



1st FutureMed Workshop & Training School
29th September to 3rd October – Chania, Crete



The quality and consistency of urban climate adaptation plans in 327 European cities



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PER L'ANALISI AMBIENTALE

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Cities at the centre of global Climate Action:

- responsible for more than 75% of GHGs
- are facing a growing threat from climate change, with increased frequency and intensity of floods and heatwaves impacting infrastructure, public health, etc.



i.e., achieving net zero GHG emissions by balancing emissions released so that they are equal to or less than the amount removed (UNFCCC)



i.e., a city's ability to survive, adapt and thrive in the face of climate-related shocks and stresses (Climate Resilient Cities)



There is an **adaptation 'gap'** between climate goals and the measures being undertaken



Research questions



Are city governments addressing these climate threats in their official Adaptation Climate Action Plans (A-CAPs)?

Are these plans internally consistent, i.e, with clear alignment between climate risks, policy goals, measures and monitoring & evaluation?

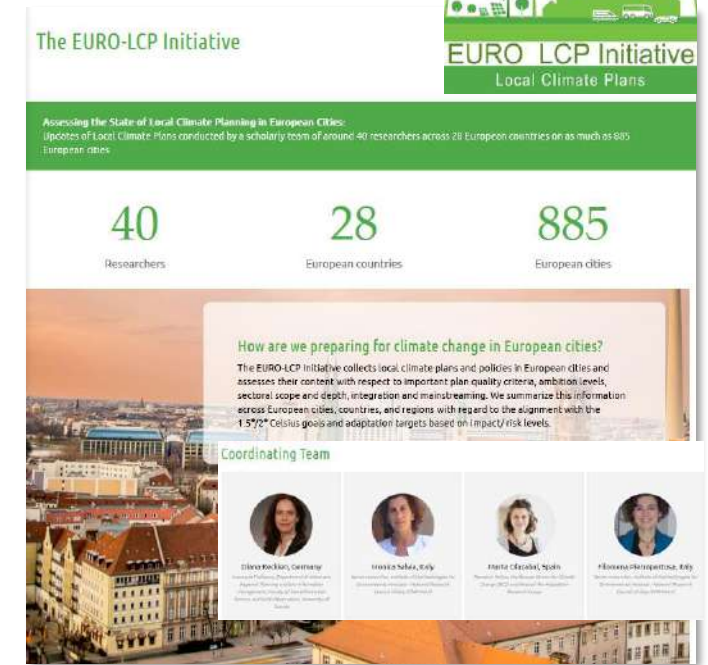


We present evidence from two recent studies conducted by core members of the **EURO-LCP Initiative** to address these research questions

The **EURO-LCP Initiative** collects local climate plans and policies in European cities and **assesses their content** with respect to important plan **quality criteria, ambition levels, sectoral scope and depth, integration and mainstreaming**.



The Initiative originated from the **COST Action TU0902, 'Integrated assessment technologies to support the sustainable development of urban areas'**, which took place from 2009 to 2013.



Two recent studies



(Reckien et al., 2023) “Quality of urban climate adaptation plans over time” *npj Nature Urban Sustainability*

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INTRODUCTION

Since the Paris Agreement (PA) in 2015¹, there has been an increasing focus on assessing the progress of climate change adaptation across multiple sectors and regions^{2–4}, including subnational jurisdictions such as local and regional authorities^{5–8}. The Paris Agreement set an agenda for the Global Stocktake of adaptation, with a view to “review the overall progress made in achieving the global goal on adaptation” (PA, art. 14d). Hence, an important question is what progress means and how it could be assessed, at the international, national, and local levels. With the First Global Stocktake due in 2023, researchers have sought to address the issue, whilst acknowledging the challenge of lacking consensus on how adaptation at this level can be tracked^{9–11}.

Hitherto, there is a wealth of information on climate responses at sub-national levels¹². Cities and urban areas are increasingly recognised as important actors in climate responses^{13–15}, with the potential to influence neighbouring as well as upper levels of government. In urban adaptation studies, most assessments focus on tracking and analysing outputs, such as approved adaptation plans, as these currently account for the majority of adaptation activities on the ground^{16–18} and are often more easily comparable and trackable¹⁹ than, e.g., impacts and outcomes. Analysing plans cannot tell the whole story in terms of actual progress in collective reduction (or redistribution) of climate impacts^{18,20}. However, it can provide information about the quality and relevance of adaptation processes and actions (also referred to as “resilience” in policy and planning literature), and help to assess the likelihood that we are advancing adaptation goals by reducing risks and increasing resilience in an equitable manner^{21–23}. Scholars argue that the best method to ensuring robust adaptation is to ensure rigorous adaptation planning processes^{24–26}. Indeed, higher quality plans have been found to decrease the cost of disasters more than

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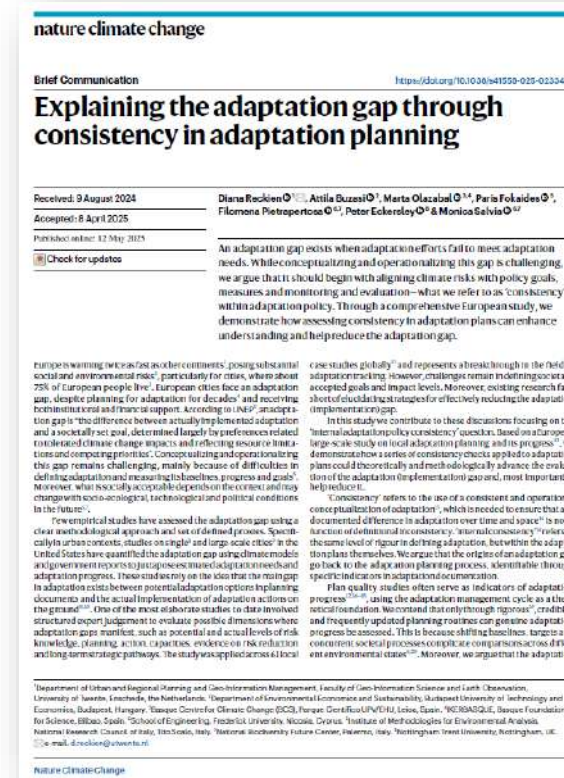
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npj



(Reckien et al., 2025) “Explaining the adaptation gap through consistency in adaptation planning” *Nature Climate Change*

2



urban warming, increased sea level rise, and other hazards, posing substantial social and environmental risks²⁷, particularly for cities, where about 75% of European people live²⁸. European cities face an adaptation gap, despite planning for adaptation for decades²⁹ and receiving technical and financial support. Knowledge on why an adaptation gap exists is limited, but it is clear that it is not just a matter of “the difference between what is planned and what is achieved” and a societal goal, determined largely by preferences related to risk and climate change impacts, and reflecting resource limitations and competing priorities³⁰. Conceptualizing and operationalizing this gap remains challenging, mainly because of difficulties in defining adaptation and measuring both processes, progress and goals³¹. Moreover, what is socially acceptable depends on the context and may change with socio-economic, technological and political conditions in the future³².

Several empirical studies have assessed the adaptation gap using a clear methodological approach and set of defined processes. Specifically, urban contexts, studies on single and large-scale cities in the United States have quantified the adaptation gap using climate models and government reports to compare intended adaptation measures and adaptation progress. These studies rely on the idea that the main gap in adaptation exists between potential adaptation options (planning documents) and the actual implementation of adaptation actions on the ground^{33–35}. One of the most elaborate studies to date involved structured expert judgement to evaluate possible dimensions where adaptation gaps manifest, such as potential and actual levels of risk knowledge, planning, action, capacities, evidence on risk reduction and understanding pathways. The study was applied across 61 local case studies globally³⁶ and represents a step forward in the field of adaptation tracking. However, challenges remain in identifying socially accepted goals and impact levels. Moreover, existing research falls short of elucidating strategies for effectively reducing the adaptation implementation gap.

In this study, we contribute to these discussions focusing on the “internal adaptation policy consistency” question, based on a European large-scale study on local adaptation planning and its progress³⁷. We demonstrate a series of consistency checks applied to adaptation plans could theoretically and methodologically advance the evaluation of the adaptation implementation gap and, most importantly, help to reduce it.

Consistency refers to the use of a consistent and operational conceptualisation of adaptation³⁸, which is needed to ensure that any documented difference in adaptation over time and space “is not a function of institutional inconsistency.” Internal consistency “refers to the same level of rigor in defining adaptation, between the adaptation plan themselves. We argue that the origins of an adaptation gap go back to the adaptation planning process, identifiable through specific indicators in adaptation planning and documentation.

