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ICAO Environmental
Symposium 2019

DESTINATION GREEN: THE NEXT CHAPTER



The ICAO Climate Adaptation Synthesis

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EUROCONTROL's work on climate adaptation



2008



2014





Right here, right now?





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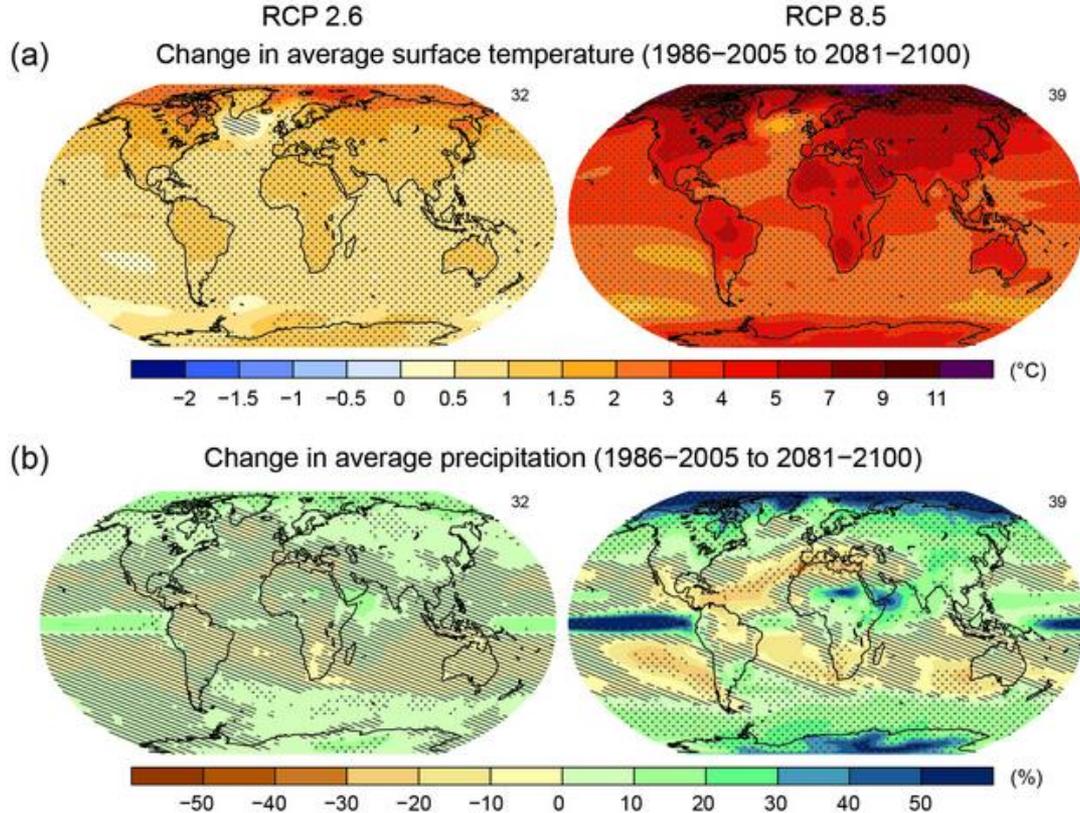
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Climate Change: is it happening now?



Well we *can't* associate it with specific events...

Aviation is used to disruptive weather – but if it's going to get worse?



Kick-off CAEP/10

3 Steering Groups

34 Contributors

**88 survey
responses**

**7 Working
Group meetings**

18 telecons

>20 documents reviewed

Delivered to CAEP/11



Contents:

Executive Summary

1) Introduction

- 1) Methodology
- 2) Respondents Expectations of Climate Change Impacts on their Aviation Sectors
- 3) Overview of Survey Demographics

2) Analysis of Climate Change Impacts and Effects

- 1) Analysis of Impacts Which Stakeholders Expect to be the Biggest Challenges
- 2) Synthesis of Information on Risk Assessment Mythologies and Progress
- 3) Synthesis of Information on Adaptation Planning

