*, *limited evidence*)	(McClymont Peace and Myers, 2012) (Tanjeela and Rutherford, 2018) (Hossain and Rahman, 2018)
Health prerequesites	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Ndaba et al., 2020) (Ducrot, 2017) (Mercer and Hanrahan, 2017) (Dey et al., 2019) (Rauf et al., 2017) (Sadia et al., 2016) (Takahashi et al., 2015)

Access to healthcare services	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Oloukoi et al., 2014) (Codjoe et al., 2020) (Bell et al., 2013) (Siekmans et al., 2017)
Disaster early warning systems	Category 2, *medium confidence* (*medium agreement*, *robust evidence*)	(Chen et al., 2014) (Dewan, 2015) (Shah et al., 2017) (Sari and Prayoga, 2018) (Stone et al., 2014) (Liu et al., 2016a) (Fauzie and Sariffuddin, 2017) (Walch, 2019) (Muema et al., 2018) (Krstic et al., 2017) (Hou et al., 2017)
Farming & Fishing practices	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(Ho and Shimada, 2019) (Sushant, 2013) (Esham and Garforth, 2013) (de Boef et al., 2013) (Kabir et al., 2017) (Uddin et al., 2014) (Altieri and Nicholls, 2017) (Basupi et al., 2019) (Grothmann et al., 2017) (Gong et al., 2018) (Karanja Ng'ang'a et al., 2016) (Gebrehiwot and van der Veen, 2013) (Hussain et al., 2016) (Schlecht et al., 2019) (Galappaththi et al., 2019) (Brüssow et al., 2017) (Iese et al., 2020) (Karlsson and Mclean, 2020) (Bell et al., 2018) (Ackerman et al., 2014) (Cradock-Henry et al., 2020)
Food storage and distribution	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Kalungu et al., 2013) (Pielke Sr, 2013) (Hussain et al., 2016) (Siegner et al., 2018) (Krishnapillai, 2018)
Food related behavioural changes	Category 3, *low confidence* (*high agreement*, *limited evidence*)	(Bilska et al., 2020) (Perkins, 2013) (Vávra et al., 2018)
Water capture/storage	Category 2, *low confidence* (*medium agreement*, *limited evidence*)	(Staddon et al., 2018) (Sharma et al., 2020) (Recha et al., 2015) (Lasage et al., 2015) (Mercer and Hanrahan, 2017) (Lindoso et al., 2018) (Aladenola et al., 2016)
Lowering water demand	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(White et al., 2006) (Bruneau et al., 2013) (Garg et al., 2016) (Tortajada and Joshi, 2013) (Wentz et al., 2016) (Opare, 2018)
Water supply/distribution	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Tzanakakis et al., 2020) (Li et al., 2020) (Beisheim and Campe, 2012) (Del Bene et al., 2018) (Perkins, 2013)

		(Poutiainen et al., 2013) (Madrigal-Ballestero and Naranjo, 2015) (Boafo et al., 2016) (Everard et al., 2020)
Seasonal/temporary mobility	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Joshi et al., 2013) (Maiti et al., 2014) (Birkenholtz, 2014) (Jamero et al., 2017) (Jessoe et al., 2018)
Cooperative governance	Category 2, *medium confidence* (*low agreement*, *medium evidence*)	(Buchely, 2012) (Garkisch et al., 2017) (Lee, 2015) (Ross et al., 2019) (Sultana et al., 2019) (Thornton et al., 2018) (Lee et al., 2020) (Ross et al., 2019) (Crnčević and Lovren, 2018)
Permanent migration	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(Wiederkehr et al., 2018) (Kubik and Maurel, 2016) (Burney et al., 2014) (Scheffran et al., 2012) (Sow et al., 2014) (Nurlinah, 2020) (Maharjan et al., 2020) (Porst and Sakdapolrak, 2020) (Hamilton et al., 2016) (Riosmena et al., 2018) (Albert et al., 2018) (Marino and Lazrus, 2015)

Table SM17.7: How widely applicable is this adaptation option?

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Ahammad et al., 2013) (Wamsler et al., 2014) (Mycoo, 2014) (Lin, 2019) (Jones et al., 2012) (Hurlimann et al., 2014) (Gain et al., 2017) (Guannel et al., 2016) (Jones et al., 2020a) (Van Coppenolle and Temmerman, 2019) (Del Valle et al., 2020) (Hérivaux et al., 2018) (Kulp and Strauss, 2019) (Aerts et al., 2014) (Romañach et al., 2018) (Kool et al., 2020) (Haasnoot et al., 2021)
Coastal infrastructure	Category 2, *high confidence* (*high agreement*, *robust evidence*)	(Masria et al., 2015) (Auerbach et al., 2015) (Mehrabani et al., 2015) (Wang et al., 2018a) (Triyanti et al., 2017) (Daigneault et al., 2016) (Tamura et al., 2019) (Hérivaux et al., 2018) (Abi Suroso and Firman, 2018) (Scussolini et al., 2017)

		(Lawrence et al., 2019c) (Haasnoot et al., 2021)
Strategic/planned retreat	Category 2, *high confidence* (*high agreement*, *robust evidence*)	(Dannenberg et al., 2019) (Song et al., 2018b) (Maldonado, 2014) (Maldonado et al., 2013) (McMichael et al., 2019) (Islam et al., 2014) (Mortreux et al., 2018) (Keene, 2017) (Ayeb-Karlsson et al., 2016) (McGhee et al., 2020) (Hino et al., 2017) (Neumann et al., 2015) (Navarro et al., 2021) (Kulp and Strauss, 2019) (Hérivaux et al., 2018) (Haasnoot et al., 2021)
Restoration/creation of natural areas	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Bustamante et al., 2019) (Elmqvist et al., 2015) (Smith et al., 2016) (Evariste et al., 2018) (Rahman et al., 2019) (Khan et al., 2019b) (Sandholz et al., 2018) (Muricho et al., 2019) (Wallace and Clarkson, 2019) (Hartman et al., 2016)
Minimizing ecosystem stressors	Category 3, *low confidence* (*high agreement*, *limited evidence*)	(Mills et al., 2018) (Harris et al., 2018) (Barbeaux et al., 2020) (van Wilgen and Wannenburgh, 2016) (Ramírez et al., 2018) (Howell et al., 2015)
Adaptive ecosystem management	Category 2, *high confidence* (*high agreement*, *robust evidence*)	(Marijnissen et al., 2020) (Santiago Fink, 2016) (Narayan et al., 2016) (Jones et al., 2020a) (Mureithi et al., 2016) (Tran and Brown, 2019) (Zölch et al., 2018) (Vogl et al., 2017) (Schmitt and Albers, 2014) (McVittie et al., 2018) (Reguero et al., 2018) (Chausson et al., 2020) (Coutts and Hahn, 2015) (Basnou et al., 2015) (Tran and Brown, 2019)
Retrofitting	Category 4, *high confidence* (*high agreement*, *medium evidence*)	(Beaudoin and Gosselin, 2016) (Norton et al., 2015) (Zevenbergen et al., 2020) (Ahmed, 2014) (Vahmani et al., 2016) (NA, 2013) (Stewart et al., 2014) (Mguni et al., 2016) (Sanesi et al., 2017) (Sutton-Grier et al., 2015)
Regulatory building codes	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Gallardo-Albarrán, 2020) (Ohunakin et al., 2014)

Spatial planning	Category 4, *medium confidence* (*high agreement*, *medium evidence*)	(Yang et al., 2016) (Jeandron et al., 2019) (Liu et al., 2016b) (Slätmo et al., 2019) (Meerow, 2019) (Zhang et al., 2020a) (Mahlkow and Donner, 2017) (Emmanuel and Loconsole, 2015) (Yiannakou and Salata, 2017)
Insurance	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(Peterson, 2012) (Thinda et al., 2020) (Alam et al., 2020a) (Di Marcantonio and Kayitakire, 2017) (Fisher et al., 2019) (Born et al., 2019) (Jensen and Barrett, 2017) (Dewi et al., 2018) (Hansen et al., 2019a) (Kim and Pongthanapanich, 2016) (Pongthanapanich et al., 2019) (Isakson, 2015) (Taylor, 2016b) (Ali et al., 2020a) (Annan and Schlenker, 2015) (Broberg and Romera, 2020) (Bogale, 2015) (Budhathoki et al., 2019) (Falco et al., 2014) (Surminski and Thieken, 2017) (Khatri-Chhetri et al., 2017) (Elum et al., 2018)
Livelihood diversification	Category 3, *medium confidence* (*medium agreement*, *robust evidence*)	(Rao et al., 2020) (Ojo and Baiyegunhi, 2020) (Ghosh and Ghosal, 2020) (Jannat et al., 2021) (Steenbergen et al., 2017) (Himes-Cornell and Hoelting, 2015) (Robinson et al., 2020) (Young et al., 2019b) (Cinner, 2014) (Cline et al., 2017) (Fabinyi, 2020) (Sain et al., 2017) (Ferdous et al., 2019) (Ahmed and Haq, 2019b) (Dayamba et al., 2018) (Hansen et al., 2019a) (Rahman and Hickey, 2019) (Shackleton et al., 2013) (Pham, 2020) (Alobo Loison, 2015) (Goulden et al., 2013) (Torell et al., 2017) (Storlazzi et al., 2019) (Daw et al., 2009)
Social safety nets	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Ulrichs et al., 2019) (Ziegler, 2016) (Mekuyie et al., 2018) (Tenzing, 2020) (Lemos et al., 2016) (Su et al., 2020) (Ivaschenko et al., 2018) (Mesquita and Bursztyn, 2017)

Health prerequesites	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Beaudoin and Gosselin, 2016) (Gallardo-Albarrán, 2020) (Naipospos and Paramita, 2019) (Houck et al., 2020) (Davies et al., 2015) (Liu et al., 2016b) (Jeandron et al., 2019) (Vatovec et al., 2013) (Wolf et al., 2018) (Hallema et al., 2020) (Norton et al., 2015) (Su et al., 2020) (Gilfillan et al., 2017) (Loosemore et al., 2014) (Dickin et al., 2016) (Araos et al., 2016b) (Konrad et al., 2017)
Access to healthcare services	Category 4, *high confidence* (*high agreement*, *medium evidence*)	(Haque et al., 2013) (Haque et al., 2014b) (Oloukoi et al., 2014) (Van Minh et al., 2014) (Sheehan et al., 2017) (Springmann et al., 2016a) (Foyer et al., 2016) (Ahmad et al., 2017) (Hatvani-Kovacs et al., 2018) (Lund et al., 2018) (Alonso et al., 2019)
Disaster early warning systems	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Braman et al., 2013) (Chaves and Pascual, 2007) (Miller, 2018) (De Perez et al., 2018) (Benmarhnia et al., 2016) (Martínez-Solanas and Basagaña, 2019) (Shukla et al., 2020) (Knowlton et al., 2014) (Nitschke et al., 2016) (Nicholls et al., 2016) (Vardoulakis et al., 2020) (Lowe et al., 2017)
Farming & Fishing practices	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(Khonje et al., 2015) (Ho and Shimada, 2019) (Béné et al., 2016) (Balana et al., 2020) (Oyekale, 2013) (Zorom et al., 2013) (Kankwamba et al., 2018) (Mullan et al., 2018) (Brown et al., 2011) (Kremen and Merenlender, 2018) (Coulibaly et al., 2017) (Lam et al., 2020) (Nyantakyi-Frimpong et al., 2017) (Chakrabarti et al., 2017) (Le Cornu et al., 2018) (Duarte et al., 2017) (Thornton and Herrero, 2015)
Food storage and distribution	Category 2, *medium confidence* (*high agreement*, *medium evidence*)	(Nolasco et al., 2017) (HLPE, 2019) (Glover and Poole, 2019) (Kochar, 2005) (Clark and Nicholas, 2013)