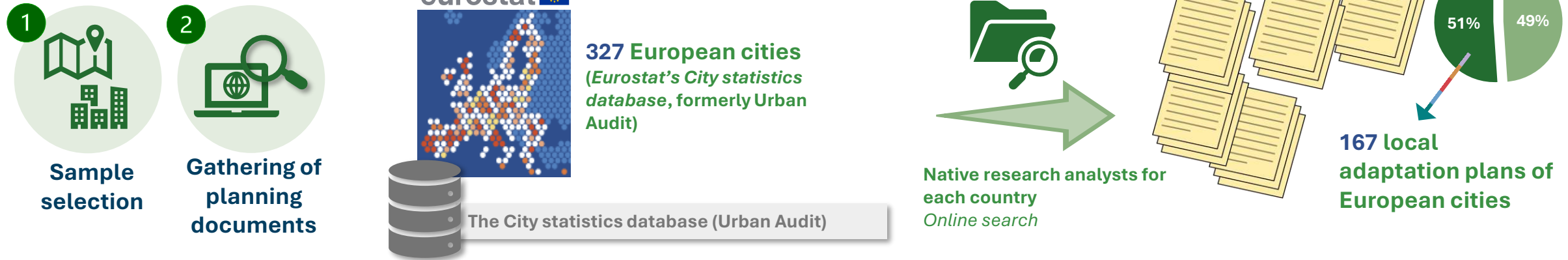
Plan quality studies often serve as indicators of adaptation progress^{39–41}, using the adaptation management cycle as a theoretical foundation. We contend that only through “rigorous,” “credible” and frequently updated planning routines can genuine adaptation progress be assessed. This is because shifting baselines, targets and consistent social processes complicate comparisons across different environmental cases⁴². Moreover, we argue that the adaptation

Department of Urban and Regional Planning and Geo-information Management, Faculty of Geo-information Science and Earth Observation, University of Twente, Enschede, The Netherlands; Department of Environmental Economics and Sustainability, Budapest University of Technology and Economics, Budapest, Hungary; Institute for Climate Change (IC3), Project Centre (UMM), Leiden, The Netherlands; 1. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 2. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 3. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 4. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 5. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 6. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 7. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 8. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 9. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 10. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 11. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 12. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 13. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 14. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 15. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 16. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 17. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 18. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 19. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 20. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 21. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 22. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 23. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 24. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 25. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 26. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 27. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 28. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 29. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 30. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 31. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 32. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 33. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 34. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 35. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 36. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 37. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 38. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 39. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 40. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 41. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands; 42. Institute for Urban and Regional Planning, University of Twente, Enschede 7500 AE, The Netherlands.

Nature Climate Change

1 Quality of urban climate adaptation plans over time

Developing a methodology to measure the quality of urban adaptation plans



1 Quality of urban climate adaptation plans over time

Developing a methodology to measure the quality of urban adaptation plans



1 Quality of urban climate adaptation plans over time

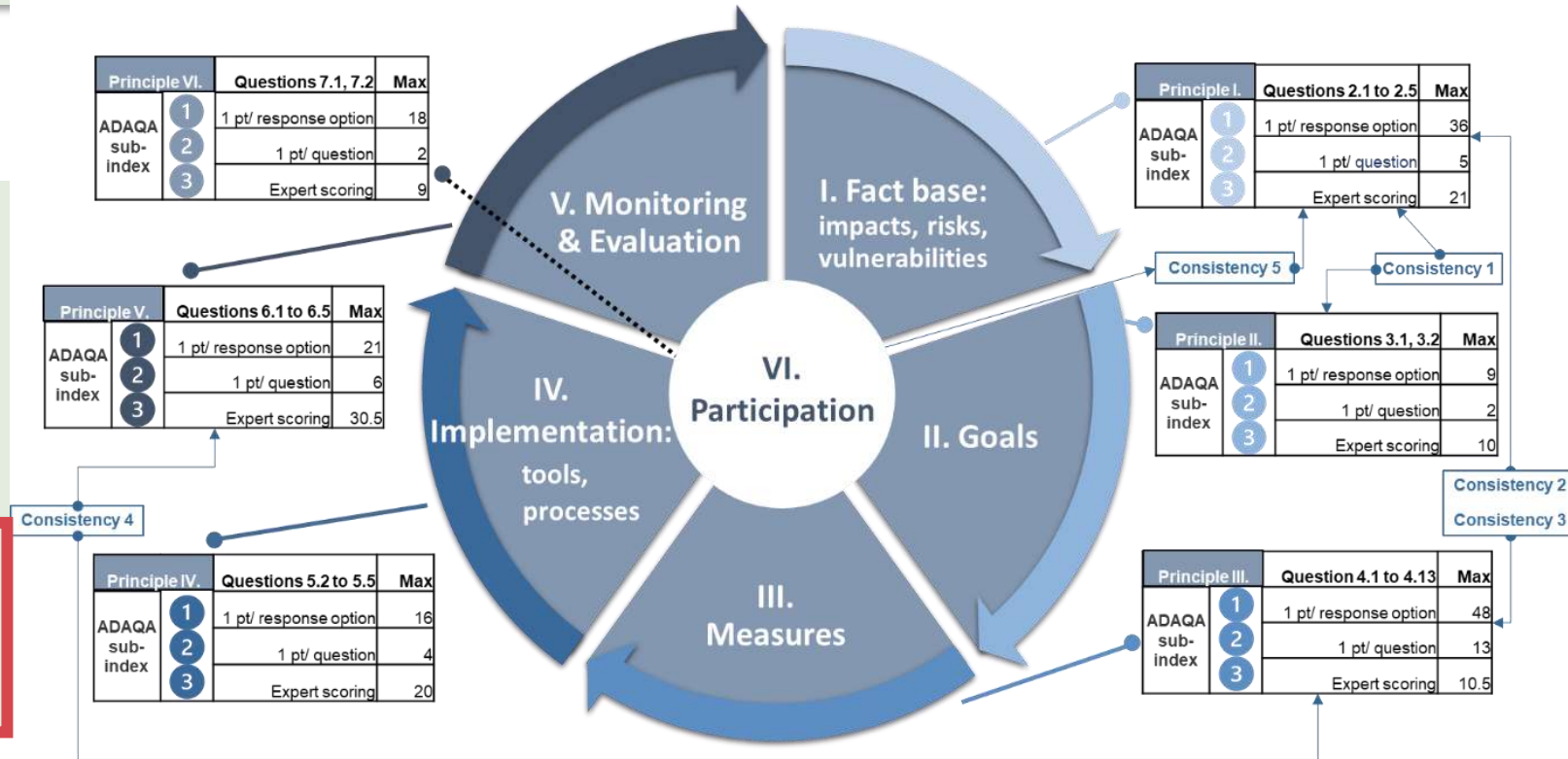
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The ADaptation plan Quality Assessment index: the ADAQA index

Index construction

- The **ADAQA** index is based on six well-established plan quality principles, i.e. **Comprehensive coverage** + **Consistency**
- Three different sub-indices developed, ADAQA-1, ADAQA-2, ADAQA-3
- ADAQA-3 uses complex heuristics and our expert judgement, stressing the need for consistency between different parts of the plan.



Plan quality is defined as the strengths of plans assumed to lead to effective implementation and reduced tradeoffs and maladaptation.

1 Quality of urban climate adaptation plans over time

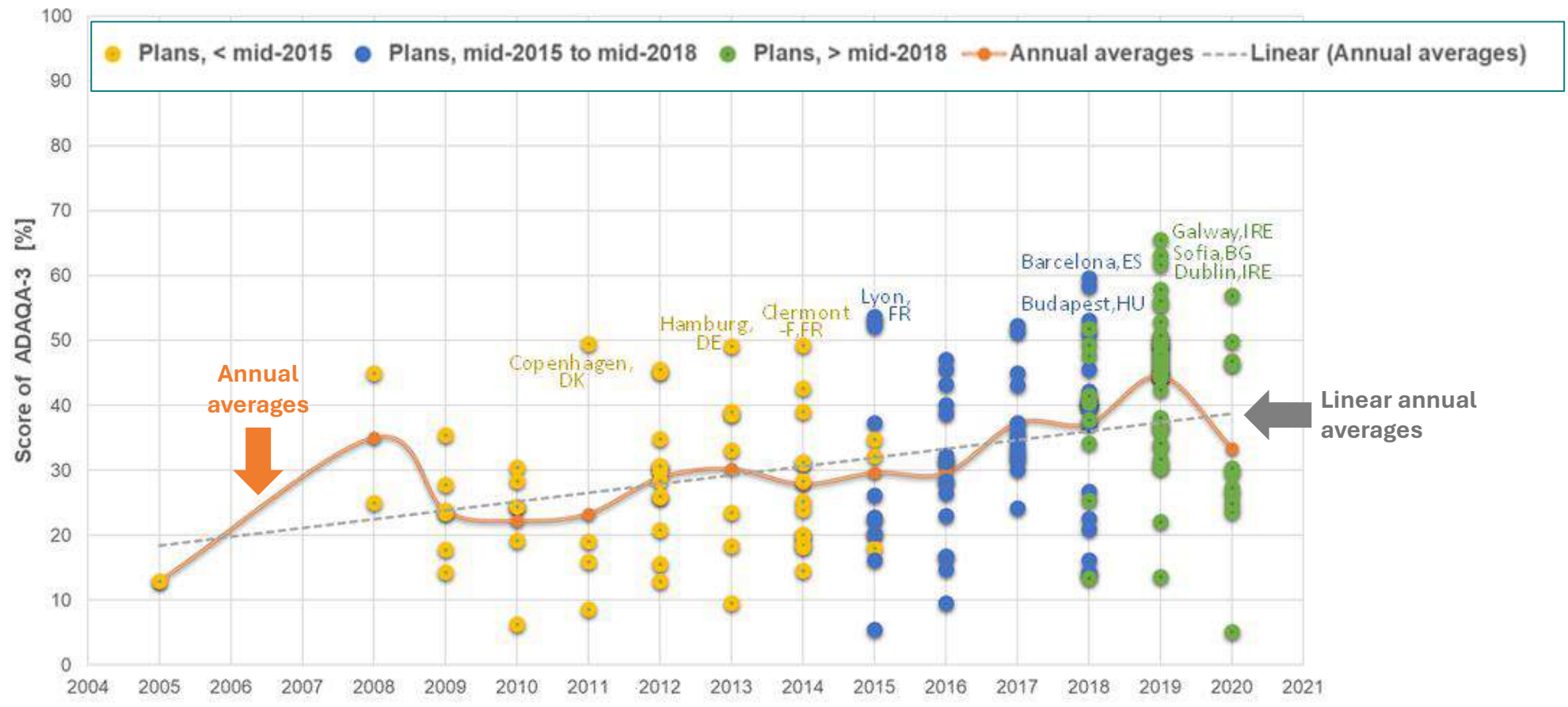
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Finding#1:

