

Joint Submission by
Belize on behalf of the Alliance of Small Island States
Bhutan on behalf of the Least Developed Countries Group
Costa Rica on behalf of the AILAC group of countries
on SBSTA 50 agenda item 6c: “Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5°C”

In order to facilitate considerations on a substantive outcome of the discussion on agenda item 6c of the 50th meeting of the Subsidiary Body for Scientific and Technological Advice (SBSTA), AOSIS, LDCs and AILAC are providing its views on how to utilize the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C (SR1.5) to strengthen the scientific knowledge on the 1.5 °C goal, including in the context of the preparation of the Sixth Assessment Report (AR6) of the IPCC and the implementation of the Convention and the Paris Agreement.

AOSIS, LDCs and AILAC welcome the IPCC’s SR1.5 Special Report, and thank the IPCC for providing such a timely and informative report.

Strengthening scientific knowledge

The SR1.5 includes a wealth of information that is highly relevant for the implementation of the Convention and the Paris Agreement. The Annex to this submission includes a collection of key relevant statements from the SR1.5 Summary for Policy Makers organized by topic. Further **exchange between experts and Parties** is required in order to allow Parties to make best use of the IPCC’s findings in implementing the Convention and the Paris Agreement.

Such exchanges should take place in a **series of workshops held in conjunction with SB sessions up to 2020** that allow for **Q&A for clarity on the report’s content** by Parties. According to its mandate, the **process should strengthen knowledge on the 1.5°C goal, including in the context of the implementation** of the Convention and the Paris Agreement. This includes strengthening knowledge on 1.5°C during relevant processes up to 2020 such as:

- The preparation of new and updated NDCs (1/CP.21 Paragraph 23,24)
- The long-term low greenhouse gas emission development strategies (1/CP.21 Paragraph 35)
- The ongoing preparation of national adaptation plans
- Provision of means of implementation and support

The **series of workshops should be organized along the four sections of the report** with a focus on the implementation of the Convention and the Paris Agreement and strengthening the scientific knowledge on the 1.5°C limit in the context of the preparation of the products AR6. The sections are the following:

- A: Understanding Global Warming of 1.5°C

- B: Projected Climate Change, Potential Impacts and Associated Risks
- C: Emission Pathways and System Transitions Consistent with 1.5°C
- D: Strengthening the Global Response in the Context of Sustainable Development and Efforts to Eradicate Poverty Global Warming

Following the structure of the underlying report would also foster a focused discussion of areas where the scientific knowledge on 1.5°C can be strengthened in the AR6.

The outcomes of these deliberations should be **compiled in a technical report** by the secretariat to inform a **decision by Parties reflecting areas of strengthened knowledge on the 1.5°C goal by COP26**. The technical report will further be a useful reference for other processes under the UNFCCC, and will also inform the scientific community of key knowledge gaps, to help them in their preparation of the IPCC AR6. The report should include information on benchmarks for increased ambition, including in relation to 1/CP.21 Paragraph 17.

Annex - Key Messages from IPCC 1.5C Special Report by Theme

Selection of key messages from the IPCC special report on Global Warming of 1.5°C Summary for Policy Makers by negotiation topic. Bold highlighting added to mark most relevant parts for the respective theme.

Mitigation and Markets

C.1 In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO₂ emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), **reaching net zero around 2050** (2045–2055 interquartile range). For limiting global warming to below 2°C CO₂ emissions are projected to decline by about 25% by 2030 in most pathways (10–30% interquartile range) and reach net zero around 2070 (2065–2080 interquartile range). **Non-CO₂ emissions in pathways that limit global warming to 1.5°C show deep reductions** that are similar to those in pathways limiting warming to 2°C. (high confidence) (Figure SPM.3a) {2.1, 2.3, Table 2.4}