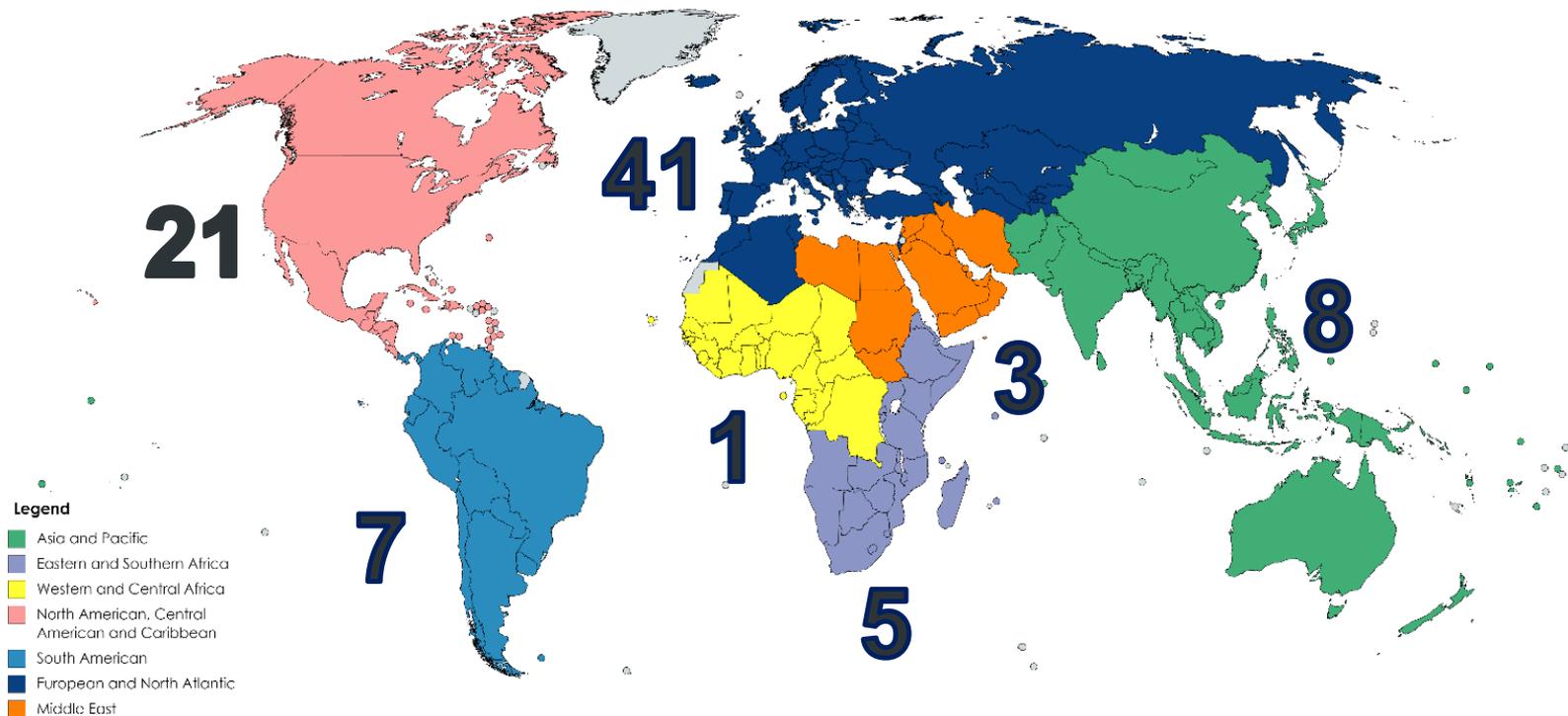
3) The Global Aviation Sector and Adaption to Climate Change