		(Krishnapillai, 2018)
Food related behavioural changes	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Rust et al., 2020) (Springmann et al., 2016b) (Song et al., 2017) (Springmann et al., 2018) (Medina Hidalgo et al., 2020) (Lake, 2018) (Ančić et al., 2019)
Water capture/storage	Category 3, *low confidence* (*medium agreement*, *medium evidence*)	(Alim et al., 2020) (Ndeketeya and Dundu, 2019) (Staddon et al., 2018) (Dono et al., 2013) (Pittock et al., 2013) (Collentine and Futter, 2018) (Wheeler et al., 2020b) (Herslund and Mguni, 2019) (Watras et al., 2014) (Rodell et al., 2018) (Abubakar, 2018) (Akpinar Ferrand and Cecunjanin, 2014) (Quigley et al., 2016)
Lowering water demand	Category 2, *low confidence* (*high agreement*, *limited evidence*)	(Stanghellini, 2013) (Lee and Tansel, 2013) (Price et al., 2014) (Daly-Hassen et al., 2019) (Biggs et al., 2015)
Water supply/distribution	Category 2, *low confidence* (*high agreement*, *limited evidence*)	(Remteng et al., 2021) (Basu et al., 2015) (Perkins, 2013) (Kariuki, 2014)
Seasonal/temporary mobility	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Kaczan and Orgill-Meyer, 2020) (Sobczak-Szelc and Fekih, 2020) (Singh and Basu, 2020) (Voigt-Graf and Kagan, 2017) (Young et al., 2019b) (Islam, 2018) (Scott et al., 2012)
Cooperative governance	Category 4, *low confidence* (*low agreement*, *medium evidence*)	(Ziervogel et al., 2016) (Fidelman et al., 2017) (Xie and Jia, 2017) (Crépeau and Atak, 2016) (Lavenex et al., 2016) (Vitorino, 2019) (Molden et al., 2017) (Lee et al., 2020) (Ross et al., 2019) (Sowman et al., 2014)
Permanent migration	Category 2, *high confidence* (*high agreement*, *robust evidence*)	(Mavhura et al., 2017) (Maharjan et al., 2020) (Mbaye, 2017) (Gippner et al., 2012) (Burney et al., 2014) (Islam et al., 2014) (Birk and Rasmussen, 2014) (Penning-Rowsell et al., 2013) (Sobczak-Szelc and Fekih, 2020) (Gouritin, 2020) (Rogers et al., 2019) (Tai et al., 2019) (Singh and Basu, 2020) (Chen and Mueller, 2018)

		(Tabe, 2019) (Schwan and Yu, 2018) (Bordner et al., 2020) (Scheffran et al., 2012)

Table SM17.8: Extent of benefit to ecosystem services

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 2, Low confidence (*high agreement*, *limited evidence*)	(Ahammad et al., 2013) (Narayan et al., 2020) (Wamsler et al., 2014) (Mycoo, 2014) (Lin, 2019) (Cheong et al., 2013) (Matos Silva and Costa, 2016) (Guannel et al., 2016) (Jones et al., 2020a) (Duarte et al., 2013) (Morris et al., 2018) (Sierra-Correa and Kintz, 2015) (Powell et al., 2019) (Narayan et al., 2016) (Stewart-Sinclair et al., 2020) (Morris et al., 2020)
Coastal infrastructure	Category 1, *medium confidence* (*low agreement*, *robust evidence*)	(Anton et al., 2019) (Rangel-Buitrago et al., 2018) (Sawyer et al., 2020) (Masria et al., 2015) (Wiryomartono, 2020) (Silva et al., 2016) (Dewan, 2020) (Jongman, 2018) (Cooper et al., 2020) (Hall et al., 2018) (Cheong et al., 2013) (Rangel-Buitrago et al., 2018) (Morris et al., 2020)
Strategic/planned retreat	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Nordstrom et al., 2015) (Fouqueray et al., 2018) (Uddin et al., 2014) (MacDonald et al., 2020) (Wollenberg et al., 2018) (Kousky, 2014)
Restoration/creation of natural areas	Category 4, *high confidence* (*medium agreement*, *robust evidence*)	(Bustamante et al., 2019) (Collas et al., 2017) (von Holle et al., 2020) (van Katwijk et al., 2016) (Camps-Calvet et al., 2016) (Elmqvist et al., 2015) (Ahmed and Glaser, 2016) (Kodikara et al., 2017) (Ots et al., 2017) (Miyamoto, 2020) (Nunes et al., 2020) (Nunez et al., 2020) (Kang et al., 2018) (Weston et al., 2015) (Carswell et al., 2015) (Saroar, 2018) (Evariste et al., 2018) (FENG Yuan, 2020)

		(Rahman et al., 2019) (Andersen et al., 2017) (Boström-Einarsson et al., 2020) (Wallace and Clarkson, 2019) (McKergow et al., 2016) (Wardell-Johnson et al., 2015) (Amoah-Antwi et al., 2020) (Hartman et al., 2016) (Pires et al., 2017) (Strassburg et al., 2020) (Kostyack et al., 2011)
Minimizing ecosystem stressors	Category 4, *high confidence* (*medium agreement*, *robust evidence*)	(Li et al., 2017a) (Harris et al., 2018) (Parkinson and Hunt, 2020) (Liu et al., 2018b) (Fernández et al., 2020) (Hall et al., 2012) (McGuire et al., 2016) (Barbeaux et al., 2020) (Whitelaw and Eagles, 2007) (Alexander et al., 2019) (Liebowitz et al., 2016) (van Wilgen and Wannenburgh, 2016) (Stafford et al., 2017) (Ahilan et al., 2018) (Andres et al., 2019) (Cockerell et al., 2020) (Derolez et al., 2020) (Duarte et al., 2020) (Peteet et al., 2018) (Stevenson et al., 2020)
Adaptive ecosystem management	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Santiago Fink, 2016) (Vincent et al., 2017) (Zinia and McShane, 2018) (Klein et al., 2019) (Griscom et al., 2017) (Tran and Brown, 2019) (Meerow, 2019) (Salgado and Martinez, 2017) (Schmitt and Albers, 2014) (McVittie et al., 2018) (Mycoo, 2017) (Zhou et al., 2018) (Malenab et al., 2018) (Erftemeijer et al., 2020) (Reguero et al., 2018) (Chausson et al., 2020) (Jones and Somper, 2014) (Williams et al., 2015) (Buckwell et al., 2020) (Mimet et al., 2020) (Dupras et al., 2016)
Retrofitting	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Li and Li, 2019) (Bakheet et al., 2020) (Byrne et al., 2015) (Perini and Sabbion, 2016) (Al-Obaidi et al., 2014) (Masria et al., 2015) (de la Mota Daniel et al., 2018) (Alves et al., 2019) (De la Sota et al., 2019) (Demuzere et al., 2014) (Sutton-Grier et al., 2015)

Regulatory building codes	Category 3, *low confidence* (*low agreement*, *limited evidence*)	(Xu and Grumbine, 2014) (Ridzuan et al., 2021) (Foka et al., 2015) (Ngo et al., 2020)
Spatial planning	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Holloway et al., 2014) (Coffey et al., 2020) (Meerow, 2019) (Zhang et al., 2020b) (Di Leo et al., 2016) (Culwick et al., 2016) (Tuyen, 2018) (Foka et al., 2015) (Ngo et al., 2020) (Heery et al., 2018) (Dugan et al., 2008)
Insurance	Category 1, *low confidence* (*high agreement*, *limited evidence*)	(Müller et al., 2017)
Livelihood diversification	Category 3, Low confidence (Low agreement, *limited evidence*)	(Bewiadzi et al., 2018) (Himes-Cornell and Hoelting, 2015) (Galappaththi et al., 2017) (Robinson et al., 2020) (Shackleton et al., 2013) (Ghahramani et al., 2015)
Social safety nets	Category 2, *very low confidence* (*low agreement*, *limited evidence*)	(Weldegebriel and Prowse, 2013) (Mesquita and Bursztyn, 2017)
Health prerequesites	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Keeler et al., 2019) (Schoen and Chopra, 2018) (Petersen, 2014) (Eckelman and Sherman, 2016) (Vatovec et al., 2013) (Venter et al., 2020) (MacNaughton et al., 2018)
Access to healthcare services	Category 2, *very low confidence* (n/a agreement, n/a evidence)	-
Disaster early warning systems	Category 3, *medium confidence* (*medium agreement*, *limited evidence*)	(Cools et al., 2016) (Semenza et al., 2017) (Hattenrath-Lehmann et al., 2018)
Farming & Fishing practices	Category 3, *high confidence* (*medium agreement*, *robust evidence*)	(Adamides et al., 2020) (Shah et al., 2019) (Ahmed et al., 2014) (Toledo and Barrera-Bassols, 2017) (Bermeo et al., 2014) (Fulton et al., 2019) (Molotoks et al., 2020) (Holsman et al., 2020) (Iram et al., 2020) (Aubin et al., 2019a) (Hejnowicz et al., 2015) (Kremen and Merenlender, 2018) (Duarte et al., 2018) (Goulding et al., 2016) (Le Cornu et al., 2018) (Rodriguez-Solorzano, 2014) (Duarte et al., 2017) (Thornton and Herrero, 2015)
Food storage and distribution	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Willett et al., 2019) (Clark and Nicholas, 2013)

Food related behavioural changes	Category 4, *medium confidence* (*high agreement*, *medium*/*limited evidence*)	(Rust et al., 2020) (Kc et al., 2018) (He et al., 2019) (Springmann et al., 2018)
Water capture/storage	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Kaye and Quemada, 2017) (Collentine and Futter, 2018) (Ndeketeya and Dundu, 2019) (Zhao et al., 2018) (Sharma et al., 2020) (Lasage et al., 2015) (Stefanakis, 2019) (Hope and Nanson, 2015) (Humphrey et al., 2018) (Rezanezhad et al., 2016) (Madani et al., 2020) (Ryan and Elsner, 2016) (Shamsudduha and Taylor, 2020) (Wu et al., 2019)
Lowering water demand	Category 3, *medium confidence* (*high agreement*, *medium evidence*)	(Koech and Langat, 2018) (Stanghellini, 2013) (Xiong et al., 2020) (Barnes et al., 2020b) (Rufí-Salís et al., 2020) (Ahmed et al., 2014) (Gunasekara et al., 2018) (Bu et al., 2015)
Water supply/distribution	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Pervov and Andrianov, 2017) (Al-Kalbani et al., 2016) (Everard et al., 2020)
Seasonal/temporary mobility	Category 3, *very low confidence* (*high agreement*, *limited evidence*)	(Ruano and Milan, 2014) (Joshi et al., 2013) (Maiti et al., 2014) (Birkenholtz, 2014)
Cooperative governance	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Rieu-Clarke and Spray, 2013) (Sutton-Grier and Moore, 2016) (Zhang and Bateman, 2017) (Tigre, 2016) (Lee et al., 2020) (Ross et al., 2019) (Sultana et al., 2019) (Levin et al., 2018) (Sullivan et al., 2019)
Permanent migration	Category 3, *medium confidence* (*medium agreement*, *limited evidence*)	(Burney et al., 2014) (Birk and Rasmussen, 2014) (Young et al., 2019b)

Table SM17.9: Equity benefits to marginalized ethnic groups

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category n/a, na confidence (na agreement, na evidence)	(Chong, 2014)
Coastal infrastructure	Category n/a, na confidence (na agreement, *limited evidence*)	(Mcleod et al., 2018)
Strategic/planned retreat	Category 1, *high confidence* (*high agreement*, *medium evidence*)	(Maldonado, 2014) (Maldonado et al., 2013) (Keene, 2017) (Zander et al., 2013) (Marino, 2018) (Siders, 2019) (Loughran and Elliott, 2021)