D1.1. Pathways that limit global warming to 1.5°C with no or limited overshoot show clear emission reductions by 2030 (high confidence). All but one show a **decline in global greenhouse gas emissions to below 35 GtCO₂eq yr⁻¹ in 2030, and half of available pathways fall within the 25–30 GtCO₂eq yr⁻¹ range (interquartile range), a 40–50% reduction from 2010 levels (high confidence)**. Pathways reflecting current nationally stated mitigation ambition until 2030 are broadly consistent with cost-effective pathways that result in a global warming of about 3°C by 2100, with warming continuing afterwards (medium confidence). {2.3.3, 2.3.5, Cross-Chapter Box 11 in Chapter 4, 5.5.3.2}

D1.3 The lower the emissions in 2030, the lower the challenge in limiting global warming to 1.5°C after 2030 with no or limited overshoot (high confidence). The challenges from delayed actions to reduce greenhouse gas emissions include the **risk of cost escalation, lock-in in carbon-emitting infrastructure, stranded assets, and reduced flexibility in future response options in the medium to long term** (high confidence). These may increase uneven distributional impacts between countries at different stages of development (medium confidence). {2.3.5, 4.4.5, 5.4.2}

C.2 Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems (high confidence). These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply **deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options** (medium confidence). {2.3, 2.4, 2.5, 4.2, 4.3, 4.4, 4.5}

C.3 All pathways that limit global warming to 1.5°C with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100–1000 GtCO₂ over the 21st century. CDR would be used to compensate for residual emissions and, in most cases, achieve net negative emissions to return global warming to 1.5°C following a peak (high confidence). CDR deployment of several hundreds of GtCO₂ is subject to multiple feasibility and sustainability constraints (high confidence). **Significant near-term emissions reductions and measures to lower energy and land demand can limit CDR deployment to a few hundred GtCO₂ without reliance on bioenergy with carbon capture and storage (BECCS)** (high confidence). {2.3, 2.4, 3.6.2, 4.3, 5.4}

Adaptation

A.3.3 Adaptation and mitigation are already occurring (high confidence). Future climate-related risks would be reduced by the upscaling and acceleration of far-reaching, multilevel and cross-sectoral climate mitigation and by **both incremental and transformational adaptation** (high confidence). {1.2, 1.3, Table 3.5, 4.2.2, Cross-Chapter Box 9 in Chapter 4, Box 4.2, Box 4.3, Box 4.6, 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.4.1, 4.4.4, 4.4.5, 4.5.3}

B.2.3 Increasing warming amplifies the exposure of small islands, low-lying coastal areas and deltas to the risks associated with sea level rise for many human and ecological systems, including increased saltwater intrusion, flooding and damage to infrastructure (high confidence). Risks associated with sea level rise are higher at 2°C compared to 1.5°C. **The slower rate of sea level rise at global warming of 1.5°C reduces these risks, enabling greater opportunities for adaptation including managing and restoring natural coastal ecosystems and infrastructure reinforcement (medium confidence).** (Figure SPM.2) {3.4.5, Box 3.5}

B.6 Most adaptation needs will be lower for global warming of 1.5°C compared to 2°C (high confidence). There are a **wide range of adaptation options that can reduce the risks of climate change (high confidence).** There are **limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, with associated losses** (medium confidence). **The number and availability of adaptation options vary by sector (medium confidence).** {Table 3.5, 4.3, 4.5, Cross-Chapter Box 9 in Chapter 4, Cross-Chapter Box 12 in Chapter 5}

B.6.3 Limits to adaptive capacity exist at 1.5°C of global warming, become more pronounced at higher levels of warming and vary by sector, with site-specific implications for vulnerable regions, ecosystems and human health (medium confidence). {Cross-Chapter Box 12 in Chapter 5, Box 3.5, Table 3.5}

B.6.2 Adaptation is expected to be more challenging for ecosystems, food and health systems at 2°C of global warming than for 1.5°C (medium confidence). Some vulnerable regions, including small islands and Least Developed Countries, are projected to experience high multiple interrelated climate risks even at global warming of 1.5°C (high confidence). {3.3.1, 3.4.5, Box 3.5, Table 3.5, Cross-Chapter Box 9 in Chapter 4, 5.6, Cross-Chapter Box 12 in Chapter 5, Box 5.3}