4) Conclusion



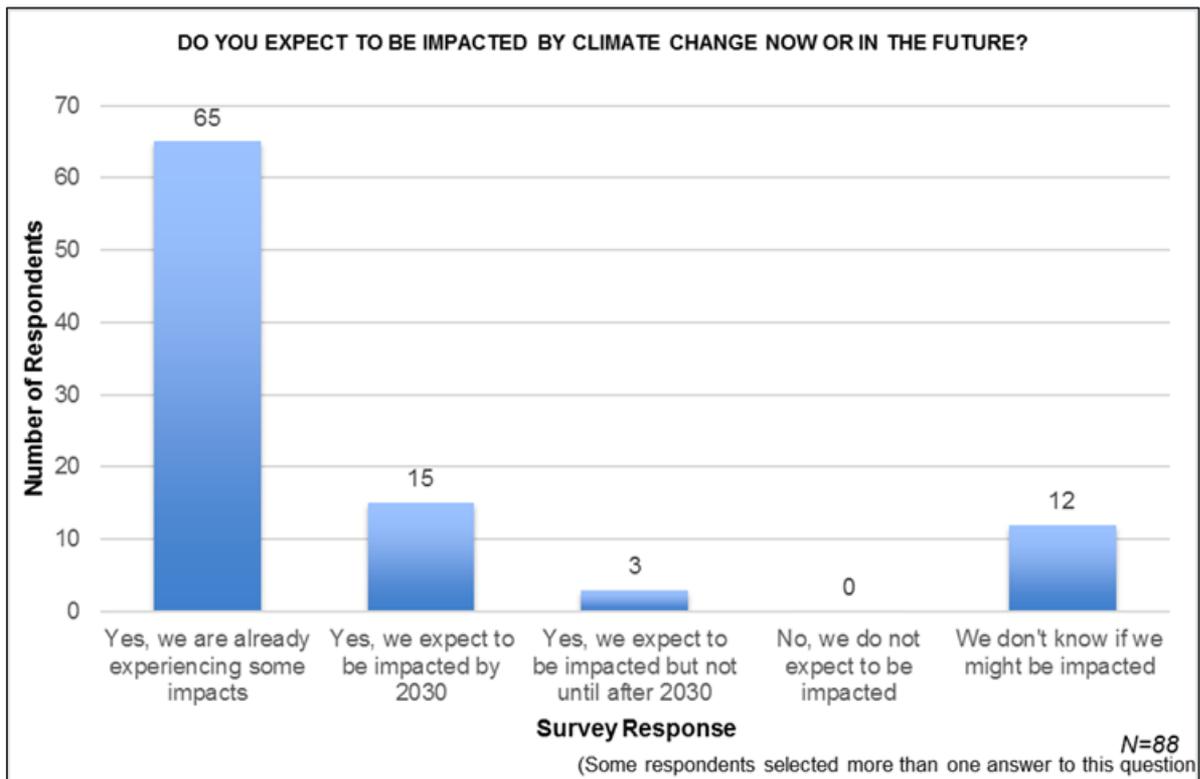
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Number of Respondents by ICAO Region





Do you expect to be impacted by Climate Change now or in the future?