		(Ajibade, 2019) (Felipe Pérez and Tomaselli, 2021)
Restoration/creation of natural areas	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Camps-Calvet et al., 2016) (Romañach et al., 2018) (Smith et al., 2016) (Sánchez and Izzo, 2016) (Brattland and Mustonen, 2018) (Watkins et al., 2016)
Minimizing ecosystem stressors	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Adaptive ecosystem management	Category n/a, n/a confidence (n/a agreement, n/a evidence)	(Klein et al., 2019)
Retrofitting	Category 2, *very low confidence* (*low agreement*, *limited evidence*)	(Tubridy, 2020) (Mitra et al., 2017) (Larsen, 2015)
Regulatory building codes	Category 3, *low confidence* (*high agreement*, *limited evidence*)	(Rosenthal and Brechwald, 2013) (Ohunakin et al., 2014)
Spatial planning	Category 1, *medium confidence* (*high agreement*, *medium evidence*)	(Bautista et al., 2015) (Cho et al., 2020) (Connolly and Anguelovski, 2021) (McConnachie and Shackleton, 2010) (Wolch et al., 2014)
Insurance	Category 1, *low confidence* (*high agreement*, *limited evidence*)	(Fisher et al., 2019) (Paganini, 2019) (Jensen and Barrett, 2017)
Livelihood diversification	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Social safety nets	Category 3, *low confidence* (*high agreement*, *limited evidence*)	(Narayanan and Gerber, 2017)
Health prerequesites	Category 2, *low confidence* (*high agreement*, *limited evidence*)	(Vatovec et al., 2013) (Jones, 2019)
Access to healthcare services	Category 2, *medium confidence* (*high agreement*, *limited evidence*)	(Sheridan et al., 2011) (Schmeltz et al., 2016) (McDonald et al., 2015b) (Green and Minchin, 2014)
Disaster early warning systems	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Farming & Fishing practices	Category 3, *low confidence* (*low agreement*, *medium evidence*)	(Shahzad et al., 2019) (Raymond-Yakoubian et al., 2017) (Sapkota et al., 2015) (Ojea et al., 2020) (Mercer et al., 2014) (Inaotombi and Mahanta, 2018)
Food storage and distribution	Category 4, *low confidence* (*high agreement*, *limited evidence*)	(HLPE, 2019) (Mugambiwa, 2018) (Siegner et al., 2018)
Food related behavioural changes	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Water capture/storage	Category 1, *medium confidence* (*high agreement*, *medium evidence*)	(Bobadoye et al., 2016) (Hadi, 2019) (Rousseau, 2020) (Abtew and Dessu, 2019) (Cooke et al., 2017) (Salinas et al., 2019)
Lowering water demand	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Water supply/distribution	Category 3, *low confidence* (*medium agreement*, *limited evidence*)	(Bobadoye et al., 2016) (Roncoli et al., 2019) (Rahaman et al., 2018)

		(Hylton and Charles, 2018) (French et al., 2021) (Satterthwaite et al., 2020) (Castán Broto et al., 2021) (Unnikrishnan, 2018)
Seasonal/temporary mobility	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Gabriel and Macdonald, 2018) (Petzold et al., 2020) (Ruano and Milan, 2014) (Kelman and Næss, 2019)
Cooperative governance	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Pijnenburg et al., 2018) (Crépeau and Atak, 2016) (Lavenex et al., 2016) (Bernauer et al., 2020) (Sullivan et al., 2019) (Etchart, 2017) (Ford et al., 2016) (Crawley and Blitz, 2019)
Permanent migration	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Schwan and Yu, 2018) (Singh, 2019) (Bordner et al., 2020)

Table SM17.10: Equity benefits to gender

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 2, *medium confidence* (*high agreement*, *limited evidence)*	(Alam and Rahman, 2014) (Krishnapillai, 2018) (Dilshad and Muhammad, 2020) (Pham and Lam, 2016)
Coastal infrastructure	Category 1, *medium confidence* (*medium agreement*, *limited evidence*)	(Mcleod et al., 2018) (Moench et al., 2017) (Jabeen, 2019) (McCall et al., 2019)
Strategic/planned retreat	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Sunikka-Blank et al., 2019) (Jain et al., 2021) (Piggott-McKellar et al., 2020) (Quetulio-Navarra et al., 2017)
Restoration/creation of natural areas	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Minimizing ecosystem stressors	Category n/a, n/a confidence (n/a agreement, n/a evidence)	(Orchard et al., 2016)
Adaptive ecosystem management	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Newsham et al., 2018) (Bisaga et al., 2019) (Olivier and Heinecken, 2017) (Vansteenkiste, 2014) (Islam, 2019) (Richerzhagen et al., 2019)
Retrofitting	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Jabeen, 2019) (McCall et al., 2019) (Bell, 2016) (Hatvani-Kovacs et al., 2015) (Núñez-Peiró et al., 2019) (Botzen et al., 2019)
Regulatory building codes	Category 2, *low confidence* (*medium agreement*, *limited evidence*)	(Solomon and Singh, 2021) (Osayomi and Ugwu, 2019) (Akter and Rahman, 2018) (Botzen et al., 2019)
Spatial planning	Category 2, *medium confidence* (*low agreement*, *medium evidence*)	(Jabeen, 2019) (Milan and Ho, 2014) (Solomon and Singh, 2021)

Insurance	Category 2, *low confidence* (*high agreement*, *limited evidence*)	(Born et al., 2019) (Akter et al., 2016) (Bageant and Barrett, 2017) (Budhathoki et al., 2019)
Livelihood diversification	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Rao et al., 2020) (Hossain et al., 2018a) (Niles and Brown, 2017) (Antwi-Agyei et al., 2018) (Young and Ismail, 2019) (Sain et al., 2017)
Social safety nets	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Coirolo et al., 2013) (Mersha and van Laerhoven, 2018) (Su et al., 2020) (Devereux, 2016) (Mesquita and Bursztyn, 2017) (Acosta et al., 2018)
Health prerequesites	Category 3, *low confidence* (*high agreement*, *limited evidence*)	(Geere and Hunter, 2020) (Sadia et al., 2016) (Pommells et al., 2018)
Access to healthcare services	Category 3, *low confidence* (*high agreement*, *limited evidence*)	(Sheridan et al., 2011) (Sadia et al., 2016)
Disaster early warning systems	Category 1, *medium confidence* (*high agreement*, *medium evidence*)	(Perera et al., 2020) (Aryal, 2014) (Moreno and Shaw, 2018) (Mustafa et al., 2015) (Shabib and Khan, 2014) (Pepper, 2019)
Farming & Fishing practices	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Ahmed et al., 2016) (Shahzad et al., 2019) (Jost et al., 2015) (de la Torre-Castro, 2019) (Leisher et al., 2016) (Mutenje et al., 2019) (Nyantakyi-Frimpong, 2017) (Hove and Gweme, 2018)
Food storage and distribution	Category 3, *low confidence* (*low agreement*, *limited evidence*)	(Adeyemi, 2010) (Siegner et al., 2018) (Kochar, 2005) (Krishnapillai, 2018)
Food related behavioural changes	Category 3, *medium confidence* (*medium agreement*, *limited evidence*)	(Richter and Bokelmann, 2018) (Boedecker et al., 2014) (Bezner Kerr et al., 2019) (Kramer et al., 2017) (Harris-Fry et al., 2020)
Water capture/storage	Category 1, *medium confidence* (*high agreement*, *medium evidence*)	(Mersha and Van Laerhoven, 2016) (Udas et al., 2019) (Gonda, 2016) (Singh, 2018) (Assan et al., 2018)
Lowering water demand	Category 2, *medium confidence* (*medium agreement*, *limited evidence*)	(Dawit and Dinka, 2021) (Mutenje et al., 2019) (Ngigi et al., 2017)
Water supply/distribution	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Udas et al., 2019) (Remteng et al., 2021) (Sultana, 2018) (Singh, 2018)
Seasonal/temporary mobility	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Gioli et al., 2014) (Penning-Rowsell et al., 2013) (Bhatta et al., 2016) (Lama, 2018) (Voigt-Graf and Kagan, 2017)

		(Call et al., 2017)
Cooperative governance	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Kreft, 2017) (Mwambi et al., 2021)
Permanent migration	Category 2, *medium confidence* (*low agreement*, *robust evidence*)	(Gippner et al., 2012) (Penning-Rowsell et al., 2013) (Porst and Sakdapolrak, 2020) (Evertsen and van der Geest, 2020) (Singh, 2019) (Gioli et al., 2014) (Zander et al., 2019) (Mitra, 2018)

Table SM17.11: Equity benefits to poor/low-income groups

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category n/a, n/a confidence (n/a agreement, n/a evidence)	(Ahammad et al., 2013) (Khadim et al., 2013) (Villamizar et al., 2017) (Krishnapillai, 2018) (Esteban et al., 2017)
Coastal infrastructure	Category 1, *low confidence* (*high agreement*, *medium evidence*)	(Adnan et al., 2020) (Wiryomartono, 2020) (Borgomeo et al., 2017) (Meerow, 2017)
Strategic/planned retreat	Category 1, *high confidence* (*high agreement*, *robust evidence*)	(Maldonado, 2014) (Maldonado et al., 2013) (Dannenberg et al., 2019) (Keene, 2017) (Zander et al., 2013) (Hino et al., 2017) (Mach et al., 2019) (Siders et al., 2019) (Mortreux et al., 2018) (Gibbs, 2016) (De Longueville et al., 2020) (Hossen et al., 2019) (Salik et al., 2015) (See and Wilmsen, 2020) (Marino, 2018) (Kousky, 2014) (Haasnoot et al., 2021) (Lawrence et al., 2020)
Restoration/creation of natural areas	Category 2, *low confidence* (*low agreement*, *robust evidence*)	(Bustamante et al., 2019) (Fleischman et al., 2020) (Camps-Calvet et al., 2016) (Jones et al., 2020b) (Smith et al., 2016) (Khan et al., 2019b) (Sandholz et al., 2018) (Rahman et al., 2019) (Le et al., 2014) (Woolf et al., 2018)
Minimizing ecosystem stressors	Category 1, *low confidence* (*medium agreement*, *medium evidence*)	(Orchard et al., 2016) (Constantine et al., 2017) (Barbeaux et al., 2020) (Hall et al., 2014) (van Wilgen and Wannenburgh, 2016) (Duarte et al., 2020)

Adaptive ecosystem management	Category 2, *medium confidence* (*low agreement*, *robust evidence*)	(Woroniecki et al., 2019) (Zinia and McShane, 2018) (Jones et al., 2020a) (Klein et al., 2019) (Barkdull and Harris, 2019) (Meerow, 2019) (Mycoo, 2017) (Bedelian and Ogutu, 2017) (Buckwell et al., 2020) (Tran and Brown, 2019) (Reid, 2016) (Anguelovski et al., 2016) (Bautista et al., 2015) (Triguero-Mas et al., 2021) (Anguelovski et al., 2019a)
Retrofitting	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Tardy and Lee, 2019) (Collado and Wang, 2020) (Ahmed, 2014) (Ahmed, 2016) (Yu et al., 2016) (Mitra et al., 2017) Meerow 2017 (NA, 2013)
Regulatory building codes	Category 2, *low confidence* (*medium agreement*, *limited evidence*)	(Núñez Collado and Wang, 2020) (Hughes, 2015) (Williams and Ismail, 2015) (Buijs et al., 2016) (Ahmed et al., 2019a) (Ohunakin et al., 2014)
Spatial planning	Category 1, *medium confidence* (*medium agreement*, *medium evidence*)	(Anguelovski et al., 2019a) (Anguelovski et al., 2019b) (Anguelovski et al., 2016) (Bautista et al., 2015) (Cho et al., 2020) (Triguero-Mas et al., 2021) (Eriksen et al., 2021) (Rosenthal and Brechwald, 2013)
Insurance	Category 2, *medium confidence* (*medium agreement*, *robust evidence*)	(Akter, 2012) (Taylor, 2016b) (Penning-Rowsell et al., 2016) (Linnerooth-Bayer et al., 2019) (Alam et al., 2020a) (Bogale, 2015) (De Nicola, 2015) (Dewi et al., 2018) (Shively, 2017) (Fisher et al., 2019) (Romero and Molina, 2015) (Carter and Janzen, 2018) (Di Marcantonio and Kayitakire, 2017) (Thistlethwaite et al., 2018) (Baarsch and Kelman, 2016) (Sainsbury et al., 2019) (Schäfer et al., 2019) (Cannon et al., 2020) (Telesetsky and He, 2016) (Isakson, 2015)
Livelihood diversification	Category 2, *medium confidence* (*medium agreement*, *robust evidence*)	(Baffoe and Matsuda, 2017) (Gentle et al., 2018) (Martin and Lorenzen, 2016) (Jannat et al., 2021) (Tran et al., 2020) (Niles and Brown, 2017)