D.3.1 Adaptation options that reduce the vulnerability of human and natural systems have many synergies with sustainable development, if well managed, such as ensuring food and water security, reducing disaster risks, improving health conditions, maintaining ecosystem services and reducing poverty and inequality (high confidence). **Increasing investment in physical and social infrastructure is a key enabling condition to enhance the resilience and the adaptive capacities of societies. These benefits can occur in most regions with adaptation to 1.5°C of global warming (high confidence). {1.4.3, 4.2.2, 4.3.1, 4.3.2, 4.3.3, 4.3.5, 4.4.1, 4.4.3, 4.5.3, 5.3.1, 5.3.2}**

D3.3. A mix of adaptation and mitigation options to limit global warming to 1.5°C, implemented in a participatory and integrated manner, can enable rapid, systemic transitions in urban and rural areas (high confidence). These are most effective when aligned with economic and sustainable development, and when local and regional governments and decision makers are supported by national governments (medium confidence) {4.3.2, 4.3.3, 4.4.1, 4.4.2}

Loss and Damage

A.3.1 Impacts on natural and human systems from global warming have already been observed (high confidence). Many land and ocean ecosystems and some of the services they provide have already changed due to global warming (high confidence). (Figure SPM.2) {1.4, 3.4, 3.5}

B.6.3 Limits to adaptive capacity exist at 1.5°C of global warming, become more pronounced at higher levels of warming and vary by sector, with site-specific implications for vulnerable regions, ecosystems and human health (medium confidence). {Cross-Chapter Box 12 in Chapter 5, Box 3.5, Table 3.5}

B.6 Most adaptation needs will be lower for global warming of 1.5°C compared to 2°C (high confidence). There are a wide range of adaptation options that can reduce the risks of climate change (high confidence). There are **limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, with associated losses (medium confidence).** The number and availability of adaptation options vary by sector (medium confidence). {Table 3.5, 4.3, 4.5, Cross-Chapter Box 9 in Chapter 4, Cross-Chapter Box 12 in Chapter 5}

B.5.1 Populations at disproportionately higher risk of adverse consequences with global warming of 1.5°C and beyond include **disadvantaged and vulnerable populations, some indigenous peoples, and local communities dependent on agricultural or coastal livelihoods (high confidence). Regions at **disproportionately higher risk** include Arctic ecosystems, dryland regions, **small island developing states, and Least Developed Countries** (high confidence). **Poverty and disadvantage are expected to increase in some populations as global warming increases**; limiting global warming to 1.5°C, compared with 2°C, could **reduce the number of people both exposed to climate-related risks and susceptible to poverty by up to several hundred million by 2050** (medium confidence). {3.4.10, 3.4.11, Box 3.5, Cross-Chapter Box 6 in Chapter 3, Cross-Chapter Box 9 in Chapter 4, Cross-Chapter Box 12 in Chapter 5, 4.2.2.2, 5.2.1, 5.2.2, 5.2.3, 5.6.3}**

Economic impacts

B.5.5 Risks to global aggregated economic growth due to climate change impacts are projected to be lower at 1.5°C than at 2°C by the end of this century (medium confidence). This excludes the costs of mitigation, adaptation investments and the benefits of adaptation. Countries in the tropics and Southern Hemisphere subtropics are projected to experience the largest impacts on economic growth due to climate change should global warming increase from 1.5°C to 2°C (medium confidence). {3.5.2, 3.5.3}

Oceans

B.2.2 Sea level rise will continue beyond 2100 even if global warming is limited to 1.5°C in the 21st century (high confidence). **Marine ice sheet instability in Antarctica and/or irreversible loss of the Greenland ice sheet could result in multi-metre rise in sea level over hundreds to thousands of years. These instabilities could be triggered at around 1.5°C to 2°C of global warming** (medium confidence). (Figure SPM.2) {3.3.9, 3.4.5, 3.5.2, 3.6.3, Box 3.3}