Main climate impacts by region

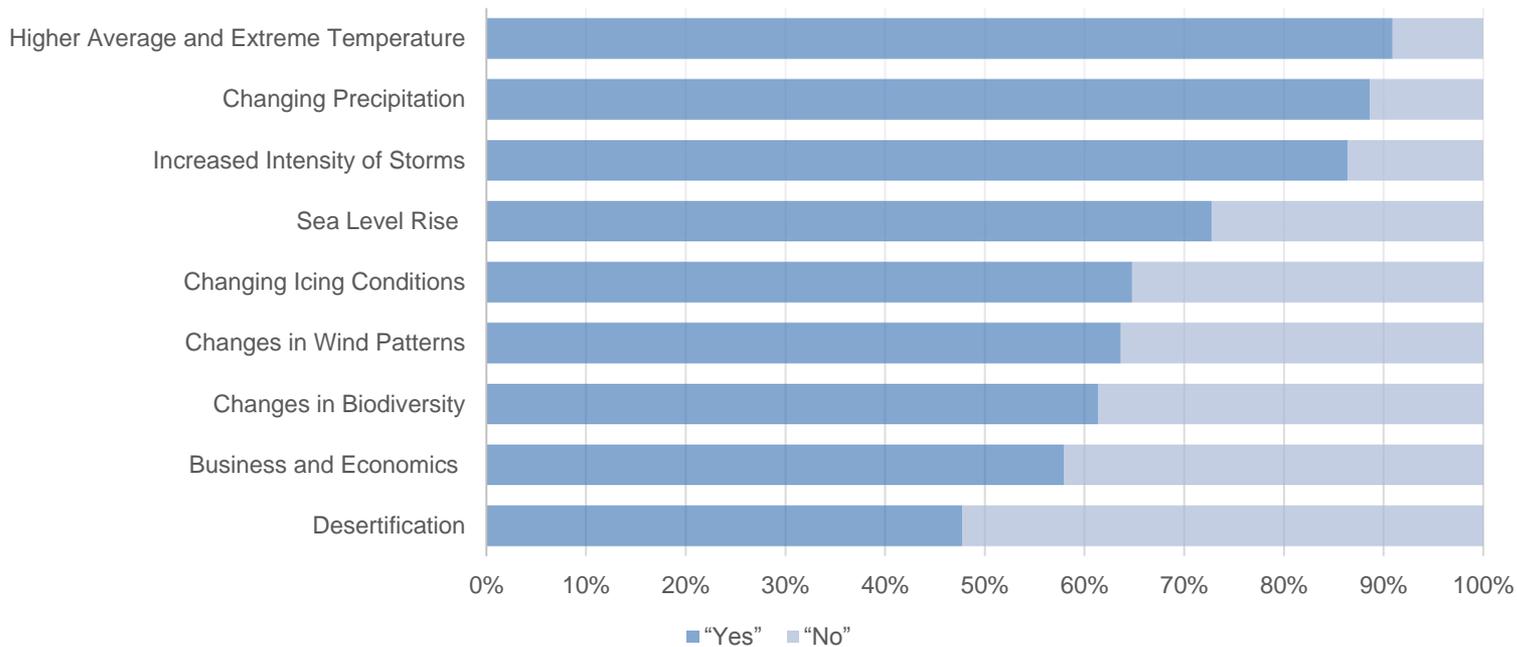
- Sea Level rise
- Changes in Biodiversity
- Increased intensity of storms
- Changing precipitations
- Desertification
- High average and extreme temperatures
- Changing icing conditions
- Changes in wind patterns
- Business and Economics





Impacts that Stakeholders are expecting

PERCENT OF RESPONDENTS THAT ARE AFFECTED TODAY, OR EXPECT TO BE AFFECTED IN THE FUTURE, BY IMPACT CATEGORY





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Analysis of Climate Change Impacts

- Summary of Impact and Timescales
- Potential Effects on Aviation
- Adaptation and Resilience Measures
- Survey Analysis

Impact Categories

- Sea level rise
- Storm surge
- Increased intensity of storms
- Changes in average and extreme temperatures
- Changing precipitation
- Changing icing conditions
- Changes in wind speed, patterns and directions
- Desertification
- Changes in Biodiversity (wildlife and ecosystems)
- Business and Economics





Impact and Timescales

- Average global mean temperatures and extreme high-heat days expected to increase.

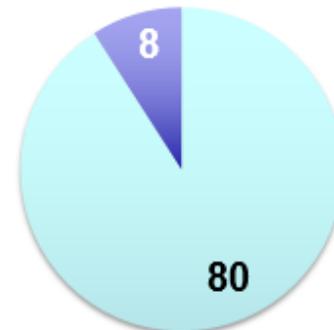
Potential Effects on Aviation

- Stress to cooling systems
- damage to airfield surface
- Affect aircraft take-off requirements.
- Degradation of permafrost

Adaptation and Resilience Measures

- Increase cooling capability
- Runway length & scheduling
- Reinforce airport surface areas

RESPONDENTS THAT ARE OR EXPECT TO BE AFFECTED BY HIGHTER AVERAGE AND EXTREME TEMPERATURES



■ Yes ■ No

N= 88

Survey Results

80 of 88 respondents stated they are affected today or expect to be affected in the future (91 percent).