		(Alobo Loison, 2015) (Asfaw et al., 2019b) (Gautam and Andersen, 2016) (Liu and Lan, 2015) (Hallegatte et al., 2016) (Torero and Viceisza, 2015) (Martin and Lorenzen, 2016) (Nawrotzki and DeWaard, 2016) (Khatri-Chhetri et al., 2017) (Geest and Schindler, 2016) (Amamou et al., 2018) (Huynh and Resurreccion, 2014)
Social safety nets	Category 4, *medium confidence* (*high agreement*, *medium evidence*)	(Bowen et al., 2020) (Hansen et al., 2019a) (Devereux, 2016) (Mersha and van Laerhoven, 2018) (Hossain and Rahman, 2018) (Rao and Li, 2019) (Tenzing, 2020) (Porter and Goyal, 2016) (Ezeh et al., 2017)
Health prerequesites	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Keeler et al., 2019) (Beaudoin and Gosselin, 2016) (Gallardo-Albarrán, 2020) (Davies et al., 2015) (Vatovec et al., 2013) (Oven et al., 2012) (Nerkar et al., 2016) (Martinez et al., 2017)
Access to healthcare services	Category 2, *medium confidence* (*low agreement*, *medium evidence*)	(Haque et al., 2013) (Haque et al., 2014b) (Rosenthal and Brechwald, 2013) (Sheridan et al., 2011) (Codjoe et al., 2020) (Atun et al., 2015) (Basu et al., 2012) (Lilford et al., 2017) (Alonso et al., 2019) (Schmeltz et al., 2016) (McDonald et al., 2015b) (Levy and Patz, 2015) (Frenz et al., 2014)
Disaster early warning systems	Category 3, *medium confidence* (*medium agreement*, *robust evidence*)	(Baudoin et al., 2016) (Ajibade and McBean, 2014) (Linnerooth-Bayer and Hochrainer-Stigler, 2015) (Goniewicz and Burkle, 2019) (Alcántara-Ayala and Oliver-Smith, 2019) (Luther et al., 2017) (Funk et al., 2019a) (Mudombi and Nhamo, 2014) (Ebi and del Barrio, 2017) (Chinwendu et al., 2017) (Choularton and Krishnamurthy, 2019)
Farming & Fishing practices	Category 3, *high confidence* (*high agreement*, *robust evidence*)	(Khonje et al., 2015) (Ahmed and Diana, 2015) (Abid et al., 2016) (Paudel Khatiwada et al., 2017) (Shahzad et al., 2019) (Raymond-Yakoubian et al., 2017) (Asche et al., 2018) (Gebrehiwot and van der Veen, 2013) (Coulibaly et al., 2017)

		(Makate et al., 2016) (Béné et al., 2016) (Chowdhury et al., 2016) (Balaji et al., 2015) (Ackerman et al., 2014) (Makate et al., 2019)
Food storage and distribution	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Gautier et al., 2016) (Singano et al., 2020) (Adeyemi, 2010) (Lampietti et al., 2011) (Kochar, 2005)
Food related behavioural changes	Category 3, *low confidence* (*low agreement*, *limited evidence*)	(Reynolds et al., 2019a) (Porter et al., 2014) (Leichenko and Silva, 2014) (Springmann et al., 2018) (Irani et al., 2018)
Water capture/storage	Category 1, *medium confidence* (*high agreement*, *limited evidence*)	(Ndeketeya and Dundu, 2019) (Seidler et al., 2016) (Ferchichi et al., 2017) (Siciliano and Urban, 2017)
Lowering water demand	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Lee and Tansel, 2013) (Bravo-Ureta et al., 2020) (Jobbins et al., 2015)
Water supply/distribution	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Rusca et al., 2017) (Tzanakakis et al., 2020) (Perkins, 2013) (Kariuki, 2014) (Sharma et al., 2020) (Millington and Scheba, 2021) (Pandey and Bajracharya, 2017)
Seasonal/temporary mobility	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Radel et al., 2018) (Ajibade, 2019) (Young et al., 2019b) (Gautam, 2017) (Nawrotzki and DeWaard, 2018) (Call et al., 2017) (Jamil and Kumar, 2020)
Cooperative governance	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Groutsis et al., 2015) (Castles, 2014) (Bernauer et al., 2020) (Oberlack and Eisenack, 2014) (Roth et al., 2019) (Cohen et al., 2013) (Musah-Surugu et al., 2017) (Guild et al., 2019)
Permanent migration	Category 2, *medium confidence* (*low agreement*, *robust evidence*)	(Mbaye, 2017) (Gippner et al., 2012) (Birk and Rasmussen, 2014) (Cohen et al., 2013) (Singh and Basu, 2020) (Schwan and Yu, 2018) (Bordner et al., 2020) (Jacobson et al., 2019)

Table SM17.12: Transformational

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category 1, *high confidence* (*high agreement*, *medium evidence*)	(Ahammad et al., 2013) (Nandy et al., 2013) (Lin, 2019) (Mycoo, 2014)

		(Cheong et al., 2013) (Khadim et al., 2013) (Laeni et al., 2021) (Alam et al., 2015) (Jones et al., 2020a) (Morris et al., 2018) (Narayan et al., 2016) (Stewart-Sinclair et al., 2020) (Nguyen and Parnell, 2019) (Elrick-Barr et al., 2016) (Torabi et al., 2018) (Renaud et al., 2015)
Coastal infrastructure	Category 1, *medium confidence* (*high agreement*, *limited evidence*)	(Hayes et al., 2018) (Masria et al., 2015) (Wang et al., 2018a) (Tamura et al., 2019)
Strategic/planned retreat	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(McMichael et al., 2019) (Islam et al., 2014) (Sina et al., 2019) (Mortreux et al., 2018) (Navarro et al., 2021) (Hauer et al., 2019) (Buchori et al., 2018)
Restoration/creation of natural areas	Category 2, *medium confidence* (*medium agreement*, *robust evidence*)	(von Holle et al., 2020) (Fleischman et al., 2020) (Diederichs and Roberts, 2016) (Ros-Tonen et al., 2014) (Weston et al., 2015) (Sánchez and Izzo, 2016) (Rahman et al., 2019) (Sandholz et al., 2018) (Khan et al., 2019b) (Brancalion et al., 2019) (Dohong et al., 2018) (Makino et al., 2013)
Minimizing ecosystem stressors	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Parkinson and Hunt, 2020) (Barbeaux et al., 2020) (Neeson et al., 2018) (Alexander et al., 2019) (Crook et al., 2015) (Kostyack et al., 2011) (van Wilgen and Wannenburgh, 2016) (Howell et al., 2015) (Ahilan et al., 2018) (Cockerell et al., 2020) (Derolez et al., 2020) (Duarte et al., 2020) (Ovando et al., 2021) (Peteet et al., 2018) (Stevenson et al., 2020)
Adaptive ecosystem management	Category 2, *medium confidence* (*medium agreement*, *robust evidence*)	(Marijnissen et al., 2020) (Vincent et al., 2017) (McVittie et al., 2018) (Vogl et al., 2017) (Mycoo, 2017) (Erftemeijer et al., 2020) (Depietri and McPhearson, 2017) (Alexandra, 2017) (Lavorel et al., 2019) (Ovando et al., 2021) (Stevenson et al., 2020)

Retrofitting	Category 2, *medium confidence* (*low agreement*, *robust evidence*)	(Watrin et al., 2019) (ShengYue et al., 2014) (Guo and Hendel, 2018) (Parrott et al., 2020) (Xu et al., 2012) (Seltenrich, 2018) (Collado and Wang, 2020) (Ahmed, 2014) (Ahmed, 2016) (Yu et al., 2016) (Mitra et al., 2017)
Regulatory building codes	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Leal Filho et al., 2019) (Chandel et al., 2016) (Eisenberg, 2016) (Garsaball and Markov, 2017) (Shapiro, 2016) (Seltenrich, 2018)
Spatial planning	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Matthews et al., 2015) (Ziter et al., 2019) (Di Leo et al., 2016) (Yiannakou and Salata, 2017) (Emmanuel and Loconsole, 2015) (Lin et al., 2016)
Insurance	Category 1, *medium confidence* (*medium agreement*, *robust evidence*)	(Singh, 2020) (Janzen et al., 2016) (Schäfer et al., 2019) (Linnerooth-Bayer et al., 2019) (O'Hare et al., 2016) (Crawford et al., 2018) (Amare et al., 2019) (Surminski and Thieken, 2017) (Banhalmi-Zakar et al., 2016) (Amamou et al., 2018) (Lucas and Booth, 2020) (Sainsbury et al., 2019) (Climate Change Adaptation Technical Working Group, 2017)
Livelihood diversification	Category 2, Low confidence (Low agreement, *robust evidence*)	(Gentle et al., 2018) (Steenbergen et al., 2017) (Galappaththi et al., 2017) (Ferdous et al., 2019) (Baird and Hartter, 2017) (Zheng et al., 2018) (Sesmero et al., 2018) (Amamou et al., 2018) (Limuwa et al., 2018) (Ojea et al., 2020) (Lasso and Dahles, 2018) (Lowe et al., 2019) (Agyeman, 2019) (Mutabazi et al., 2015) (Bailey and Buck, 2016) (Ghahramani et al., 2015)
Social safety nets	Category 2, *medium confidence* (*low agreement*, *robust evidence*)	(Tirado et al., 2013) (Davies et al., 2013) (Coirolo et al., 2013) (Lemos et al., 2016) (Godfrey-Wood and Flower, 2018) (Haug and Kg Wold, 2017) (FAO and RCRCCC, 2019) (Devereux, 2016) (Tenzing, 2020) (Haque et al., 2014a)

		(Weldegebriel and Prowse, 2013) (World Bank, 2015) (Acosta et al., 2018)
Health prerequesites	Category 2, *high confidence* (*high agreement*, *medium evidence*)	(Zens et al., 2020) (Seltenrich, 2018) (Mayhew et al., 2014) (Hanefeld et al., 2018) (Nuzzo et al., 2019) (Prior et al., 2018) (Whitmee et al., 2015)
Access to healthcare services	Category 3, *medium confidence* (*medium agreement*, *limited evidence*)	(Sheehan et al., 2017) (Siekmans et al., 2017) (Atun et al., 2015)
Disaster early warning systems	Category 1, *high confidence* (*high agreement*, *medium evidence*)	(Magee et al., 2016) (Alcántara-Ayala and Oliver-Smith, 2019) (Bauer et al., 2015) (Hussain-Alkhateeb et al., 2018)
Farming & Fishing practices	Category 2, *medium confidence* (*low agreement*, *robust evidence*)	(Ghahramani and Bowran, 2018) (Mayanja et al., 2020) (Marshall et al., 2014) (Uddin et al., 2014) (Hadarits et al., 2017) (Osbahr et al., 2008) (Wezel et al., 2020) (Nyantakyi-Frimpong, 2017) (Mutenje et al., 2019) (Biemans et al., 2019) (Hove and Gweme, 2018) (Ghahramani et al., 2015)
Food storage and distribution	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Preka et al., 2020) (Gautier et al., 2016) (Mulwa and Visser, 2020) (Lwasa et al., 2014) (Fleming et al., 2014) (Tolentino-Arévalo et al., 2019) (Free et al., 2020) (Swinburn et al., 2019)
Food related behavioural changes	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Derqui et al., 2020) (Preka et al., 2020) (Song et al., 2017) (Pourias et al., 2016) (Springmann et al., 2016b) (Reynolds et al., 2019b) (Willett et al., 2019) (Swinburn et al., 2019) (Irani et al., 2018)
Water capture/storage	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Ndeketeya and Dundu, 2019) (Ali et al., 2020b) (Zhang et al., 2018) (Johns, 2019) (Devine and Anthony Toby, 2019) (Page et al., 2018) (Di Matteo et al., 2019) (Jacob et al., 2019) (Marchetti et al., 2019) (Humphrey et al., 2018) (Wu et al., 2019)
Lowering water demand	Category 1, *high confidence* (*high agreement*, *robust evidence*)	(Koech and Langat, 2018) (Kitta et al., 2015) (Barnes et al., 2020b) (Hatfield and Dold, 2019) (Bravo-Ureta et al., 2020)

		(Lavee et al., 2013) (Zhang et al., 2017)
Water supply/distribution	Category 2, *medium confidence* (*high agreement*, *medium evidence*)	(Li et al., 2020) (Zhao et al., 2017) (Lafforgue and Lenouvel, 2015) (Brouwer et al., 2013) (Everard et al., 2020) (Alvarez-Garreton et al., 2019) (Nilsson et al., 2013) (Rasul and Sharma, 2016)
Seasonal/temporary mobility	Category 2, *medium confidence* (*medium agreement*, *medium evidence*)	(Radel et al., 2018) (Gioli et al., 2014) (Gautam, 2017) (Voigt-Graf and Kagan, 2017) (Milan and Ho, 2014)
Cooperative governance	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Kreft, 2017) (Lavenex et al., 2016) (Rother, 2019) (Leck and Simon, 2018) (Bordner et al., 2020) (Thornton et al., 2018) (Timmerman et al., 2017) (Sultana et al., 2019) (Levin et al., 2018) (Crépeau and Atak, 2016)
Permanent migration	Category 4, *high confidence* (*high agreement*, *medium evidence*)	(Gippner et al., 2012) (Islam et al., 2014) (Birk and Rasmussen, 2014) (Argent et al., 2014) (Fenton et al., 2017) (Weber, 2017) (Warn and Adamo, 2014)