Plan Quality in European cities is increasing from 2005 to 2020, by about 1.3 percentage points/ year.

Data analysis



1 Quality of urban climate adaptation plans over time

6



Data analysis

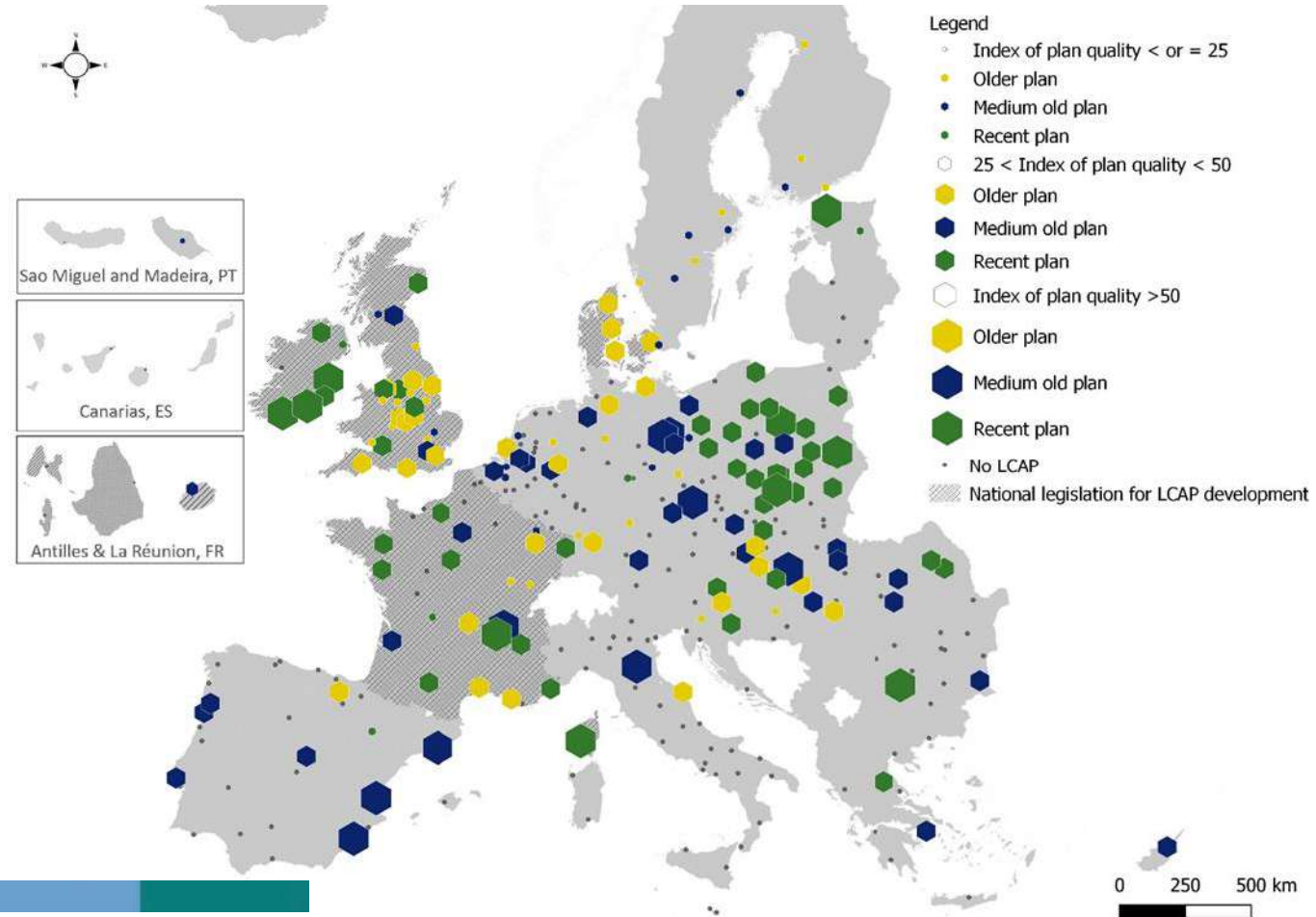
Finding #2:

Newer plans (in green) are higher in quality. These are mainly found in cities in Ireland, France, and Eastern Europe, in particular Poland. Most of these cities follow a national model.

- There are also some good plans before 2018, mostly in larger cities.



Top-ranking cities are
**Sofia (BG), Galway (IE),
Waterford (IE), Dublin (IE),
and Potsdam (DE).**



1 Quality of urban climate adaptation plans over time

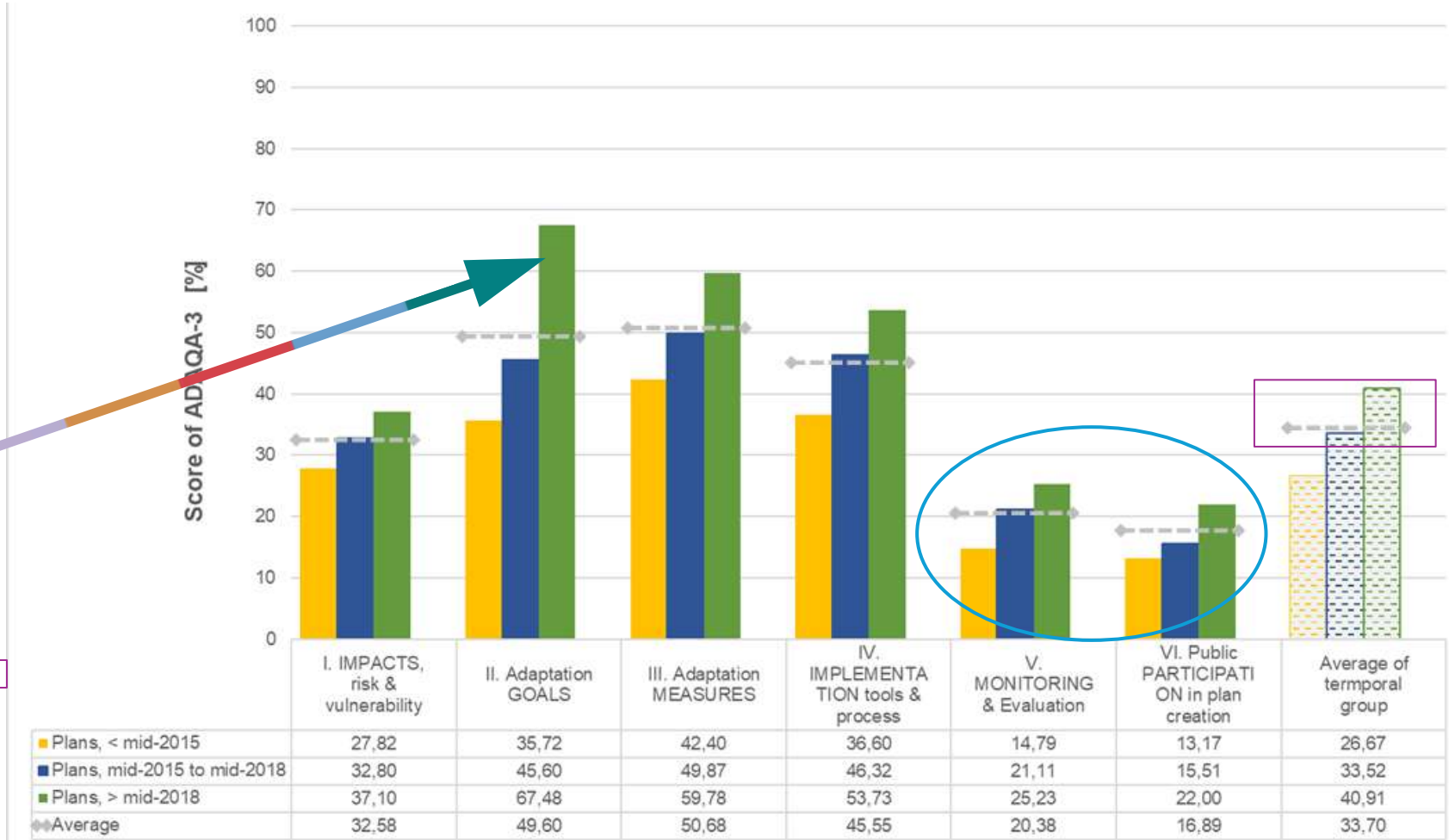


Data analysis

Finding #3:

