International Civil Aviation and Adaptation to Climate Change

By ICAO Secretariat

INTRODUCTION

ICAO's policies and activities on climate change have primarily been driven by the imperative of mitigating the emissions from international civil aviation. In this regard ICAO has two global aspirational goals, of 2 per cent annual fuel efficiency improvement and carbon neutral growth from 2020, respectively. To achieve these global aspirational goals, a comprehensive approach has been agreed, consisting of a basket of CO_2 mitigation measures including aircraft technology and standards, the development of sustainable aviation fuels, operational improvements, and the adoption of the first-ever sectoral global market-based measure, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

While the efforts of ICAO are mainly focused on reducing the impact of international civil aviation on the global climate, the impact of climate change to aviation infrastructure and operations has also been identified as a significant risk for the aviation sector and ICAO's work on climate adaptation is the foundation of risk preparedness[1].

The key questions are how should aviation infrastructure be designed and built so that CO_2 emissions are limited, and more extreme temperatures and weather events, water scarcity, sand storms, or any impact attributable to a changing climate, can be withstood; and how to minimize the disruptions to the operation of the air travel network. Indeed, with 100,000 international flights being operated daily in 2019, any disruption in one part of the network can incur multiple delays in others.

The reason why ICAO has been engaged at an early stage on aviation adaptation and resilience to extreme climate-related events is to better understand the nature, the risks and the impacts of climate change on international aviation. This work has primarily focused on identifying impacts, in the air and on the ground and it led to updating ICAO Doc 9184, Airport Planning Manual – Part 2, to include the consideration at a very early planning stage of the risks for new and redeveloping infrastructure. This document is the most comprehensive piece of guidance made available to States, airport planners and developers that wish to integrate the environmental impacts of airport infrastructure and operations as early as the design phase, considering the long lifespan of such infrastructure. This is also the main reason to consider the climate change resilience of the airport and to ensure the permanence of this capital-intensive asset.

In order to ensure the resilience of the international aviation system, the role of ICAO in disseminating best practices and guidance is instrumental. Indeed, the ability to engage all stakeholders effectively, from the airports, airlines, air navigation services providers to the energy suppliers and local authorities is a prerequisite to avoid the creation of islands of resilience, with no connection to the rest of the network. Therefore, ICAO has engaged with a number of organizations, including the World

1 - ICAO Assembly Resolution A39-2 *Consolidated statement of continuing ICAO policies and practices related to environmental protection* requests to identify the potential impacts of climate change on international aviation operations and related infrastructure and identify adaptation measures to address the potential climate change impacts, in cooperation with other relevant international organizations and the industry.
- ICAO Assembly Resolution A39-24 deals with the strategy on disaster risk reduction and response mechanisms in aviation.
- More information available at: https://www.icao.int/environmental-protection/Pages/adaptation.aspx

Meteorological Organization (WMO), in order to enhance the awareness and preparedness of all.

In the meantime, as per the latest scientific information, climate events have increased in frequency and intensity, stressing the imperative to develop a reference document for the sector. In 2019, the Council's Committee on Aviation Environmental Protection (CAEP) recommended the approval of the ICAO's Climate Adaptation Synthesis.

ICAO'S CLIMATE ADAPTATION SYNTHESIS

Methodology

The ICAO Climate Adaptation Synthesis 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. The scientific content of the report is based on the findings of the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5) (2014), supplemented with peer-reviewed scientific information, as required.

The synthesis was conducted in two stages:

1. Literature review: the literature review collated information from documents relevant to aviation climate change adaptation issues; and
2. Survey: a survey was designed and sent to all ICAO Member States in order to collect meaningful information on the current level of awareness of climate change impacts, the nature of the impacts and how they will affect international aviation infrastructure and operations, as well as the self-assessed level of preparedness of the various international aviation stakeholders.

Content

One of the key findings showed that 74 per cent of respondents found that their aviation sectors already experience some climate change impacts, while a further 17 per cent expect some impact by 2030.

Potential climate effects on the aviation sector were identified for eight climate impact categories, including:

1. sea level rise;
2. increased intensity of storms;
3. temperature change;
4. changing precipitation;
5. changing icing conditions;
6. changing wind direction;
7. desertification; and
8. changes to biodiversity.

Consideration was also given to potential climate change impacts to business and economics, as well as climate change risk assessment and adaptation planning.

The impacts on the aviation system were identified globally and are shown in the ICAO Global Climate Adaptation Risk Map (Figure 1). The survey showed that 30 per cent of respondents have already implemented climate adaptation measures, while 25 per cent intend to do so in the next five to ten years. Six per cent indicate that they have no measure planned. A climate change risk assessment is required to determine the climate change vulnerabilities, before an adaptation strategy is developed.

Regarding the preparedness of the global aviation sector for climate change impacts, the majority of respondents stated that while the global aviation sector has engaged heavily in climate change mitigation efforts, more effort should be given to climate change adaptation, including the need for more global coordination. Many respondents identified the need for more outreach, training, and capacity-building, as well as increasing the understanding of specific vulnerabilities for the sector. Respondents also thought that the development of adaptation risk assessments, policies and planning for resilience at the global level could be required. The full ICAO Climate Adaptation Synthesis can be found on the ICAO web site[2].

2 https://www.icao.int/environmental-protection/Pages/environment-publications.aspx

NEXT STEPS

The ICAO Climate Adaptation Synthesis is the first global overview of the climate change risks and impacts that could affect international aviation infrastructure and operations. It is also the only document that reflects the self-assessed level of preparedness of all major international aviation stakeholders, and relays the need for more suitable information and guidance on risk assessment at global level.

ICAO envisages cooperating with international experts to develop the first globally recognized climate change risk assessment methodology. The cornerstone of this methodology will be the identification, characterisation and visualisation of the climate change impacts on international aviation and identification of the risks to which the operations and infrastructure may be exposed based on climate change projections and scenarios.

With this additional resource, ICAO's 193 Member States will have the opportunity to assess their own level of vulnerability and decide with their national and local stakeholders, how to build resilience into their international aviation system. In doing so, they will enhance their ability to assess and mitigate the climate change risks that would compromise the sustainable development of international aviation and the economies that the sector supports.

FIGURE 1: Based on replies from ICAO Member States, the ICAO Global Climate Adaptation Risk Map (ICAO, 2019) shows the nature of the climate change impacts on international aviation.