Table SM17.13: GHG emissions

Adaptation option	Assessment (confidence level)	Literature
Accommodate	Category n/a, n/a confidence (n/a agreement, n/a evidence)	(Narayan et al., 2020) (Wamsler et al., 2014) (Ahmed and Glaser, 2016) (Macreadie et al., 2017) (Davis et al., 2015) (Cheong et al., 2013) (Munang et al., 2013) (Jones et al., 2020a) (Duarte et al., 2013) (Sasmito et al., 2020) (Macreadie et al., 2019) (Elrick-Barr et al., 2016)
Coastal infrastructure	Category 1, *very low confidence* (*low agreement*, *limited evidence*)	(Broekens et al., 2012) (Gulliver et al., 2020) (Yuan et al., 2020) (Davis et al., 2015)
Strategic/planned retreat	Category 3, *low confidence* (*medium agreement*, *limited evidence*)	(MacDonald et al., 2020) (Wollenberg et al., 2018)
Restoration/creation of natural areas	Category 4, *high confidence* (*high agreement*, *robust evidence*)	(Collas et al., 2017) (Fleischman et al., 2020) (Kim et al., 2019b) (Mackey et al., 2020) (Nunez et al., 2020) (Lin and Ge, 2020)

		(Nunes et al., 2020) (Wang et al., 2018b) (Ros-Tonen et al., 2014) (Chandra et al., 2017b) (Sánchez and Izzo, 2016) (Sandholz et al., 2018) (Santos et al., 2018) (Sapkota et al., 2015) (Swamy and Tewari, 2017) (Taillardat et al., 2020) (Woolf et al., 2018)
Minimizing ecosystem stressors	Category 4, *low confidence* (*high agreement*, *limited evidence*)	(Parkinson and Hunt, 2020) (Coutts and Hahn, 2015) (Duarte et al., 2020)
Adaptive ecosystem management	Category 3, *high confidence* (*high agreement*, *medium evidence*)	(Jones et al., 2020a) (Schmitt and Albers, 2014) (McVittie et al., 2018) (Zhou et al., 2018) (Chausson et al., 2020) (Taillardat et al., 2020)
Retrofitting	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Ríos-Fernández, 2020) (Guo and Hendel, 2018) (Xu et al., 2012) (Akbari and Matthews, 2012) (Taleb, 2014) (Alves et al., 2019) (De la Sota et al., 2019) (Ruparathna et al., 2016) (Wells et al., 2018) (Nolon, 2016) (Viguié et al., 2020) (Kouis et al., 2021)
Regulatory building codes	Category 3, *low confidence* (*low agreement*, *medium evidence*)	(Zhang et al., 2019) (Perrotti and Stremke, 2020) (Shapiro, 2016) (Weiner, 2017) (Chuang and Ma, 2013)
Spatial planning	Category 2, *low confidence* (*low agreement*, *limited evidence*)	(Sodiq et al., 2019) (Di Leo et al., 2016) (Song et al., 2018a)
Insurance	Category na, na confidence (na agreement, na evidence)	-
Livelihood diversification	Category N/A, N/A confidence (x agreement, x evidence)	(Sain et al., 2017)
Social safety nets	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Health prerequesites	Category 1, *high confidence* (*high agreement*, *medium evidence*)	(Eckelman and Sherman, 2016) (Pollard et al., 2014) (Sherman et al., 2012) (Eckelman et al., 2018) (MacNeill et al., 2017) (Salas and Jha, 2019)
Access to healthcare services	Category 1, *low confidence* (*high agreement*, *limited evidence*)	(Charlesworth and Jamieson, 2018) (Eckelman and Sherman, 2016)
Disaster early warning systems	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Farming & Fishing practices	Category 3, *medium confidence* (*low agreement*, *robust evidence*)	(Sapkota et al., 2015) (Wilkes et al., 2017) (Shikuku et al., 2017) (Woolf et al., 2018)

		(Kashyap and Agarwal, 2020) (Usman, 2017) (Smith, 2016) (Chang et al., 2011) (Nadège et al., 2019) (Zomer et al., 2016)
Food storage and distribution	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Lwasa et al., 2014) (Smith et al., 2020) (Fabbri et al., 2018) (Willett et al., 2019) (Swinburn et al., 2019)
Food related behavioural changes	Category 3, *medium confidence* (*medium agreement*, *medium evidence*)	(Wang et al., 2020) (He et al., 2019) (Reynolds et al., 2019a) (Ratnasiri and Bandara, 2017) (van de Ven et al., 2018) (Van de Kamp et al., 2018) (González-García et al., 2018) (Song et al., 2017) (Springmann et al., 2016b)
Water capture/storage	Category 3, *low confidence* (*low agreement*, *limited evidence*)	(Paton et al., 2014) (Berga, 2016) (Lucena et al., 2018)
Lowering water demand	Category 2, *low confidence* (*low agreement*, *medium evidence*)	(Koech and Langat, 2018) (Stanghellini, 2013) (Xiong et al., 2020) (Barnes et al., 2020b) (Massa et al., 2020) (Hendrickson and Horvath, 2014) (Sapkota et al., 2015)
Water supply/distribution	Category 3, *low confidence* (*low agreement*, *limited evidence*)	(Kaye and Quemada, 2017) (Rath and Morgan, 2020) (Paton et al., 2014) (Shrestha et al., 2012) (Alvarez-Garreton et al., 2019)
Seasonal/temporary mobility	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-
Cooperative governance	Category 3, *low confidence* (*medium agreement*, *limited evidence*)	(Unger et al., 2020) (Keohane and Victor, 2016)
Permanent migration	Category n/a, n/a confidence (n/a agreement, n/a evidence)	-

Table SM17.14: Overview table of the assessment of adaptation options per criteria mentioned above, supporting 17.2 and 17.5.1.2

	Formal decisions	Public Governance	Private Governance	Community Governance	How widely applicable is this adaptation option? How many humans could benefit from it?	Extent of benefit to ecosystem services	Equity benefits: ethnic groups	Equity benefits: gender	Equity benefits: low-income	Transformational potential	Contribution to GHG emissions
Risk to coastal socio-ecological systems											
Coastal accomodation											
Final judgement	3	3	2	3	2	2	n/a	2	n/a	1	n/a
Confidence level	*high*	*very high*	*high*	*medium*	*medium*	*Low*	na	*medium*	n/a	*high*	n/a
Agreement	*high*	*high*	*high*	*medium*	*medium*	*High*	na	*high*	n/a	*high*	n/a
Evidence	*medium*	*robust*	*medium*	*medium*	*medium*	*Limited*	na	*limited*	n/a	*medium*	n/a
Coastal infrastructure											
Final judgement	4	3	3	2	2	1	n/a	1	1	1	1
Confidence level	*high*	*high*	*medium*	*medium*	*high*	*medium*	na	*medium*	*low*	*medium*	*very low*
Agreement	*high*	*high*	*high*	*high*	*high*	*low*	na	*medium*	*high*	*high*	*low*
Evidence	*medium*	*robust*	*medium*	*medium*	*robust*	*robust*	*limited*	*limited*	*medium*	*limited*	*limited*
Strategic coastal retreat											
Final judgement	2	3	2	3	2	3	1	2	1	3	3
Confidence level	*High*	*Very high*	*Medium*	*Medium*	*High*	*Medium*	*high*	*medium*	*High*	*high*	*low*
Agreement	*Medium*	*High*	*High*	*Medium*	*high*	*Medium*	*High*	*medium*	*High*	*high*	*medium*
Evidence	*Robust*	*Robust*	*limited*	*Robust*	*robust*	*Medium*	*medium*	*medium*	*Robust*	*Medium*	*Limited*
Risk to terrestrial and ocean ecosystems											
Nature restoration											
Final judgement	4	3	2	3	4	4	2	n/a	2	2	4
Confidence level	*high*	*high*	*low*	*high*	*high*	*high*	*low*	n/a	*low*	*medium*	*high*

Agreement	*high*	*high*	*medium*	*medium*	*high*	*medium*	*low*	n/a	*low*	*medium*	*high*
Evidence	*robust*	*robust*	*limited*	*robust*	*robust*	*robust*	*medium*	n/a	*robust*	*robust*	*robust*
Minimizing ecosystem stressors											
Final judgement	3	2	3	2	3	4	n/a	n/a	1	2	4
Confidence level	*low*	*low*	*low*	*low*	*low*	*high*	n/a	n/a	*low*	*low*	*low*
Agreement	*medium*	*low*	*low*	*low*	*high*	*medium*	n/a	n/a	*medium*	*low*	*high*
Evidence	*limited*	*limited*	*limited*	*limited*	*limited*	*robust*	n/a	n/a	*medium*	*medium*	*limited*
Ecosystem-based adaptation											
Final judgement	3	2	2	3	2	4	n/a	2	2	2	3
Confidence level	*medium*	*medium*	*medium*	*medium*	*high*	*high*	n/a	*low*	*medium*	*medium*	*high*
Agreement	*medium*	*medium*	*medium*	*medium*	*high*	*high*	n/a	*low*	*low*	*medium*	*high*
Evidence	*medium*	*medium*	*medium*	*medium*	*robust*	*robust*	n/a	*medium*	*robust*	*robust*	*medium*
Risks associated with critical physical infrastructure, networks, and services											
Infrastructure retrofitting											
Final judgement	4	2	3	3	4	3	2	2	2	2	2
Confidence level	*high*	*medium*	*high*	*high*	*high*	*medium*	*very low*	*medium*	*medium*	*medium*	*low*
Agreement	*high*	*medium*	*medium*	*high*	*high*	*medium*	*low*	*medium*	*medium*	*low*	*low*
Evidence	*robust*	*robust*	*robust*	*robust*	*medium*	*medium*	*limited*	*medium*	*medium*	*robust*	*medium*
Building codes											
Final judgement	4	4	2	2	4	3	3	2	2	2	3
Confidence level	*high*	*high*	*low*	*medium*	*high*	*low*	*low*	*low*	*low*	*high*	*low*
Agreement	*high*	*high*	*low*	*medium*	*high*	*low*	*high*	*medium*	*medium*	*high*	*low*
Evidence	*robust*	*robust*	*medium*	*medium*	*robust*	*limited*	*limited*	*limited*	*limited*	*medium*	*medium*
Spatial planning											
Final judgement	4	4	2	2	4	2	1	2	1	3	2
Confidence level	*high*	*high*	*low*	*high*	*medium*	*low*	*medium*	*medium*	*medium*	*medium*	*low*