Across principles,

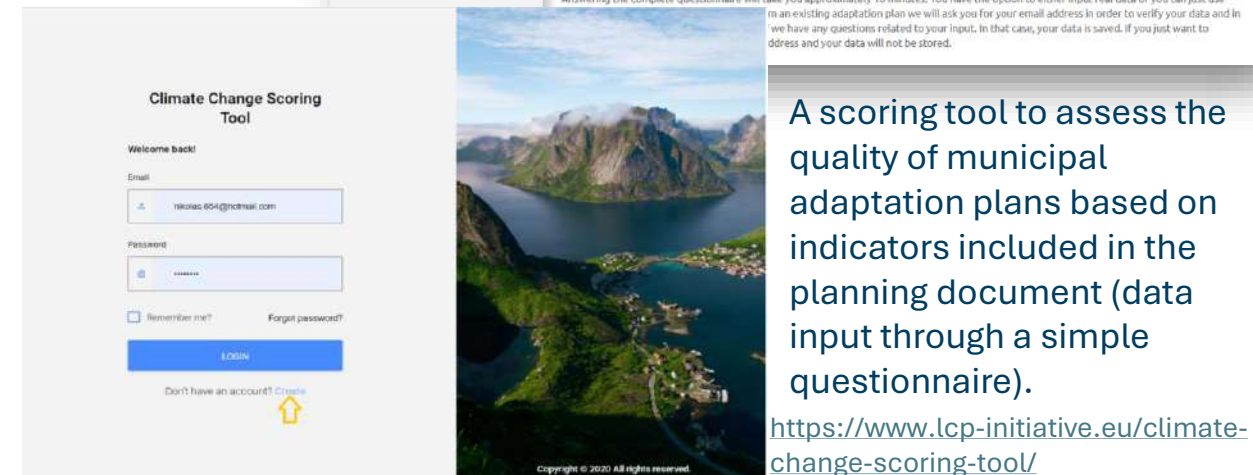
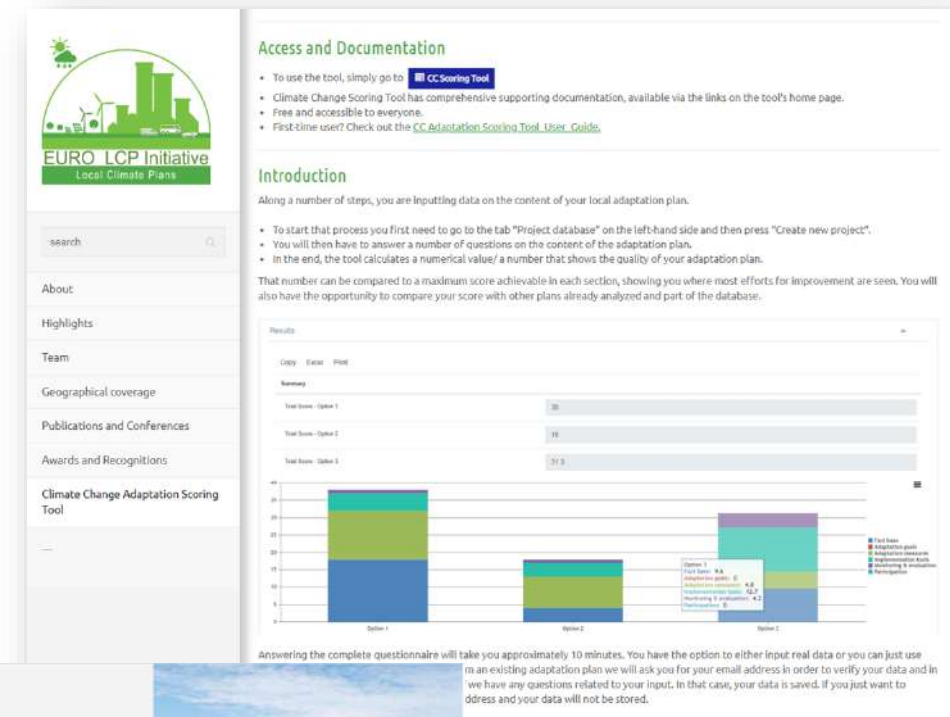
- adaptation goals improved most in **recent plans** (in green).
- Specifying M&E, and participation is generally low.
- On average, plans reach 34% of coverage/ comprehensiveness.



1 Quality of urban climate adaptation plans over time

Further developments:

1. The ADaptation plan Quality Assessment (ADAQA) index was incorporated into the **Climate Change Adaptation Scoring Tool**:
 - An online scoring tool to help decision makers and practitioners to measure and track the quality of A-CAPs



A scoring tool to assess the quality of municipal adaptation plans based on indicators included in the planning document (data input through a simple questionnaire).

<https://www.lcp-initiative.eu/climate-change-scoring-tool/>

1 Quality of urban climate adaptation plans over time

Further developments:

2. Contribution to the **EEA** Report on urban adaptation
3. Collaboration with **EU Joint Research Centre (JRC)** to apply the methodology to the adaptation pillar of **SECAPs** in the Global Covenant of Mayors (GCoM) database
4. Collaboration with **Global Green Growth Institute (GGGI)** to apply the methodology to review the National Adaptation Plans (NAPs) of developing countries



European
Environment
Agency



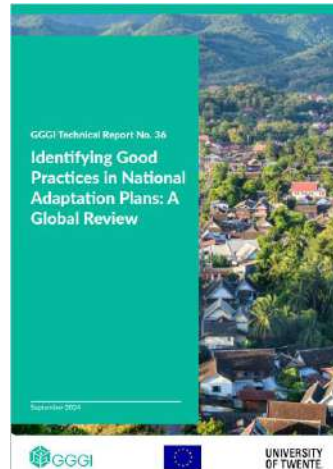
GLOBAL COVENANT
of MAYORS for
CLIMATE & ENERGY



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Global
Green Growth
Institute



Report Release on 30th Sep 2024:

[Identifying Good Practices in National Adaptation Plans: A Global Review — Global Green Growth Institute](#)

Guidelines and recommendations for developing good quality, robust NAPs.



Global review and assessment on multi-level national adaptation planning for system transformation



UN Climate Change - ...

Iscriviti

7



Condividi



<https://www.youtube.com/watch?v=9tVlpoMJ3il>



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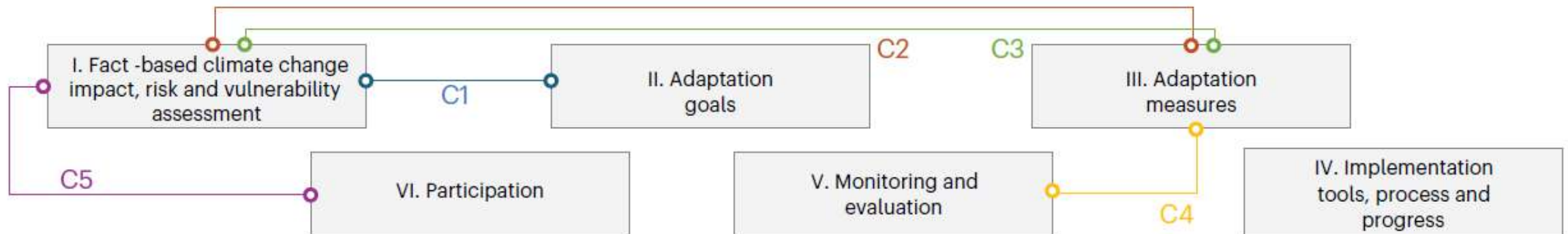
M. Salvia et al., 1st FutureMed Workshop, Chania, 30/09/2025

2 Explaining the adaptation gap through consistency...

We assessed the **current adaptation gap** at urban level by **analysing 'consistency' in adaptation planning**.