B.2.1 Model-based projections of global mean sea level rise (relative to 1986–2005) suggest an indicative range of 0.26 to 0.77 m by 2100 for 1.5°C of global warming, 0.1 m (0.04–0.16 m) less than for a global warming of 2°C (medium confidence). A reduction of 0.1 m in global sea level rise implies that **up to 10 million fewer people would be exposed to related risks, based on population in the year 2010 and assuming no adaptation** (medium confidence). {3.4.4, 3.4.5, 4.3.2}

B.4 Limiting global warming to 1.5°C compared to 2°C is projected to reduce increases in ocean temperature as well as associated increases in ocean acidity and decreases in ocean oxygen levels (high confidence). **Consequently, limiting global warming to 1.5°C is projected to reduce risks to marine biodiversity, fisheries, and ecosystems, and their functions and services to humans**, as illustrated by recent changes to Arctic sea ice and **warm-water coral reef ecosystems** (high confidence). {3.3, 3.4, 3.5, Box 3.4, Box 3.5}

B.4.2 Global warming of 1.5°C is projected to shift the ranges of many marine species to higher latitudes as well as increase the amount of damage to many ecosystems. It is also expected to drive the loss of coastal resources and reduce the productivity of fisheries and aquaculture (especially at low latitudes). The risks of climate-induced impacts are projected to be higher at 2°C than those at global warming of 1.5°C (high confidence). **Coral reefs, for example, are projected to decline by a further 70–90% at 1.5°C (high confidence) with larger losses (>99%) at 2°C (very high confidence). The risk of irreversible loss of many marine and coastal ecosystems increases with global warming, especially at 2°C or more** (high confidence). {3.4.4, Box 3.4}

Rainfall, drought and water stress

B.1.3 Risks from droughts and precipitation deficits are projected to be higher at 2°C compared to 1.5°C of global warming in some regions (medium confidence). **Risks from heavy precipitation events are projected to be higher at 2°C compared to 1.5°C of global warming** in several northern hemisphere high-latitude and/or high-elevation regions, eastern Asia and eastern North America (medium confidence). **Heavy precipitation associated with tropical cyclones is projected to be higher at 2°C compared to 1.5°C global warming** (medium confidence). There is generally low confidence in projected changes in heavy precipitation at 2°C compared to 1.5°C in other regions. **Heavy precipitation when aggregated at global scale is projected to be higher at 2°C than at 1.5°C of global warming** (medium confidence). As a consequence of heavy precipitation, **the fraction of the global land area affected by flood hazards is projected to be larger at 2°C compared to 1.5°C of global warming** (medium confidence). {3.3.1, 3.3.3, 3.3.4, 3.3.5, 3.3.6}

B.5.4 Depending on future socio-economic conditions, limiting global warming to 1.5°C compared to 2°C may **reduce the proportion of the world population exposed to a climate change-induced increase in water stress by up to 50%, although there is considerable variability between regions** (medium confidence). **Many small island developing states could experience lower water stress as a result of projected changes in aridity when global warming is limited to 1.5°C, as compared to 2°C** (medium confidence). {3.3.5, 3.4.2, 3.4.8, 3.5.5, Box 3.2, Box 3.5, Cross-Chapter Box 9 in Chapter 4}

Ecosystems

B.3 On land, impacts on biodiversity and ecosystems, including species loss and extinction, are projected to be lower at 1.5°C of global warming compared to 2°C. Limiting global warming to 1.5°C compared to 2°C is projected to lower the impacts on terrestrial, freshwater and **coastal ecosystems** and to retain more of their services to humans (high confidence). (Figure SPM.2) {3.4, 3.5, Box 3.4, Box 4.2, Cross-Chapter Box 8 in Chapter 3}

B.5.4 Depending on future socio-economic conditions, limiting global warming to 1.5°C compared to 2°C may **reduce the proportion of the world population exposed to a climate change-induced increase in water stress by up to 50%, although there is considerable variability between regions** (medium confidence). **Many small island developing states could experience lower water stress as a result of projected changes in aridity when global warming is limited to 1.5°C, as compared to 2°C** (medium confidence). {3.3.5, 3.4.2, 3.4.8, 3.5.5, Box 3.2, Box 3.5, Cross-Chapter Box 9 in Chapter 4}