Agreement	*high*	*high*	*high*	*high*	*high*	*low*	*high*	*low*	*medium*	*medium*	*low*
Evidence	*medium*	*robust*	*limited*	*limited*	*medium*	*medium*	*medium*	*medium*	*medium*	*medium*	*limited*
Risk to living standards and equity											
Insurance											
Final judgement	4	2	4	2	3	1	1	2	2	1	na
Confidence level	*High*	*High*	*High*	*High*	*high*	*low*	*low*	*low*	*medium*	*medium*	na
Agreement	*High*	*High*	*Large*	*HIgh*	*high*	*high*	*high*	*high*	*medium*	*medium*	na
Evidence	*Robust*	*Robust*	*Robust*	*medium*	*robust*	*limited*	*limited*	*limited*	*robust*	*robust*	na
Diversification of livelihoods											
Final judgement	2	2	3	3	3	3	n/a	2	2	2	N/A
Confidence level	*Medium*	*high*	*Medium*	*high*	*medium*	*Low*	n/a	*low*	*medium*	*Low*	N/A
Agreement	*Medium*	*medium*	*high*	*high*	*medium*	*Low*	n/a	*low*	*medium*	*Low*	x
Evidence	*Robust*	*robust*	*Medium*	*robust*	*robust*	*Limited*	n/a	*medium*	*robust*	*robust*	x
Social safety nets											
Final judgement	4	4	1	2	3	2	3	3	4	2	n/a
Confidence level	*high*	*high*	*medium*	*medium*	*medium*	*very low*	*low*	*medium*	*medium*	*medium*	n/a
Agreement	*high*	*high*	*high*	*high*	*medium*	*low*	*high*	*medium*	*high*	*low*	n/a
Evidence	*robust*	*robust*	*medium*	*Limited*	*medium*	*limited*	*limited*	*medium*	*medium*	*robust*	n/a
Risk to human health											
Availability of health infrastructure											
Final judgement	3	3	2	3	4	2	2	3	3	2	1
Confidence level	*medium*	*medium*	*high*	*medium*	*high*	*low*	*low*	*low*	*medium*	*high*	high
Agreement	*medium*	*medium*	*high*	*medium*	*high*	*low*	*high*	*high*	*medium*	*high*	high
Evidence	*medium*	*robust*	*medium*	*medium*	*robust*	*medium*	*limited*	*limited*	*medium*	*medium*	medium
Access to health care											
Final judgement	3	3	3	2	4	2	2	3	2	3	1
Confidence level	*medium*	*high*	*high*	*high*	*high*	*very low*	*medium*	*low*	*medium*	*medium*	low
Agreement	*medium*	*medium*	*high*	*high*	*high*	n/a	*high*	*high*	*low*	*medium*	high
Evidence	*medium*	*robust*	*medium*	*medium*	*medium*	n/a	*limited*	*limited*	*medium*	*limited*	limited

Disaster early warning											
Final judgement	4	3	3	2	4	3	n/a	1	3	1	n/a
Confidence level	*high*	*high*	*medium*	*medium*	*high*	*medium*	n/a	*medium*	*medium*	*high*	n/a
Agreement	*high*	*high*	*high*	*medium*	*high*	*medium*	n/a	*high*	*medium*	*high*	n/a
Evidence	*medium*	*medium*	*limited*	*robust*	*robust*	*limited*	n/a	*medium*	*Robust*	*medium*	n/a
Risk to food security											
Farm/fishery practice											
Final judgement	2	2	2	3	3	3	3	3	3	2	3
Confidence level	*high*	*high*	*high*	*high*	*high*	*high*	*low*	*medium*	*high*	*medium*	*medium*
Agreement	*medium*	*high*	*medium*	*high*	*high*	*medium*	*low*	*medium*	*high*	*low*	*low*
Evidence	*robust*	*medium*	*robust*	*medium*	*robust*	*robust*	*medium*	*medium*	*robust*	*robust*	*robust*
Food storage/distribution											
Final judgement	3	3	3	2	2	2	4	3	2	2	3
Confidence level	*low*	*High*	*medium*	*low*	*medium*	*low*	*low*	*low*	*medium*	*medium*	*medium*
Agreement	*medium*	*medium*	*medium*	*low*	*High*	*low*	*high*	*low*	*medium*	*medium*	*medium*
Evidence	*limited*	*robust*	*medium*	*limited*	*medium*	*limited*	*limited*	*limited*	*medium*	*medium*	*medium*
Diets/food waste											
Final judgement	1	2	3	3	4	4	n/a	3	3	3	3
Confidence level	*high*	*medium*	*low*	*low*	*high*	*medium*	n/a	*medium*	*low*	*medium*	*medium*
Agreement	*high*	*medium*	n/a	*high*	*high*	*high*	n/a	*medium*	*low*	*medium*	*medium*
Evidence	*medium*	*medium*	*limited*	*limited*	*robust*	*medium/limited*	n/a	*limited*	*limited*	*medium*	*medium*
Risk to water security											
Water capture/storage											
Final judgement	3	3	2	2	3	2	1	1	1	3	3
Confidence level	*low*	*medium*	*low*	*low*	*low*	*medium*	*medium*	*medium*	*medium*	*medium*	*low*
Agreement	*low*	*medium*	*low*	*medium*	*medium*	*medium*	*high*	*high*	*high*	*medium*	*low*
Evidence	*limited*	*limited*	*limited*	*limited*	*medium*	*medium*	*medium*	*medium*	*limited*	*medium*	*limited*
Water use/demand											
Final judgement	3	3	2	3	2	3	n/a	2	2	1	2

Confidence level	*high*	*high*	*low*	*high*	*low*	*medium*	n/a	*medium*	*low*	*high*	*low*
Agreement	*high*	*high*	*low*	*high*	*high*	*high*	n/a	*medium*	*low*	*high*	*low*
Evidence	*robust*	*robust*	*limited*	*medium*	*limited*	*medium*	n/a	*limited*	*limited*	*robust*	*medium*
Water supply/distribution											
Final judgement	4	3	2	2	2	2	3	2	2	2	3
Confidence level	*high*	*medium*	*medium*	*medium*	*low*	*low*	*low*	*low*	*low*	*medium*	*low*
Agreement	*high*	*medium*	*medium*	*medium*	*high*	*low*	*medium*	*low*	*low*	*high*	*low*
Evidence	*robust*	*medium*	*medium*	*medium*	*limited*	*limited*	*limited*	*limited*	*medium*	*medium*	*limited*
Risk to peace and migration											
Seasonal/temporary mobility											
Final judgement	1	2	3	3	2	3	2	2	2	2	n/a
Confidence level	*high*	*medium*	*low*	*Medium*	*high*	*very low*	*low*	*medium*	*high*	*medium*	n/a
Agreement	*high*	*high*	*moderate*	*medium*	*high*	*high*	*low*	*medium*	*hight*	*medium*	n/a
Evidence	*medium*	*limited*	*limited*	*medium*	*medium*	*limited*	*limited*	*medium*	*medium*	*medium*	n/a
Governance cooperation											
Final judgement	4	4	2	2	4	3	2	2	2	3	3
Confidence level	*very high*	*high*	*medium*	*medium*	*low*	*medium*	*high*	*low*	*low*	*medium*	*low*
Agreement	*high*	*medium*	*high*	*low*	*low*	*medium*	*high*	*low*	*low*	*medium*	*medium*
Evidence	*robust*	*robust*	*medium*	*medium*	*medium*	*medium*	*medium*	*limited*	*medium*	*medium*	*limited*
Permanent migration											
Final judgement	3	3	2	3	2	3	2	2	2	4	n/a
Confidence level	*medium*	*High*	*medium*	*high*	*high*	*medium*	*low*	*medium*	*medium*	*high*	n/a
Agreement	*low*	*Medium*	*medium*	*high*	*high*	*medium*	*low*	*low*	*low*	*high*	n/a
Evidence	*robust*	*Robust*	*Medium*	*medium*	*robust*	*limited*	*limited*	*robust*	*robust*	*medium*	n/a

SM17.2 Support for Case Studies in Table 17.6 and Figure 17.7

Case studies were found by seeking review articles or chapters in books that compared the utility of a method or compared different classes of methods for informing decisions on climate adaptations; articles or chapters (hereafter termed papers) were relevant if they provided descriptions and critiques of the methods. In the first instance, Google Scholar was used to search for review articles with specific search terms, including "review", "climate adaptation" revised to be only "climate", and [name of tool], where [name of the tool] included terms for the classes of tools - Bayesian methods, Interval methods, decision making under deep uncertainty (DMDU), cost-benefit analyses and economic analyses, multicriteria decision analysis, elicitation, and general decision support tools. The paucity of articles and chapters being found meant that targeted searches were undertaken by closer inspection of journals appearing in the initial search, along with targeted scanning of decision-analysis journals. Even with targeted and informed searching, few articles addressing this aim were found. A total of 124 papers had titles and abstracts suitable for further consideration. Many of these related to achieving net zero emissions and so were excluded because of the focus on climate adaptation. Closer inspection of these papers showed 38 articles were suitable.

SM17.3 Tracking of developed country contributions to the 100 Billion developing country climate finance Copenhagen Accord pledge, subsequently agreed at Cancun.

SM17.3.1 Sources of Information

Different groups and organizations provide regular or occasional reports on climate finance. These either track total finance across all available sources, intermediaries and instruments, or can be focused specifically on the contribution of developed countries towards climate finance in developing countries. Four sources are used to estimate the progress on developed country contributions from 2011 to 2020 (see Table SM17.15). Estimates produces by different organizations vary according to the sources of information, what is classified as climate finance, as well as the purpose of the analysis or reporting. Of note is the CPI, while providing the most comprehensive tracking across public and private finance, does not specifically analyze their data to arrive at a regular estimate of the developed country "100 billion" contribution; however, the 2019 report does provide such an estimate. In contrast the OECD report is specifically targeted at tracking developed country contributions, and therefore provides annual estimates.

Table SM17.15: Sources used for analysis of the trends and ranges of estimates of developed country contributions of climate finance to developing countries.

Source / Citations	What is Tracked	Data sources
OECD (2020) Climate Finance Provided and Mobilised by Developed Countries Reports	Public and private finance from OECD countries to non-Annex I countries.	Bilateral public finance, as reported in developed countries' Biennial Reports (BRs) to the UNFCCC. Multilateral public climate finance attributable to developed countries, derived from activity-level multilateral outflows recorded in the OECD DAC statistics on development finance along with developed countries' BRs to the UNFCCC. Officially supported climate-related export credits, sourced from activity-level export credit transactions recorded in the OECD Export Credit Group database. Finance from private sources mobilised by bilateral and multilateral public finance interventions, primarily sourced from the OECD DAC statistics on development finance.
CPI (2019) CPI (2020) Global Climate Finance Landscape Reports	All available public and private finance from multiple sources, which is then categorized according to, among others, source, instrument, purpose (mitigation, adaptation, multi-purpose), destination	As for OECD, but with additional sources including: Bloomberg New Energy Finance Climate Bonds Initiative International Energy Association Climate Funds Update via ODI/HBF Direct surveys of 36 Development Finance Institutions

	country (or region) and destination sector.	
Carty et al. (2020) Carty and le Comte (2018) Oxfam Shadow Climate Finance Reports	Public finance from Annex-1 countries for climate change in non-Annex 1 countries.	Annex 1 country Biennial Reports (BRs) to the UNFCCC
UNFCCC (2020) Compilation and synthesis of fourth biennial reports of Annex-1 Parties	Public and private finance from Annex-1 countries	Annex 1 country Biennial Reports (BRs) to the UNFCCC

SM17.3.2 Analysis Undertaken for the Cross-Chapter Box Finance in Chapter 17

Developed country climate finance contributions to developing countries were extracted from all the sources listed in Table SM17.15, for years where such figures were reported. Where available, the proportions of the total finance that public and private was also extracted, and likewise the allocation to adaptation, mitigation, and cross-cutting (mitigation and adaptation together). From these data, an upper and lower estimate for total finance, and the proportion allocated to adaptation were estimated. The proportion allocated to adaptation depended strongly on assumptions regarding cross-cutting finance; following the approach of Carty et al. (2020), two estimates for proportion allocated to adaptation in cross-cutting finance were calculated: a low estimate which assumed no adaptation finance, and a high estimate, assuming 50% of cross-cutting finance was for adaptation. The summary figures reported in Cross-Chapter Box FINANCE in Chapter 17 are shown in Table SM17.16, while the underlying data to arrive at these estimates are shown in Tables SM17.17 and Tables SM17.18.

Table SM17.16: Summary of ranges of total finance and proportion allocated towards adaptation, derived from calculating the maximum and minimum of reported totals available for each year from the sources listed in Table SM17.15. Note that not all sources reported totals for each year or each biennial cycle.

Summary	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2013/14**	**2015/16**	**2017/18**
Max % Adaptation		25.0	24.0	25.0	21.0	27.5	32.4	24.5	24.9	30.0
Min % Adaptation		17.4	15.9	14.6	13.5	18.7	21.3	16.5	14.0	19.1
Max Total USD	62.0	52.4	56.0	74.9	75.6	71.1	78.9	52.4	74.9	75.0
Min Total USD	39.0	38.0	43.5	42.1	46.9	42.0	54.0	40.8	44.5	48.0

Table SM17.17: Proportion (in percent) of total climate finance allocated to adaptation, according to different sources. High estimates assume that 50% of cross-cutting finance is allocated to adaptation, while low estimates assume that no cross-cutting finance is allocated to adaptation. While unable to validate, it is likely that the proportion of cross-cutting finance tracks quite closely the proportion of adaptation and mitigation specific finance (15-20%). Cells with "ND" indicate that the information, while potentially available was not extracted, while cells with "NA" indicate information was not available.