Changing Precipitation



Impact and Timescales

- Changes in precipitation type (e.g., rain, snow, hail) and frequency, potential extreme rainfall or prolonged drought

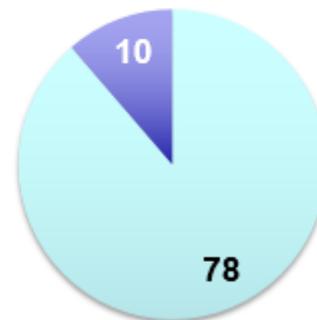
Potential Effects on Aviation

- Flooding of airport surfaces & infrastructure
- Reduced water availability.

Adaptation and Resilience Measures

- Increase drainage capability
- Water conservation measures

RESPONDENTS THAT ARE OR EXPECT TO BE AFFECTED BY CHANGING PRECIPITATION



■ Yes ■ No

N= 88

Survey Results

78 of 88 respondents stated they are affected today or expect to be affected in the future (89 percent).



Increased Intensity of Storms



Impact and Timescales

- Storms projected to be stronger & potentially more frequent.
Increased risk of extreme weather

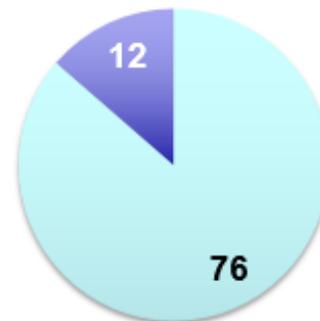
Potential Effects on Aviation

- Damage to aviation infrastructure
- Delays or cancellations of flights

Adaptation and Resilience Measures

- Reinforce infrastructure
- Pre-emptive cancellation of flights

RESPONDENTS THAT ARE OR EXPECT TO BE AFFECTED BY INCREASED INTENSITY OF STORMS



Yes No

N= 88

Survey Results

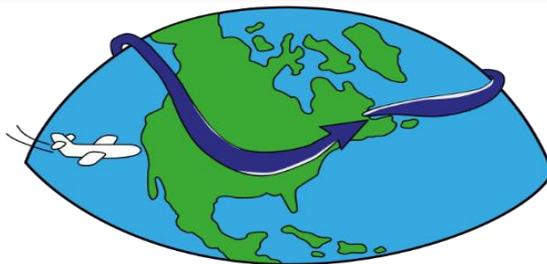
76 of 88 respondents stated they are affected today or expect to be affected in the future (88 percent).