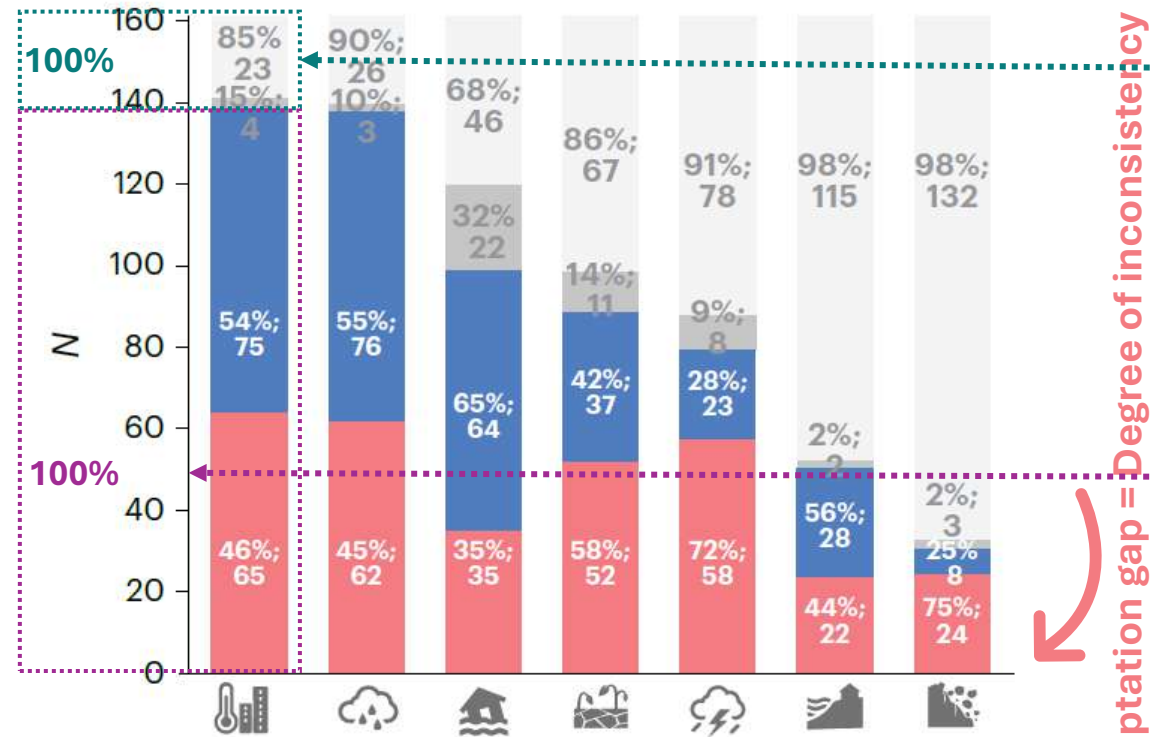


5 'consistency checks' at different stages of the adaptation management process, using the same data on coverage and the five forms of consistency.



This highlighted gaps, misalignments and inconsistencies between the various planning phases of the 167 European cities.

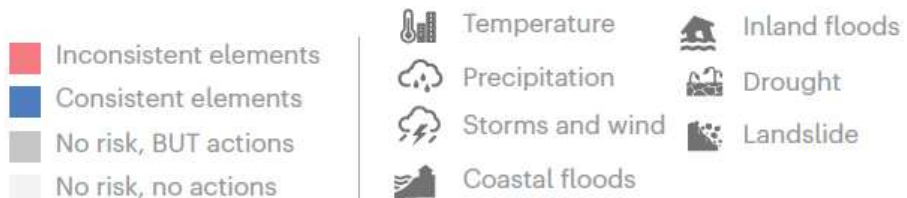
2 Explaining the adaptation gap through consistency...



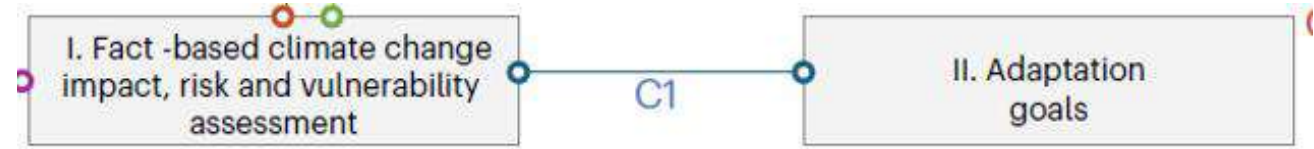
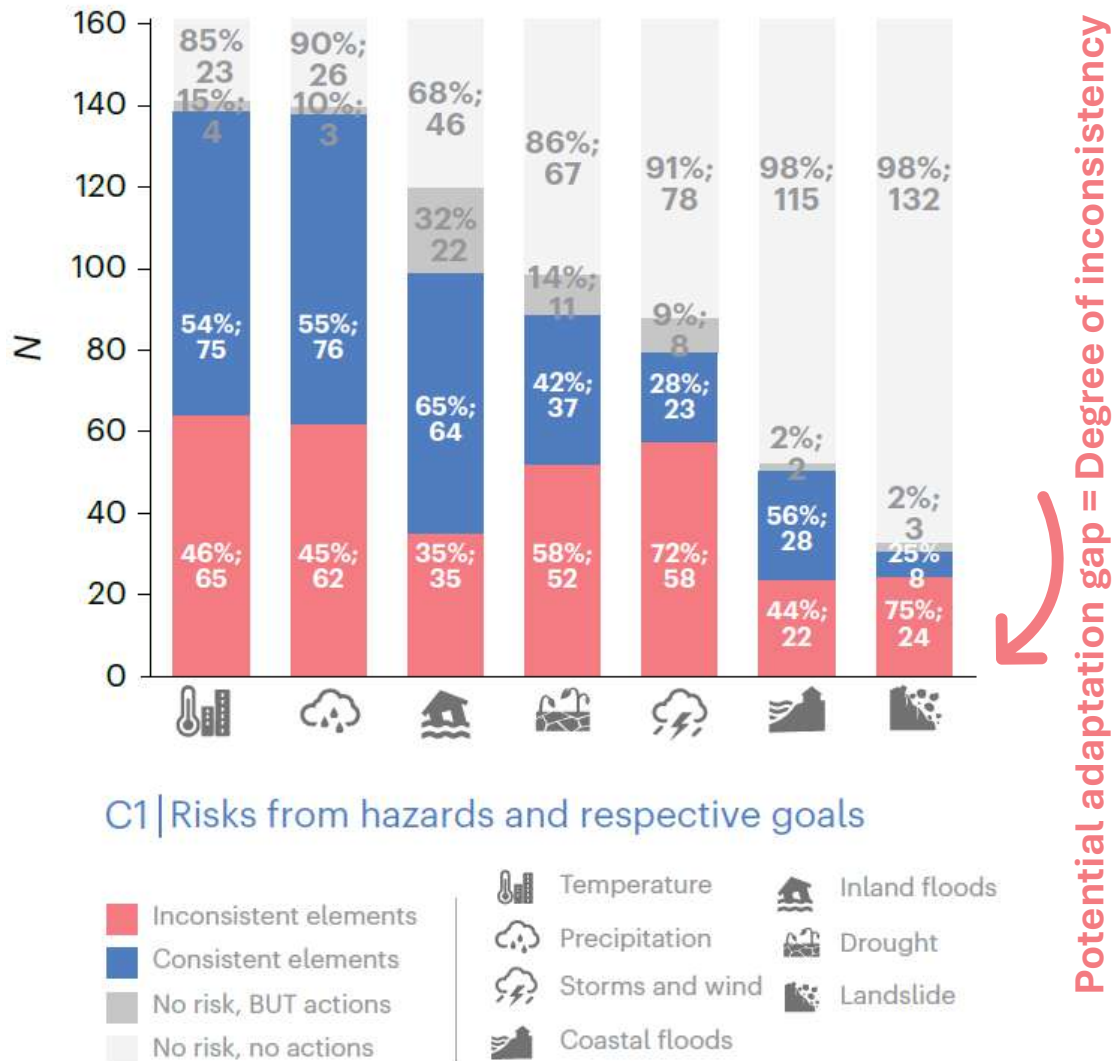
- percentage figures on grey bars add up to 100%, showing cities without risk information and measures (and with or without measures/actions).