Source	**Type**	**% Adaptation**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2011/12**	**2013/14**	**2015/16**	**2017/18**
OECD	Public + Private	High	20.7	19.8	18.6	17.6	22.6	25.8	NA	20.2	18.1	24.3
OECD	Public + Private	Low	17.4	15.9	14.6	13.5	18.7	21.3	NA	16.5	14.0	20.1
Oxfam	Unclear	High	25.0	24.0	25.0	21.0	27.5	32.4	NA	24.5	23.0	30.0
Oxfam	Unclear	Low	21.0	18.5	19.0	21.0	24.8	26.5	NA	19.8	20.0	25.7
UNFCCC BRs	Climate Specific, Public Only	High	NA	NA	NA	NA	NA	NA	NA	ND	24.9	27.5
UNFCCC BRs	Climate Specific, Public Only	Low	NA	NA	NA	NA	NA	NA	NA	ND	14.1	19.1

Table SM17.18: Raw data on different aspects of climate finance extracted from the sources listed in Table SM17.15. Cells with "ND" indicate that the information, while potentially available was not extracted, while cells with "NA" indicate information was not available. All values in USD.

Source	Type	Action Type	2012	2013	2014	2015	2016	2017	2018	2011/12	2013/14	2015/16	2017/18
OECD	Public + Private	Adaptation	NA	9.1	9.8	10.0	10.1	13.3	16.8		9.5	10.0	15.1
	Public & Private	Mitigation	NA	39.8	47.1	52.9	58.6	52.3	55.0		43.5	55.7	53.7
	Public & Private	Cross Cutting	NA	3.5	4.9	5.6	6.2	5.5	7.1		4.2	5.9	6.3
	Public & Private	Total	NA	52.4	)	74.9	74.9	71.1	78.9		52.4	74.9	75.0
	Public Only	Total	NA	38.0	43.5	42.1	46.9	54.5	62.3		40.8	44.5	58.4
CPI		Adaptation	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Mitigation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Cross Cutting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Public & Private	Total	39-62	ND	ND	ND	ND	42.0	54.0	ND	ND	ND	72.0
	Public Only	Total	35-49	ND	ND	ND	ND	ND	ND	ND	41.0	48.0	48.0
UNFCCC BRs		Adaptation	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0	6.9
	Climate Specific, Public Only	Mitigation	ND	ND	ND	ND	ND	ND	ND	ND	ND	22.7	23.1
	Climate Specific, Public Only	Cross Cutting	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.6	6.1
	Climate Specific, Public Only	Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	35.3	36.2
	Climate & Core, Public Only	Total	ND	ND	ND	ND	ND	ND	ND	28.9	41.9	47.4	48.7
Oxfam	Unclear	Adaptation	NA	7.6	7.9	8.1	9.6	13.7	16.8	NA	7.8	8.9	15.3
	Unclear	Mitigation	NA	34.5	42.5	39.7	59.7	47.5	49.1	NA	38.5	49.7	48.3
	Unclear	Cross Cutting	NA	3.9	5.5	5.1	6.3	4.3	6.7	NA	4.7	5.7	5.5
	Unclear	Total	NA	46.0	56.0	52.9	75.6	65.5	72.6	NA	51.0	64.3	69.0

SM17.4 Cross-chapter evidence on incremental and transformational adaptation for managing risk in the context of adaptation limits for RKRs B and RKR-E

17.2.2.5 presents cross-chapter evidence on incremental and transformational adaptation for managing risk in the context of adaptation limits for RKRs B and RKR-E. Figure 17.5 presents the evidence for RKR-E.

Table SM17.19: Evidence from across regional and thematic chapters on the spectrum of incremental to transformational adaptation for managing climate related heat risk to health including associated soft and hard adaptation limits (RKR-E).

Chapter	Observed losses and damages/ current risk	Projected losses and damages/future risk	Adaptation		Adaptation limits	
			Incremental (change within system)	Transformational (significant change)	Soft	Hard
Chapter 7 health-global	Heat is a significant health risk due to widespread urbanization, demographic changes, and an increase in hot weather (*high confidence*) (7.3.1).	More frequent hot days and intense heat waves will increase heat-related deaths in Asia (*high confidence*) (10.4.7).	A multi-sectoral integrated approach is beneficial for responding to extreme heat risks (*high confidence*) includes heat action plans that incorporate early warning and response systems for urban and non-urban settings; tried, tested, and iteratively updated response strategies targeting both the general population and vulnerable groups such as the elderly or outside workers; and effective stakeholder communication plans (7.2.4.1).	These short-term responses can be complemented by longer term urban planning and design, including nature-based solutions that mitigate urban heat island effects (*high confidence*). For outdoor workers, improved basic protection (including shade, planned rest breaks), heat-appropriate personal protective equipment, work scheduling for cooler times of the day, heat acclimation, improved aerobic fitness, access to cold drinking water and on-site cooling facilities and mechanisation of work are solutions recommended for managing exposure to heat (7.4.2.1.2).	Some regions are already experiencing heat stress conditions approaching the upper limits of labour productivity and human survivability (*high confidence*). These include the Persian Gulf and adjacent land areas, parts of the Indus River Valley, eastern coastal India, Pakistan, north-western India, the shores of the Red Sea, the Gulf of California, the southern Gulf of Mexico, and coastal Venezuela and Guyana (7.2.4.1).	
Chapter 10 Asia	The short-term effects of high temperatures on daily mortality and morbidity have been reported in several cities throughout Asia (10.4.7.1).	More frequent hot days and intense heat waves will increase heat-related deaths in Asia (*high confidence*) (10.4.7).	Some cities are also reporting adaptation to heat risk. For example, Ahmedabad (India) has pioneered preparedness for extreme temperatures and heat waves by developing annual Heat Action Plans, building regulations to minimise trapping heat, advisories about managing heat stress, and instituting cool roofs policy (10.4.6.4.5).	Illustrative examples of EbA in Asian cities include sponge cities in China for sustainable water management, flood mitigation, and minimising heat waves impact (10.4.6.4.3).	The wet-bulb globe temperature as a measure of heat stress, is likely to approach critical health thresholds in West and South Asia under the RCP4.5 scenario, and in some other regions such as East Asia under the RCP8.5 scenario (*high confidence*) (10.4.4.4; WGI AR6 Chapters 4 and 11).	By end century, under higher projections (RCP 8.5) daily maximum wet-bulb temperature is expected to exceed survivability threshold

						across most of South Asia (no conf statement) (10.4.6.3.2).
Chapter 13 Europe	70'000 deaths and 54'000 deaths during the 2003 and 2010 heatwaves, heat related death attributable to climate change > 6 per 100'000 inhabitants (period 1991-2018) adaptation actions have reduced heat-related mortality in parts of Southern Europe (*high confidence*) (13.7.3; 13.6).	Risk of heat stress, mortality and morbidity to people will more than triple with 3°C GWL compared to 1.5°C GWL-90'000 vs. 30'000 deaths in 2100 (*high confidence*). The risk will become severe more rapidly in southern and western central Europe and urban areas (*high confidence*) (13.7.2; 13.10.2.1).	Air cooling, building interventions. Observed adaptation actions are largely incremental with only few examples of transformative action; continues to be a gap between planning and implementation of adaptation action (*high confidence*) (13.11.3).	Increasing use of and plans for Nature-based Solutions (NbS) to address urban heating. At 3°C GWL large scale system transformations in Southern Europe are needed due to adaptation limits (*medium confidence*). Implementing actions that enhance behavioural change combined with a large portfolio of options that include building interventions, space cooling and urban planning can be effective in managing extreme heat risks under high warming scenarios (13.6.2.1; 13.6.2.2; 13.7.2; 13.10.2.1).	Above 3°C GWL, there are limits to the adaptation potential of people and existing health systems, particularly in SEU and EEU and where health systems are under pressure (*high confidence*) (13.6.2.3; 13.7.2; 13.7.4; 13.10.2.1; 13.8).	
Chapter 14 North America	Climate change has impacted human health and wellbeing in North America (*very high confidence*). High	Health risks are projected to increase this century under all future emissions scenarios (*very high confidence*), but the magnitude and severity of impacts depends on the	Available adaptation options will be less effective or unable to protect human health under high-emission scenarios (*high confidence*) (14.6).	Transformational, long-term adaptation action, that reduces risk and increases resilience, can address rapidly escalating impacts in the mid to latter part of the 21st century, especially if coupled with moderate to high mitigation measures (*high confidence*) (14.6).		Hard limits to adaptation may be reached for outdoor labour (*medium*

	temperatures have increased mortality and morbidity (*very high confidence*), with impacts that vary by age, gender, location, and socioeconomic conditions (*very high confidence*) (14.4.2.1; 14.4.6; Box 14.4).	implementation and effectiveness of adaptation strategies (*very high confidence*). Warming is projected to increase heat-related mortality (*very high confidence*) and morbidity (*medium confidence*) (14.4.6; Box 14.4.3).				*confidence*) (14.8).
Chapter 12 C&SAmerica	Heat stress a health concern (*high confidence*); it is an increasing occupational health hazard (12.3.1.4).	Significant increases in the intensity, frequency and duration of heatwaves (***), strong increases in heat-related mortality in urban areas. (12.3.7.1).	Climate services for the health sector promising and focused on early warning systems and forecasting models and integrated health-climate surveillance systems (*high confidence*) (12.5.6.1.1).	NbS proposed to be combined with community engagement and integration of diverse knowledge can foster transformational adaptation of social-ecological system (12.5.3.2).		
Chapter 9 Africa	Climate variability is already impacting the health of tens of millions of Africans through exposure to extreme heat. Heat extremes (hot days and	Increasing temperatures will cause tens of thousands of additional deaths under moderate and high global warming scenarios, particularly in north, west and central Africa, with up to year-round	Cooling stations, but *limited evidence* of pro-active climate change adaptation in African cities, particularly for those countries highly vulnerable to climate change (*high confidence*) (9.9.5).	Collective action and strengthened networked collaboration; more inclusive governance; spatial planning and risk-sensitive infrastructure delivery will contribute to reducing risks. The deployment of ecosystem-based solutions in reducing and adapting to climate risk is an action with demonstrated health, ecological, economic, and social co-benefits. There is an urgent need for improved societal and political transformations to reduce climate change	Morbidity and mortality will escalate with further global warming, placing additional strain on health and economic systems (*high confidence*) (9.10).	Up to year-round exceedance of deadly heat thresholds by 2100 (RCP8.5) (*high agreement, robust*

	hot nights) have increased in frequency since 1980 (*high confidence*) (9.10).	exceedance of deadly heat thresholds by 2100 (RCP8.5) (*high agreement, robust evidence*). There is an urgent need for improved societal and political transformations to reduce climate change risks for these vulnerable groups (Box 9.1).		risks for these vulnerable groups (*medium confidence*) (Box 9.1; 9.9.5).		*evidence*) (Box 9.1).
Chapter 11 Australasia	In Australia, heat-related deaths have increased with a third attributable to climate change (*high confidence*) (11.3; 11.4; 11.5.2; Table 11.2; Box 11.1; Box 11.2; Box 11.3; Box 11.4; Box 11.5; Box 11.6).	Increase in heat-related mortality and morbidity for people and wildlife in Australia (*high confidence*). Heatwave related excess deaths for people in Melbourne, Sydney and Brisbane may increase by about 300/year (RCP2.6) to 600/year (RCP8.5) during 2031–2080 relative to 142/year in 1971–2020. Mass mortality of wildlife species has been observed and is projected to continue (11.3.6; Table 11.14).	Heat wave early warning services and responses for health in Australia have advanced Urban (systems/form) cooling interventions including irrigated green infrastructure and increased albedo, education to reduce heat stress, heatwave/fire early-warning systems, battery/generator systems for black-outs, building standards that improve insulation/cooling, accessible well-resourced primary health care. For wildlife, removing human stressors, reducing pressures from ferals and weeds, and ensuring there is adequate high-quality habitat (11.3.6).	Current levels of adaptation are largely incremental and reactive, while awareness is rising, a step change in the adaptation process, in particular implementation and monitoring for effectiveness, ins needed also involving transformation, e.g. including integrated approaches across interdependent systems (e.g. nature based approaches, climate-sensitive urban design), which is needed to match the rising risks and to support climate resilient development (*high confidence*) (Table 11.1; 11.3.2; 11.5; 11.6; 11.7).	Mass mortality of wildlife (***), individuals, and communities reaching psycho-social adaptation limits (11.9.1).	
Chapter 15 SIDS	Small islands face	Heat-related mortality and risks of	*limited evidence* reported. Early warning and response		Reduced habitability of small islands through a	

	disproportionate health risks associated with changes in temperature and precipitation, climate variability, and extremes (Cross-Chapter Box INTERREG in Chapter 16; Key Risk 4 in 15.3.9; Figure 15.5)	occupational heat stress in small island states are projected to increase with higher temperatures. Higher temperatures also can affect the productivity of outdoor workers (15.3.4.2).	systems; integrating climate services into health decision-making systems; public uptake and buy in; improving health data collection systems (15.6.2).		compounding of eight key risks including heat-related health stress even under a global temperature scenario of 1.5 degrees (*high confidence*) (15.3.4.9).	

