Towards a more resilient aviation sector

By ICAO Secretariat

Introduction

The aviation industry is at the center of international trade and globalization, and once it is exposed to the risk of climate change impacts, any disruption in one part of the network can incur multiple delays and even collapse others. Therefore, there has been a growing awareness of climate change impacts and the specific challenges they may bring to the aviation industry, whether related to en route or ground impacts to airports, air navigation service providers (ANSPs), airlines, and other aviation infrastructure.

In this context, mitigation and adaptation measures should be strategically combined for sustainable development, considering their synergies to enable a more effectively climate-resilient aviation future. Climate adaptation in aviation involves adapting, changing, or enhancing aircraft operations and infrastructure to prepare for expected climate changes and keep the adverse impacts to acceptable levels. In turn, aviation climate resilience is the ability of aircraft operations and infrastructure to be able to withstand and recover from external perturbation resulting from the impacts of climate change.

The outbreak of the COVID-19 pandemic in early 2020 severely affected the aviation sector, with border closures, travel restrictions and quarantine measures imposed by States. In addition, risk composition between the COVID-19 pandemic and climate change has also negatively affected the broad adaptive capacity of communities, governments and societies. Apart from their impacts, a related similarity shared by climate change and the pandemic is the need for a holistic and systemic approach that requires global, national, and local coordinated responses.

Regarding this systemic approach, facing the pandemic offered a unique chance to reexamine worldwide transportation and considering the chance of building back better. The pandemic has shown how important it is to take early action to address an impending crisis, and how severe events can affect people and the economy. As a result, it has been realized by all parties that there are numerous opportunities for developing future transportation and mobility concepts that are not only climate and pandemic-proof, but also sustainable and potentially less vulnerable to the negative consequences of globalization, such as environmental degradation, economic over-exploration, and overcrowding.

Another important takeaway from the pandemic for the aviation industry is the need for preparedness in order that the industry network could respond in a more resilient manner to future pandemics, reducing impacts such as the cancellation of flights and airports closure.

Scientific understanding

Adaptation and resilience are at the core of the latest report from the UN's Intergovernmental Panel on Climate Change (IPCC), which is the second part of the WG2 Sixth Assessment Report *Climate Change 2022: Impacts, Adaptation and Vulnerability*[1], published in February 2022.

Although development and adaptation efforts have reduced vulnerability, the report states "rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their

1 IPCC WG2 Sixth Assessment Report *Climate Change 2022: Impacts, Adaptation and Vulnerability* (2022) Available at: https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii

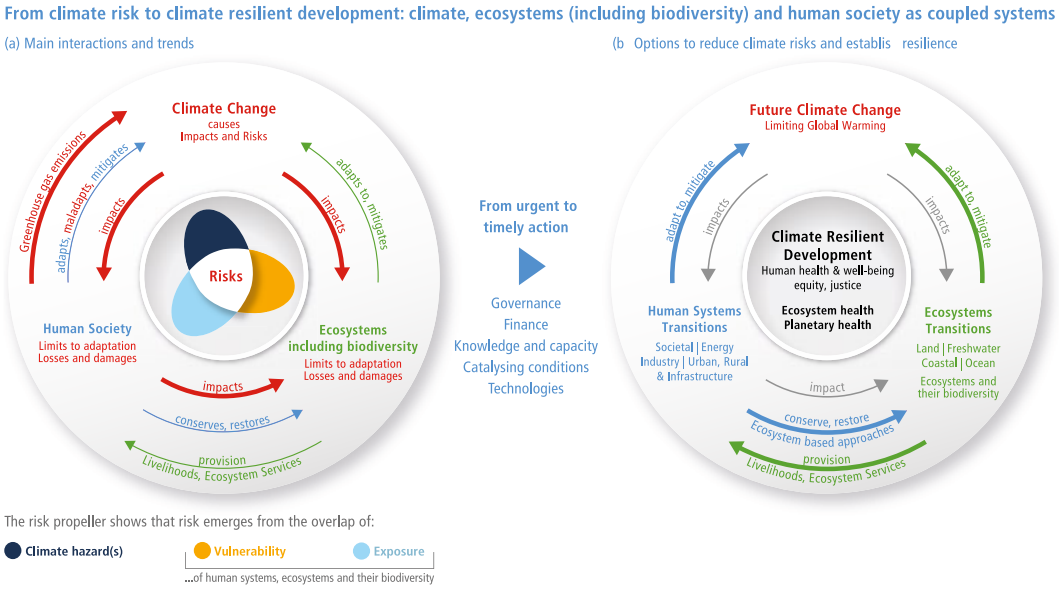

FIGURE 1: Interdependence of climate, ecosystems and biodiversity, and human societies (IPCC, 2022)

ability to adapt". In addition, it highlights that "evidence of observed impacts, projected risks, levels and trends in vulnerability, and adaptation limits demonstrate that worldwide climate resilient development action is more urgent than previously assessed."