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Changes to the jet stream



Impacts to routings

Flight times

Fuel burn and emissions



Management of
en-route capacity



Gate and slot
management



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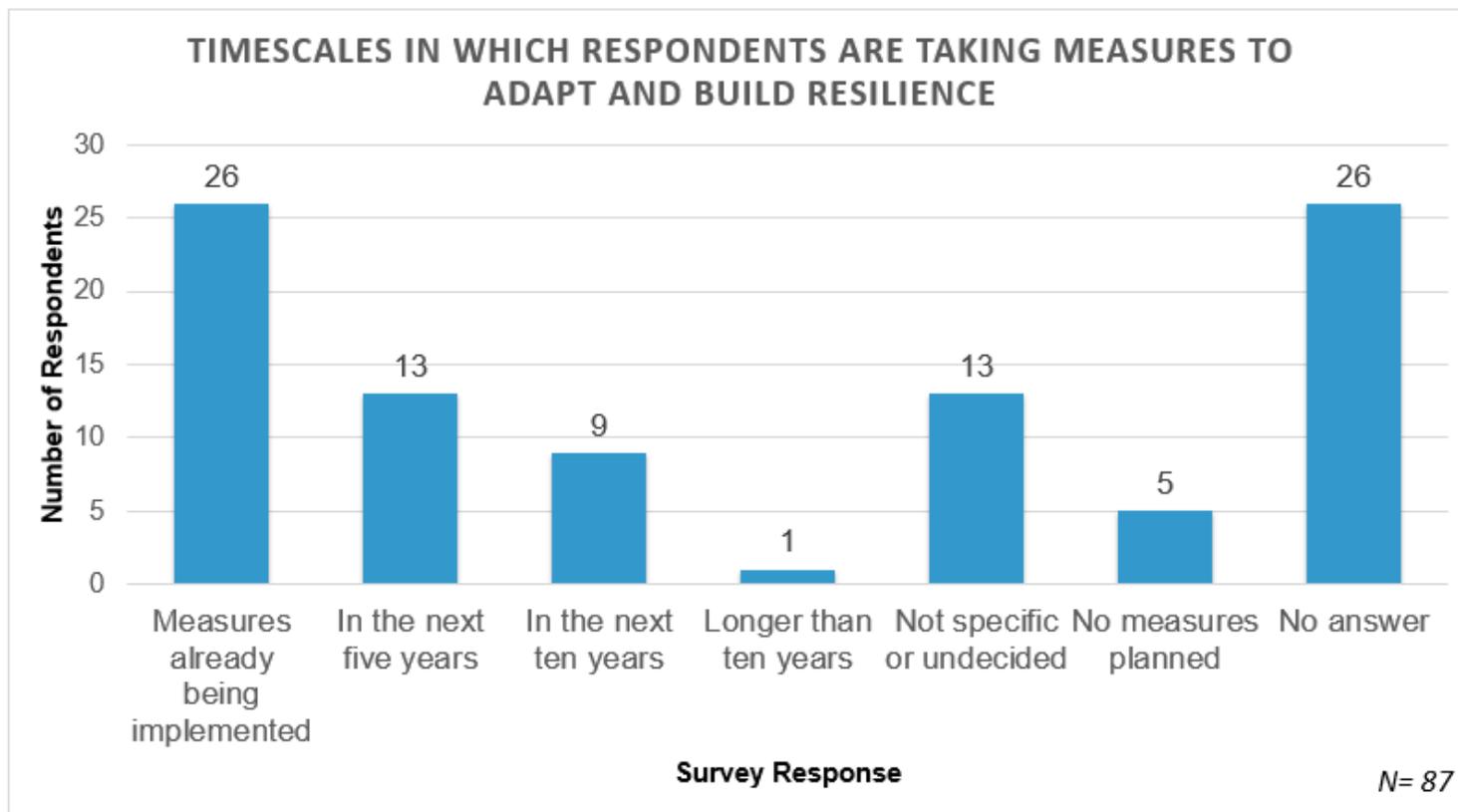
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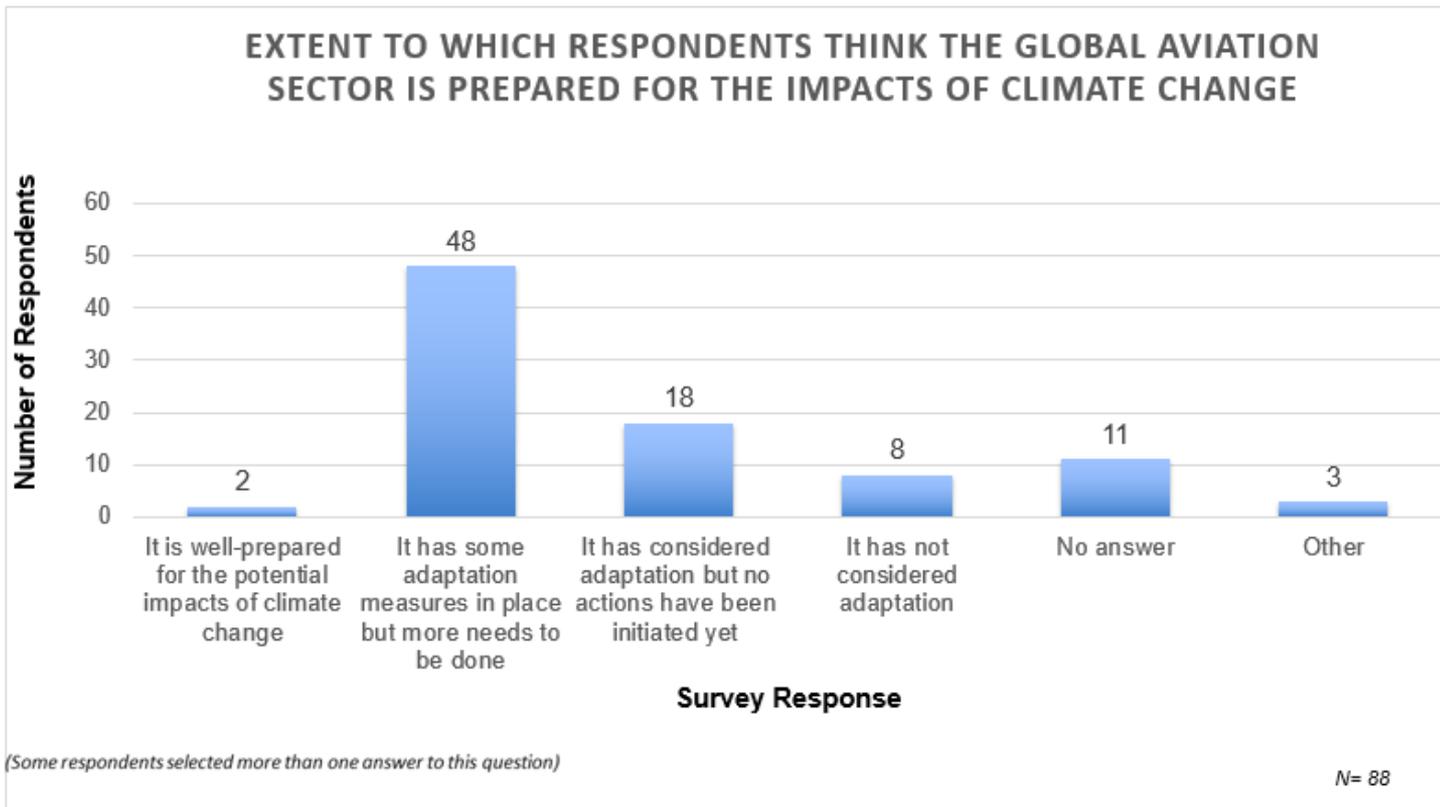
Global Network: global challenge