WGI Statements

Marine heatwaves have approximately doubled in frequency since the 1980s (*high confidence*), and human influence has very likely contributed to most of them since at least 2006 (Box 9.2; 11.2; 11.3; 11.9; TS.2.4; TS.2.6; Box TS.10; Figure SPM.3).

Every additional 0.5°C of global warming causes clearly discernible increases in the intensity and frequency of hot extremes, including heatwaves (*very likely*) (8.2; 11.2; 11.3; 11.4; 11.6; 11.9; Cross-Chapter Box 11.1; Cross-Chapter Box 12.1; TS.2.6; Figure SPM.5; Figure SPM.6).

Table SM17.17 Evidence from across regional and thematic chapters on the spectrum of incremental to transformational adaptation for managing climate related risk to tropical coral reefs including associated soft and hard adaptation limits (RKR-E)

Chapter	Observed losses and damages/ current risk	Projected -future risk	Adaptation		Adaptation limits	
			Incremental	Transformational	Soft	Hard

Global tropics - ch.3 (Global, tropical coastal and island regions: Caribbean, Pacific, Persian /Arabian Gulf, South Asia, SE Asia)	Coastal and shelf-sea ecosystems, including coral reefs (3.4.2.1) have recently experienced mass mortalities caused directly by thermal stress (*very high confidence*). Consequences for ecosystem services include collapse of regional fisheries (*high confidence*) (3.5.3) and reduced capacity of habitat-forming species to protect shorelines (*high confidence*) (3.4.2.5; 3.5.5.4).	Risks exacerbated by increases in intensity, frequency, and duration of marine heatwaves (*high confidence*) and other extreme events such as droughts and tropical cyclones (*low to medium confidence*) (3.4.2.1). At warming levels associated with SSP1-2.6, coral reefs are at risk of widespread decline and loss of structural integrity already by mid-century due to increasing intensity and frequency of marine heatwaves (*very high confidence*) (3.4.2.1).	For low-emission scenarios a wider array of adaptation options to be effective and feasible, including lower-risk nature-based options like coral restoration (3.5.2; 3.5.5.3). Recovery and restoration efforts that target resistant coral populations and culture heat-tolerant algal symbionts have the greatest potential. There is *low confidence* (*limited evidence, low agreement*) that enhanced thermal tolerance can be sustained over time (Box 5.5).	Under high-emission scenarios transformative changes required in coastal and ocean systems. A combination of available management approaches and high-risk interventions (enhanced corals, reef shading) can contribute to sustaining some coral reefs beyond 1.5°C of global warming, but available modelling indicates that their effectiveness declines with >2°C warming (Figure 3.23; 3.4.2.1) (*medium confidence*) adaptation options are more limited, more uncertain and pose higher risks to people, culture, and ecosystems (e.g., hard infrastructure for coastal protection, assisted migration or evolution (3.5.2), livelihood diversification, migration and relocation of people (*medium confidence*) (3.6.2.2.2; 3.6.2.2.3; 3.6.2.3; CCB SLR).		Widespread decline and loss of structural integrity already by mid-century due to increasing intensity and frequency of marine heatwaves (*very high confidence*) (3.4.2.1).

Chapter 9 Africa	Climate change is causing mass coral die-offs (*high confidence*) (9.6). Mass coral bleaching in the western Indian Ocean occurred in 1998, 2005, 2010, and 2015/2016 with coral cover reduced to 30–40% of 1998 levels by 2016 (9.6.1). Severe (>30%) coral bleaching has impacted ~80% of major reef areas in the western Indian Ocean and Red Sea along Africa's eastern coast (9.8.5.1). Ecosystem services provided by coral reefs including supporting nursery habitats for fish, coastal tourism, and shoreline protection are already being compromised by climate change (*medium confidence*) (9.6.1.4).	Over 90% of coral reef ecosystems will be lost with global warming at 2°C (*very high confidence*) (9.6.2.3).		EBa in terms of Marine Protected Areas (MPAs) are considered a viable, cost-effective adaptation strategy that would yield multiple co-benefits from local to global scales, improving the outlook for the environment and people into the future (*medium confidence*). There is substantial evidence that coral reefs that are protected through MPAs (e.g., from overfishing or by way of reducing nutrient pollution) can minimize the sensitivity of corals to elevated temperatures (9.6.5).		Complete loss at 2°C (*very high confidence*) (9.6.2.3).

Chapter 10 Asia (Persian /Arabian Gulf)	About 94.3% of corals bleached, and two-thirds of corals suffered mortality in 2017. Coral reefs were found to be affected differentially during bleaching episodes and presence of stress tolerant symbionts and higher thermal thresholds were observed (10.4.3).	Degradation and loss of coral reefs can affect about 4.5 million people in the Southeast Asia and Indian Ocean. In the coral reef fisheries sector, there are about 3.35 million fishers in Southeast Asia and 1.5 million fishers in the Indian Ocean. The economic loss under different climate change scenarios and fishing effort were estimated to range from US$27.78 to US$31.72 million annually in Nha Rang Bay, Vietnam. A survey conducted in Taiwan, Province of China, showed that the average annual personal willingness to pay was US$35.75 and total annual willingness to pay as US$0.43 billion. These high values indicate the need to preserve these coral reef ecosystems. In Bangladesh the coral reef of St. Martin's Island contributes 33.6 million USD/year to the local economy climate change along with other anthropogenic activities has been identified as a threat these habitats (10.4.3).	Restoration of reefs, ecosystem-based approach, Coral culture, and transplantation within the Gulf (10.4.3).	Building resilience through multiple mechanisms, such as innovative policy combinations, complemented by environmental technology innovations and sustained investment are suggested. Marine protected area networks and strengthening of marine and coastal resource policies in order to build coral reef resilience proposed (10.4.3).		The risk of irreversible loss of many marine and coastal ecosystems increases with global warming, especially at 2°C or more (*high confidence*). Thermally tolerant Persian Gulf corals are facing an increasing frequency of mass bleaching and each event leaves a substantial long-term impact on coral communities with low capacity for recovery indicating a bleak future for Gulf reefs (10.4.3).

Chapter 11 Australasia (East Australia)	Multiple extensive coral bleaching events have occurred, threatening system resilience. Three bleaching events from 2016–2020 caused significant loss of corals on the Great Barrier Reef. The worst coral bleaching event on record affected over 90% of reefs in 2016. Tourism has been significantly affected by coral bleaching (11.3.2; Box 11.2; Table 11.14).	Projections suggest bleaching conditions are likely twice each decade from 2035 and annually after 2044 under RCP8.5 (11.3.2; 11.4.1; Box 11.2).	AUD$1.9 billion investment to reduce human pressures on the Great Barrier Reef that suppress natural adaptive capacity. Adaptation efforts on the Great Barrier Reef aimed specifically at climate impacts, for example, coral restoration following marine heatwave impacts may slow the impacts of climate change in small discrete regions of the reef, or reduce short-term socio-economic ramifications, but will not prevent widespread bleaching (*virtually certain*) (Box 11.2).			Adaptation will be unable to prevent ecosystem collapse. System already close to tipping points, and where adaptation is unable to prevent ecosystem collapse or its transition to a new state: Degradation of tropical shallow coral reefs in Australia and associated biodiversity and ecosystem service values due to marine heatwave (*very high confidence*). (11.3.2; Box 11.2; Table 11.14).

Chapter 12 Central and South America (Central America and Caribbean)	and increasing number of coral bleaching events associated with abnormal increase in sea temperatures have occurred in NES, but thus far mortality remained low, and corals have been able return to normal values or remain stable after sea water temperature rise, showing some resilience of NES' coral reefs to climate change (*medium confidence*) (12.3.5.4).	Coral reefs are projected to lose their habitat, change their distribution range, and suffer more bleaching events driven by ocean warming. In the RCP 4.5 and RCP8.5 scenarios by 2050, virtually every coral reef will experience at least one severe bleaching event per year (*high confidence*) (Figure 12.7; Table SM12.3; Table 12.A4).	Adaptation measures adopted in ecosystems such as coral reefs have been based on the application of the spatial ocean zoning schemes (e.g. marine protected areas (MPAs), the prohibition of productive activities in coral reefs areas, the application of the precautionary approach, the establishment of conservation and restoration measures (e.g. coral gardening, larval propagation), the development of research and education programs, the promotion of recreational and cultural activities, the establishment of management plans with some level of participatory processes, the use of community-based approaches, the creation of national specific laws (12.5.2.2).			Coral reefs in Central America will show partial but irreversible loss already under low levels of warming (RCP2.6) (*high confidence*), at higher warming levels coral reefs will lose their habitat (Figure 12.7; Table SM12.3; Table SM12.4). Degradation and possible death of the Mesoamerican coral reef, the second largest reef in the world. Severe damage to habitat for marine species, degrading coastal protection and other ecosystem services, decreased food security from fisheries, lack of income from tourism (12.4).

Chapter 14 North America (North American waters (e.g., Gulf of Mexico, coast of Florida and the Yucatan, Mexico)	Coral reefs are facing an increasing risk of bleaching and mortality from warming ocean temperatures interacting with non-climate stressors (*very high confidence*). Loss of coral habitat leads to loss of ecosystem structure, fish habitat and food for coastal communities and impacts tourism opportunities (14.4.10) Coral reefs are providing $544 M a year in flood reduction protection for coastal communities in the US and Mexico (Box 14.3).	Without mitigation to keep surface temperatures below a 2.0 °C increase by the end of the century, up to 99% of coral reefs may be lost while 95% of reefs still may be lost if warming is kept below 1.5°C (*high confidence*). In Florida, by 2100, an estimated $24 –55 US billion may be lost in recreational use and value derived by people knowing the reef exists and is healthy as coral reefs decline due to bleaching and mortality from warming and non-climate stressors under future scenarios without carbon mitigation (14.4.9).	Various options for protecting and restoring coral reefs to prevent loss of ecosystem function are being explored or are under development. Many restoration and protection activities are being tested on Florida reef species. Another approach for financing protection of reefs involves/requires? officially designating reefs as "natural infrastructure" which allows insurance to be used for rebuilding lost reefs; conservation and restoration of barrier habitats (14.4.2).			95% or 99% loss for warming <1.5°C or < 2.0°C (14.4.9).

Chapter 15 SIDS (Caribbean, Pacific, Indian Ocean)	Small islands are increasingly affected by coral bleaching (*high confidence*) (15.2.1).	Modelling of both bleaching and ocean acidification effects under future climate scenarios suggested that some Pacific small islands (e.g., Nauru, Guam, Northern Marianas Islands) will experience conditions that cause severe bleaching on an annual basis before 2040 (*medium confidence*) (15.3.3.1.3).	EbA activities, especially at national and regional scales, have predominantly focused on restoring or conserving coastal and marine ecosystems. Coral reefs are unlikely to withstand increased temperatures, reducing the effectiveness of coral reef based EbA options under higher temperature scenarios (15.5.4).		The vulnerability of communities in small islands, especially those relying on coral reef systems for livelihoods, may exceed adaptation limits well before the end of this century even for a low greenhouse gas emission pathway (*high confidence*) (15.3.4.1; 15.3.4.6; CCB7-1).	Above 1.5°C, coral reefs will decline by an additional 70% to 90% (*high confidence*), and 99% will not survive at 2°C (*very high confidence*) (15.3.3.1.3; 15.3.3.1.4).

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