- figures on coloured bars add up to 100%, representing cities with respective risk information or planned measures (and with or without the second element checked for consistency);

C1 | Risks from hazards and respective goals



2 Explaining the adaptation gap through consistency...

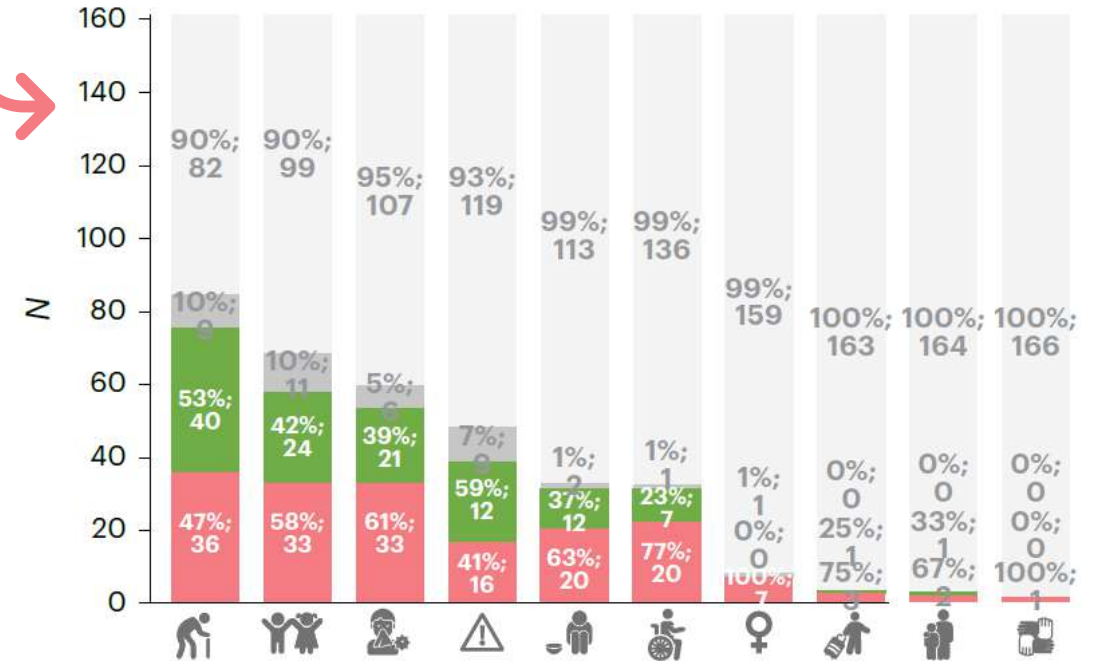
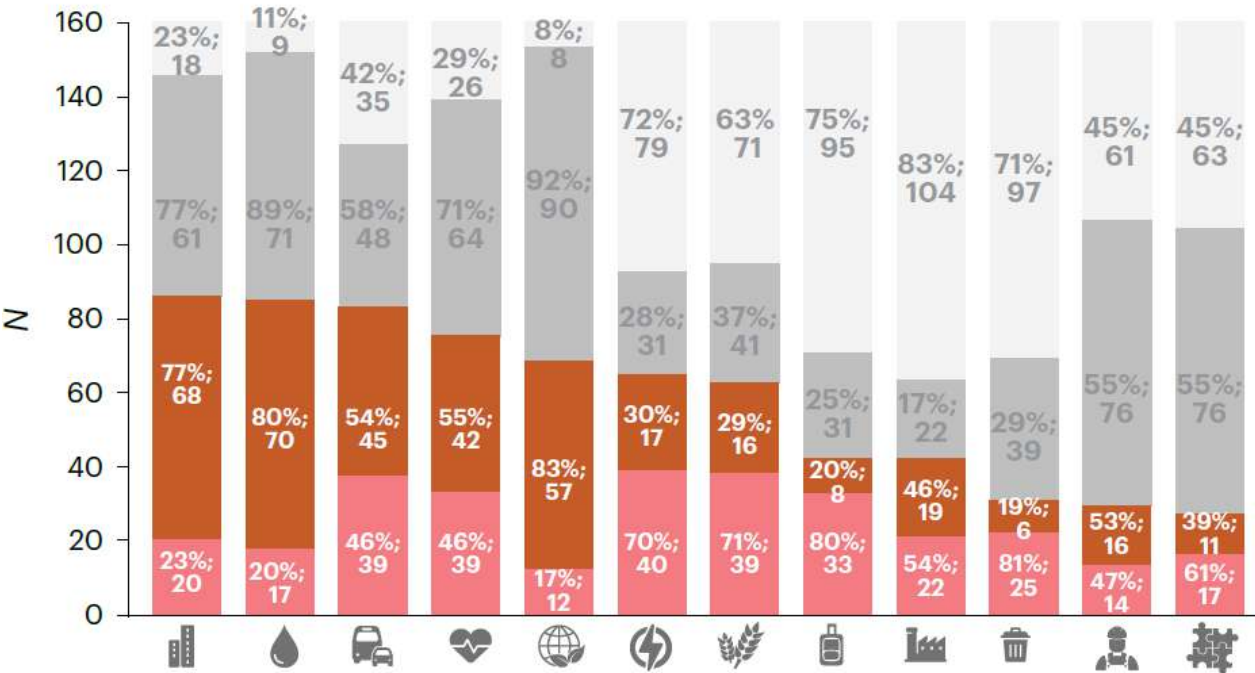


C1

- **2/5 of cities** with hazard risk information unearth a potential adaptation gap—that is, they **identify risks/hazards without a related adaptation goal**.
- Substantial **variation across hazards** exists, particularly for **landslides and wind/storm changes**, which are identified as a risk but not adequately followed up with an adaptation goal.
- About **1/3 of plans state an adaptation goal** related to **inland flooding without flooding** being identified as a risk—the largest such inconsistency among C1.

2 Explaining the adaptation gap through consistency...

Potential adaptation gap = Degree of inconsistency



C2 | Risks for sectors and respective measures

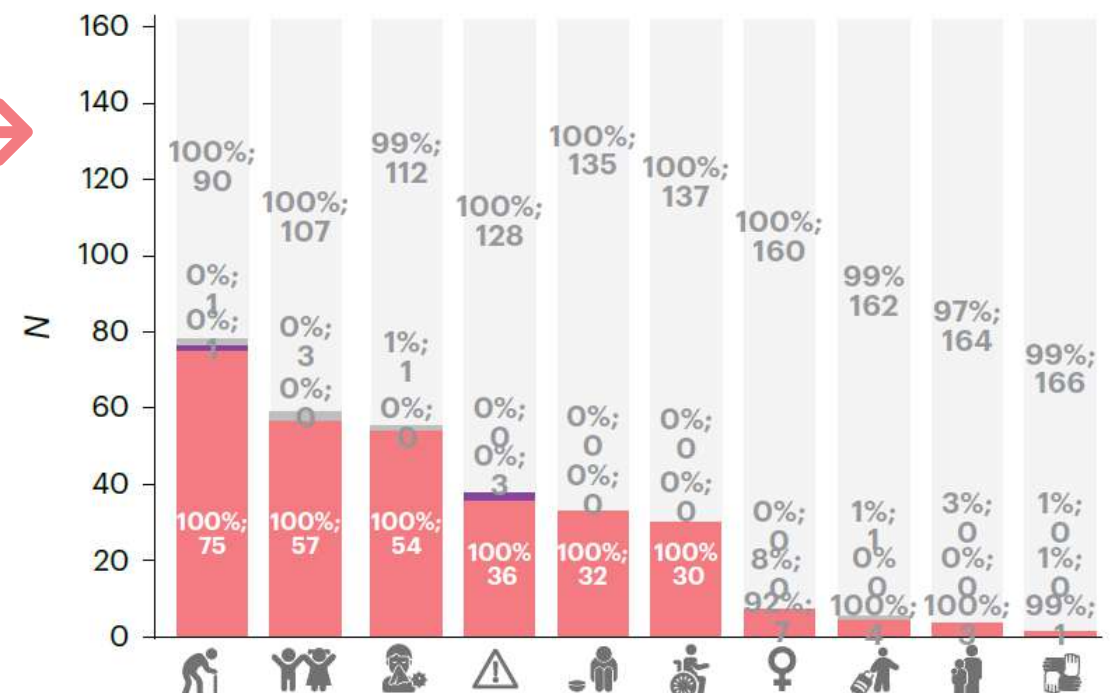
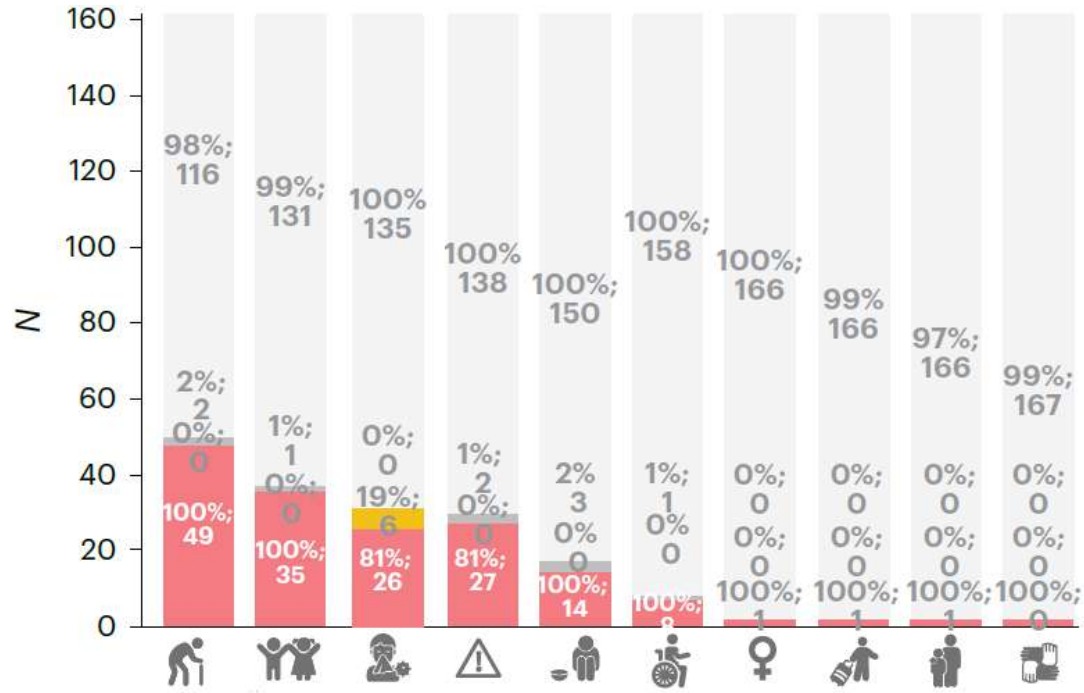