Adapting and Building Resilience







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What do our Stakeholders think? How can we ramp up action?

Capacity building, training,
guidance

Coordination and
collaboration

Adaptation, risk
assessment, policies and
planning (Global)

Adaptation, risk
assessment, and planning
(National and local)

Infrastructure and
technical adaptation

Operational adaptation

Research

Met services

Q: Is the global aviation sector prepared for the impacts of climate change?

A: Guidance material has been developed but training and raising awareness should be conducted as well. (State)

We see a lot of good examples of risk assessments carried out. We believe such assessments are the most important basis for a rational approach to climate adaptation. (Airport)

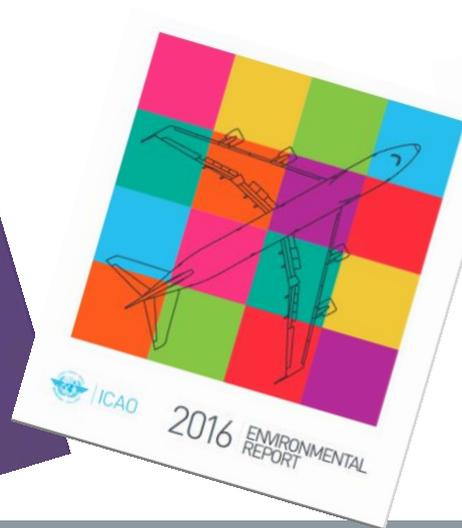
A: Rising awareness and capacity building for climate change among community and aviation stake holders, and promote environment friendly strategy. (State)

➤ **Action is being taken, but need more to be done, and to be done more quickly**



What next for CAEP/12?

- ICAO Environment Report 2019
- Disseminate information on the Climate Adaptation Synthesis
- New work on risk assessment and adaptation measures



CAEP WG2 Task 07.0 Climate Adaptation Synthesis Analysis

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Conclusions



- Awareness is growing: more States and aviation sector organisations taking action
- *But*, we can do more, and more quickly
- First step is a climate change risk assessment to identify vulnerabilities
- Then develop a climate change adaptation strategy or plan
- Individual solutions for individual organisations, but –
- Global network = global challenge
- We ***all*** need to take action





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THANK YOU