The work of the International Civil Aviation Organization (ICAO) on adaptation and resilience is also in line with one of the report's main points, which reinforces that "political commitment, institutional frameworks, policies and instruments with clear goals and priorities are key enabling conditions for implementing, accelerating and sustaining adaptation in human systems and ecosystems".

Chapter 6: Cities, Settlements and Key Infrastructure of the IPCC report provides information on aviation by stating, "many airports are in the low elevation coastal zone making them especially vulnerable to flooding and sea level rise". Under a 2°C scenario the report suggests that "the number of airports at risk of storm surge flooding increases from 269 to 338 or as many as 572 in an RCP8.5 scenario and that these airports are disproportionately busy and account for up to 20% of the world's passenger routes".

A few examples are also provided on climate related impacts at airports in different regions. This includes the vulnerability of European airports to inundation from sea level rise and storm surges that may double between 2030 and 2080 without adaptation, and the weight restrictions for large aircraft due to reduced lift caused by rising temperatures. There is also the issue of the exposure to climate-induced extreme events, in particular coastal airports in Asia.

Overview of ICAO work on Climate Adaptation

Over the last decade, ICAO has been disseminating best practices and guidance aligned with the scientific understanding to ensure adaptation and resilience of the international aviation system. Member States and stakeholder organizations are expressing increasing concerns about the potential impacts of climate change for their aviation infrastructure, operations and business.

Following successive Assembly Resolutions calling for the adaptation and resilience of aviation to climate change, guidance documents have been continuously released over the years. The latest request was through the Assembly Resolution A40-18: *Consolidated statement of continuing ICAO policies and practices related to environmental protection - Climate change*. This Resolution requested the Council to identify the potential impacts of climate change on international aviation operations and related infrastructure, to identify adaptation measures to address

the potential climate change impacts, and, to develop guidance on climate change risk assessment for international aviation in cooperation with other relevant international organizations and the industry.

Therefore, key guidance and best practices documents has been developed by ICAO regarding adaptation and resilience, through the collaboration of hundreds of experts and the Committee on Aviation Environmental Protection (CAEP). Particularly noteworthy are some documents, such as:

ICAO Doc 9184, Airport Planning Manual – Part 2, Land Use and Environmental Management primarily focuses on identifying environmental and climate-related impacts, and enabling their consideration at a very early stage of planning for new and redeveloping infrastructure. Important to highlight that city and infrastructure planning approaches that integrate adaptation into everyday decision-making are supported by the 2030 Agenda (the Paris Agreement, the Sustainable Development Goals, the New 22 Urban Agenda and the Sendai Framework for Disaster Risk Reduction).

ICAO Climate Adaptation Synthesis Report captures existing information on the range of projected climate impacts in the aviation sector to better understand risks to airports, air navigation services providers (ANSPs), airlines and other aviation infrastructure. It also identified potential climate effects on the aviation sector for eight climate impact categories through both a literature review and a survey designed and sent to all ICAO Member States.

Climate Risk Assessment, Adaptation and Resilience Report provides guidance on steps for aviation organizations to conduct climate change risk assessments and adaptation planning and to identify key vulnerabilities. This guidance document will be further detailed in a following article of this Chapter.

Another example of guidance material and tools are the Eco-Airport Toolkit e-publication on Climate Resilient Airports, which provides a high-level overview of the issues climate change may bring for airports as well as some strategies on how to anticipate and prepare for contingencies with concrete examples of action.

Next Steps

ICAO's role and commitment in supporting 193 Member States on climate change adaptation topic with referring to SDGs (Sustainable Development Goals) will continue to be a key cornerstone of ICAO's work. It will be reinforced as adaptation and mitigation actions need to scale up due to more frequently or intense climate impacts foresighted for the years and decades to come.

Further work planned on adaptation and resilience topics will include the update of the ICAO Climate Adaptation Synthesis, including a new comprehensive survey with aviation stakeholders to support further guidance. It also includes the continue monitoring of adaptation progression in the aviation sector and the tracking of a variety of information on initiatives related to adaptation measures implemented by airports, aircraft operators, air navigation service providers (ANSP) and other aviation stakeholders.