C3 | Risks for vulnerable groups and respective measures



2 Explaining the adaptation gap through consistency...

Potential adaptation gap = Degree of inconsistency



C4 | Measures for vulnerable groups and respective M&E



C5 | Risks for vulnerable groups and respective participation



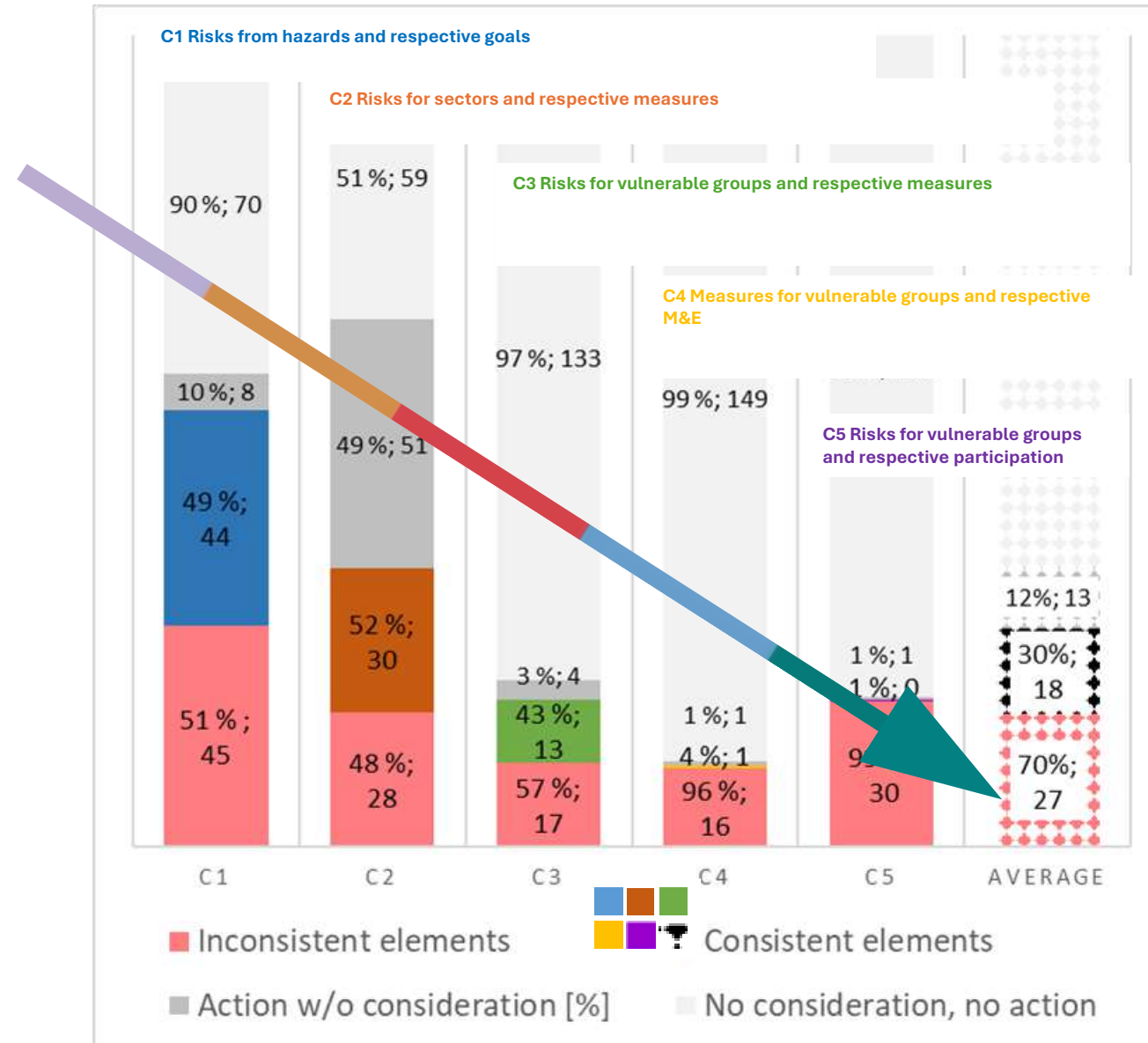
2 Explaining the adaptation gap through consistency...

On average:

→ **Adaptation gap: 70%** of our checks across all the CAPs identified inconsistencies within the adaptation process

→ i.e. if there is an identified risk, there is no related follow-up action

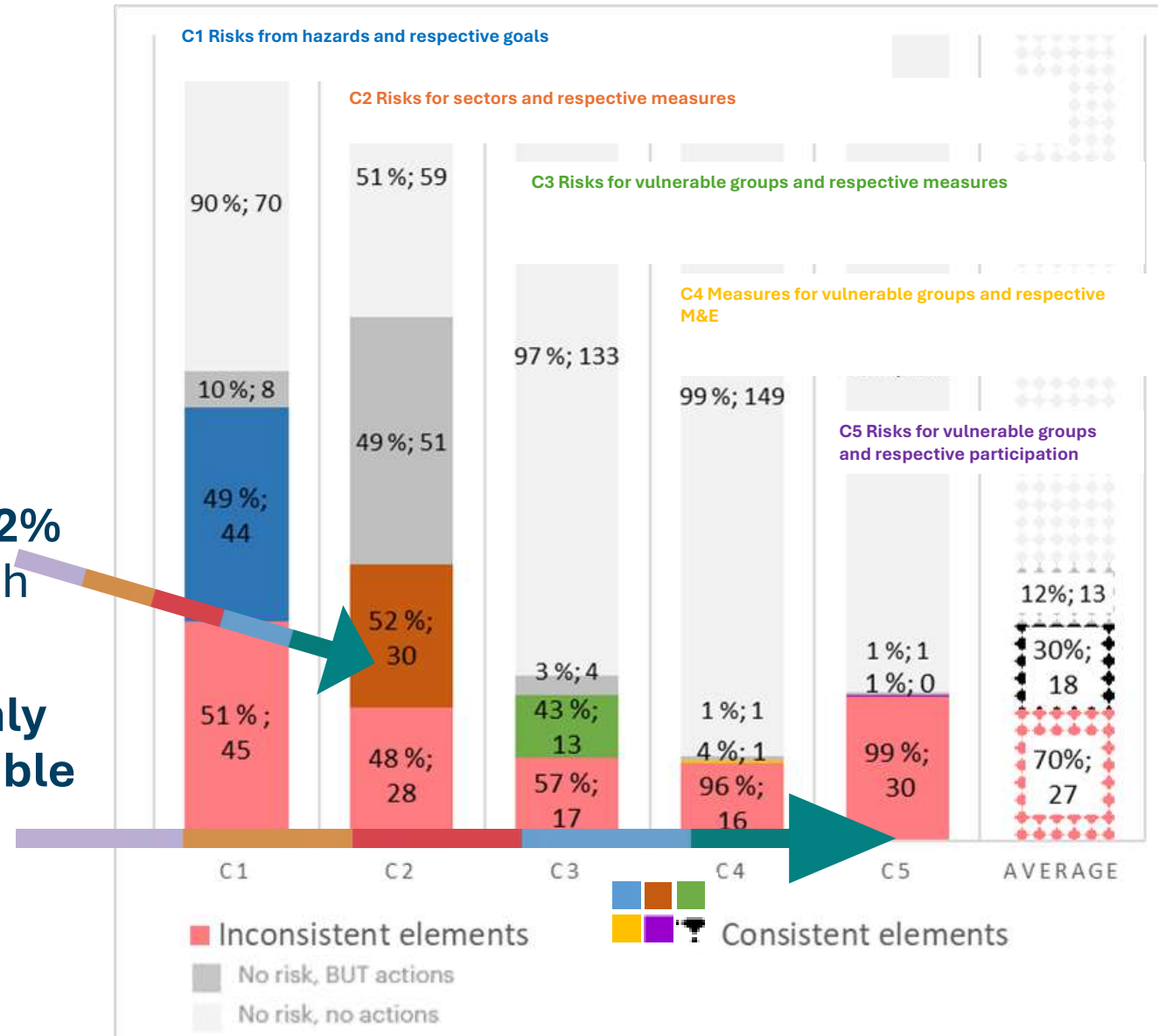
→ **Only 30% are consistent**



2 Explaining the adaptation gap through consistency...

On average:

- **C2** shows the **highest consistency: 52%** of plans fully aligning sectoral risks with adaptation measures.
- **C5** shows the **lowest consistency: only 1%** of plans effectively involve **vulnerable groups** in plan development.