Finance

C.2 Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems (*high confidence*). These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and **imply deep emissions reductions in all sectors, a wide portfolio of mitigation options**

and a **significant upscaling of investments in those options** (medium confidence). {2.3, 2.4, 2.5, 4.2, 4.3, 4.4, 4.5}

D.5.3 Global model pathways limiting global warming to 1.5°C are projected to involve the **annual average investment needs in the energy system of around 2.4 trillion USD₂₀₁₀ between 2016 and 2035**, representing about **2.5% of the world GDP** (medium confidence). {4.4.5, Box 4.8}

D.7.2 Cooperation on strengthened accountable multilevel governance that includes non-state actors such as industry, civil society and scientific institutions, coordinated sectoral and cross-sectoral policies at various governance levels, gender-sensitive policies, **finance including innovative financing, and cooperation on technology development and transfer can ensure participation, transparency, capacity building and learning among different players** (high confidence). {2.5.1, 2.5.2, 4.2.2, 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.5.3, Cross-Chapter Box 9 in Chapter 4, 5.3.1, 5.5.3, Cross-Chapter Box 13 in Chapter 5, 5.6.1, 5.6.3}

D.7.3 International cooperation is a critical enabler for developing countries and vulnerable regions to strengthen their action for the implementation of 1.5°C-consistent climate responses, including through enhancing access to finance and technology and enhancing domestic capacities, taking into account national and local circumstances and needs (high confidence). {2.3.1, 2.5.1, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 5.4.1, 5.5.3, 5.6.1, Box 4.1, Box 4.2, Box 4.7}.

D.5.1 Directing finance towards investment in infrastructure for mitigation and adaptation could provide additional resources. This could involve the **mobilization of private funds by institutional investors, asset managers and development or investment banks, as well as the provision of public funds. Government policies that lower the risk of low-emission and adaptation investments can facilitate the mobilization of private funds and enhance the effectiveness of other public policies.** Studies indicate a number of challenges, including access to finance and mobilization of funds. (high confidence) {2.5.1, 2.5.2, 4.4.5}

D.5.2 Adaptation finance consistent with global warming of 1.5°C is difficult to quantify and compare with 2°C. **Knowledge gaps include insufficient data to calculate specific climate resilience-enhancing investments from the provision of currently underinvested basic infrastructure.** Estimates of the **costs of adaptation might be lower at global warming of 1.5°C than for 2°C.** Adaptation needs have typically been supported by **public sector sources** such as national and subnational government budgets, and in developing countries together with support from development assistance, multilateral development banks, and United Nations Framework Convention on Climate Change channels (medium confidence). More recently there is a **growing understanding of the scale and increase in non-governmental organizations and private funding** in some regions (medium confidence). **Barriers include the scale of adaptation financing, limited capacity and access to adaptation finance** (medium confidence). {4.4.5, 4.6}

D.5.4 Policy tools can help mobilize incremental resources, including through **shifting global investments and savings and through market and non-market based instruments** as well as accompanying measures to secure the equity of the transition, acknowledging the challenges related with implementation, including those of energy costs, depreciation of assets and impacts on international competition, and utilizing the

opportunities to maximize co-benefits (high confidence). {1.3.3, 2.3.4, 2.3.5, 2.5.1, 2.5.2, Cross-Chapter Box 8 in Chapter 3, Cross-Chapter Box 11 in Chapter 4, 4.4.5, 5.5.2}

D.3.1 Adaptation options that reduce the vulnerability of human and natural systems have many synergies with sustainable development, if well managed, such as ensuring food and water security, reducing disaster risks, improving health conditions, maintaining ecosystem services and reducing poverty and inequality (high confidence). **Increasing investment in physical and social infrastructure is a key enabling condition to enhance the resilience and the adaptive capacities of societies.** These benefits can occur in most regions with adaptation to 1.5°C of global warming (high confidence). {1.4.3, 4.2.2, 4.3.1, 4.3.2, 4.3.3, 4.3.5, 4.4.1, 4.4.3, 4.5.3, 5.3.1, 5.3.2}