2 Explaining the adaptation gap through consistency...

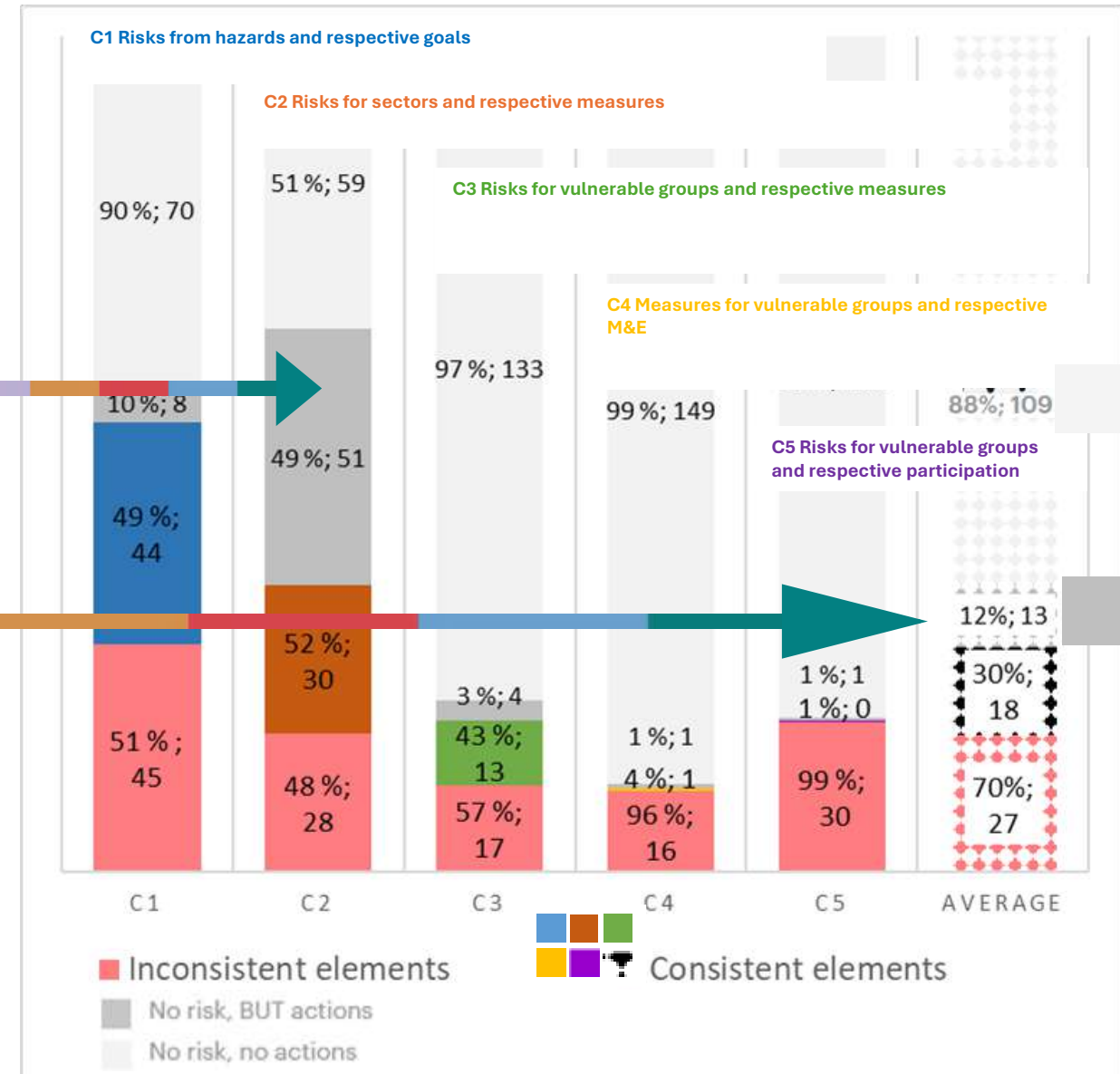
On average:

→ many adaptation goals and measures **lack preceding risk assessment**

→ **particularly in sector-specific planning** where **49%** of decisions are made without risk consideration

→ 12% of plans have actions w/o an identified risk/ need, e.g.:

→ A goal w/o risk; A measure w/o risk,
Participation w/o risk, M&E w/o a measure



2 Explaining the adaptation gap through consistency...

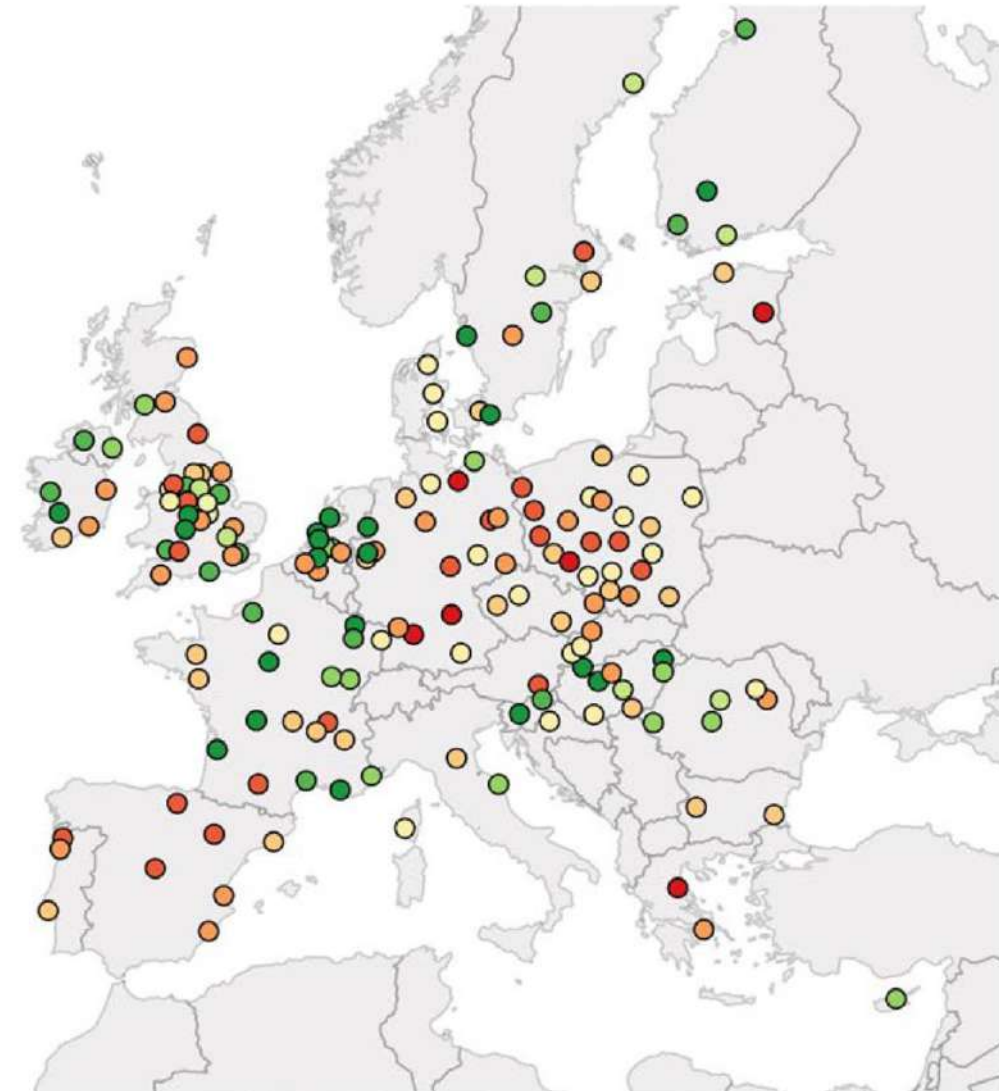


→ Plans in Eastern & Southern Europe, but also in Germany, are less consistent than in other parts of Europe

→ Lack of consideration of vulnerable groups and those in need

→ **Contributing to an adaptation gap**

Adaptation gap (%)





npj Nature Urban Sustainability (Reckien et al., 2023)

- Our findings suggest that, overall, **the quality of A-CAPs improved from 2005 to 2020**, primarily in terms of **setting adaptation goals**, proposing **varied and thorough adaptation measures**, and **detailing their implementation**.
- However, **there has only been a slight improvement** in **monitoring plan implementation** and **involving civil society** in the planning process.



Nature Climate Change (Reckien et al., 2025)

- **70%** of our checks across all the A-CAPs **identified inconsistencies** within the adaptation process.
- These mainly arise from a **lack of consideration of social vulnerability**, particularly regarding **planning the implementation of measures for vulnerable groups** and involving them in the development and evaluation of plans.
- **This could reduce the effectiveness of A-CAPs, as vulnerable groups are at risk of being exposed to more extreme weather events caused by climate change.**

THANK YOU FOR YOUR ATTENTION



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