Technology Transfer

D.5.5 The systems transitions consistent with adapting to and limiting global warming to 1.5°C include the widespread adoption of **new and possibly disruptive technologies and practices and enhanced climate-driven innovation.** These imply enhanced technological innovation capabilities, including in industry and finance. **Both national innovation policies and international cooperation can contribute to the development, commercialization and widespread adoption of mitigation and adaptation technologies.** Innovation policies may be more effective when they combine public support for research and development with policy mixes that provide incentives for technology diffusion. (*high confidence*) {4.4.4, 4.4.5}.

D.7.2 Cooperation on strengthened accountable multilevel governance that includes non-state actors such as industry, civil society and scientific institutions, coordinated sectoral and cross-sectoral policies at various governance levels, gender-sensitive policies, **finance including innovative financing, and cooperation on technology development and transfer** can ensure participation, transparency, capacity building and learning among different players (*high confidence*). {2.5.1, 2.5.2, 4.2.2, 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.5.3, Cross-Chapter Box 9 in Chapter 4, 5.3.1, 5.5.3, Cross-Chapter Box 13 in Chapter 5, 5.6.1, 5.6.3}

D.7.3 **International cooperation is a critical enabler** for developing countries and vulnerable regions to strengthen their action for the implementation of 1.5°C-consistent climate responses, including through **enhancing access to finance and technology** and enhancing domestic capacities, taking into account national and local circumstances and needs (*high confidence*). {2.3.1, 2.5.1, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 5.4.1, 5.5.3, 5.6.1, Box 4.1, Box 4.2, Box 4.7}.

Capacity Building

D.7 **Strengthening the capacities for climate action of national and sub-national authorities, civil society, the private sector, indigenous peoples and local communities** can support the implementation of ambitious actions implied by limiting global warming to 1.5°C (*high confidence*). **International cooperation can provide an enabling environment for this to be achieved in all countries and for all people, in the context of sustainable development. International cooperation is a critical enabler for developing countries and**

vulnerable regions (*high confidence*). {1.4, 2.3, 2.5, 4.2, 4.4, 4.5, 5.3, 5.4, 5.5, 5.6, 5, Box 4.1, Box 4.2, Box 4.7, Box 5.3, Cross-Chapter Box 9 in Chapter 4, Cross-Chapter Box 13 in Chapter 5}

D.7.2 Cooperation on strengthened accountable multilevel governance that includes non-state actors such as industry, civil society and scientific institutions, **coordinated sectoral and cross-sectoral policies at various governance levels, gender-sensitive policies, finance including innovative financing, and cooperation on technology development and transfer can ensure participation, transparency, capacity building and learning among different players** (*high confidence*). {2.5.1, 2.5.2, 4.2.2, 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.5.3, Cross-Chapter Box 9 in Chapter 4, 5.3.1, 5.5.3, Cross-Chapter Box 13 in Chapter 5, 5.6.1, 5.6.3}

D.7.3 **International cooperation is a critical enabler** for developing countries and vulnerable regions to strengthen their action for the implementation of 1.5°C-consistent climate responses, including through enhancing access to finance and technology and **enhancing domestic capacities**, taking into account national and local circumstances and needs (*high confidence*). {2.3.1, 2.5.1, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 5.4.1, 5.5.3, 5.6.1, Box 4.1, Box 4.2, Box 4.7}

D2.3 Mitigation and adaptation consistent with limiting global warming to 1.5°C are underpinned by enabling conditions, assessed in this Report across the geophysical, environmental-ecological, technological, economic, socio-cultural and institutional dimensions of feasibility. **Strengthened multilevel governance, institutional capacity, policy instruments, technological innovation and transfer and mobilization of finance, and changes in human behaviour and lifestyles are enabling conditions that enhance the feasibility of mitigation and adaptation options for 1.5°C-consistent systems transitions.** (*high confidence*) {1.4, Cross-Chapter Box 3 in Chapter 1, 2.5.1, 4.4, 4.5, 5.6}