# THE CLIMATE ADAPTATION POLICY INDEX (CAPI) – MEASURING CLIMATE CHANGE ADAPTATION POLICY OUTPUT ALONG TWO DIMENSIONS

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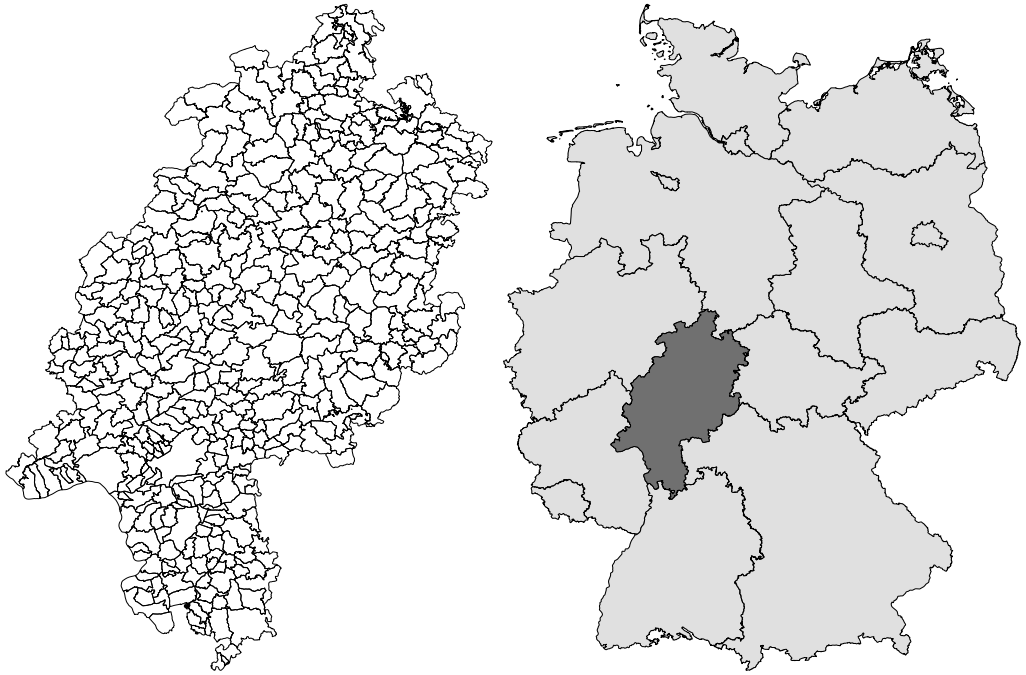
# INTRODUCTION

- **“Comparing Local Climate Adaptation – The Diffusion of Policy Innovations”, Project funded by the Fritz Thyssen Stiftung 2019-2023**

- **Why is the local level important?**
  - Adaptation will be necessary under all climate change scenarios
  - Adaptation is highly localized and context specific
  - Authority/capacities to adapt lie with municipalities, e.g. key planning competences
  - New challenges for local authorities

Source: Pixabay/Hans Braxmeier

# EMPIRICAL STUDY



| | | Hessen | | | Sample | | |
|---|---|---|---|---|---|---|---|
| | | N | % | | N | % | % (RR) |
| **Spatial distribution** | Districts (NUTS II) | | | | | | |
| | Darmstadt (South) | 184 | 43.6 | | 95 | 45.0 | 51.6 |
| | Giessen (West) | 101 | 23.9 | | 46 | 21.8 | 45.5 |
| | Kassel (North) | 137 | 32.5 | | 70 | 33.2 | 51.1 |
| | Total | 422 | 100.0 | | 211 | 100.0 | 50.0 |
| | p-value of Pearson chi-square = 0.7723 | | | | | | |
| **Demographic distribution** | Population size | | | | | | |
| | ≥ 100.000 | 5 | 1.2 | | 5 | 2.3 | 100.0 |
| | 50.000-99.999 | 7 | 1.7 | | 6 | 2.8 | 85.7 |
| | 20.000-49.999 | 47 | 11.1 | | 31 | 14.4 | 66.0 |
| | 10.000-19.999 | 111 | 26.3 | | 57 | 26.5 | 50.9 |
| | 5.000-9.999 | 133 | 31.5 | | 68 | 31.6 | 51.2 |
| | < 5.000 | 119 | 28.2 | | 44 | 20.5 | 37.3 |
| | Total | 422 | 100.0 | | 211 | 100.0 | 50.0 |
| | p-value of Pearson chi-square = 0.06 | | | | | | |

*Note*: N = Number of municipalities, RR = Response rate.

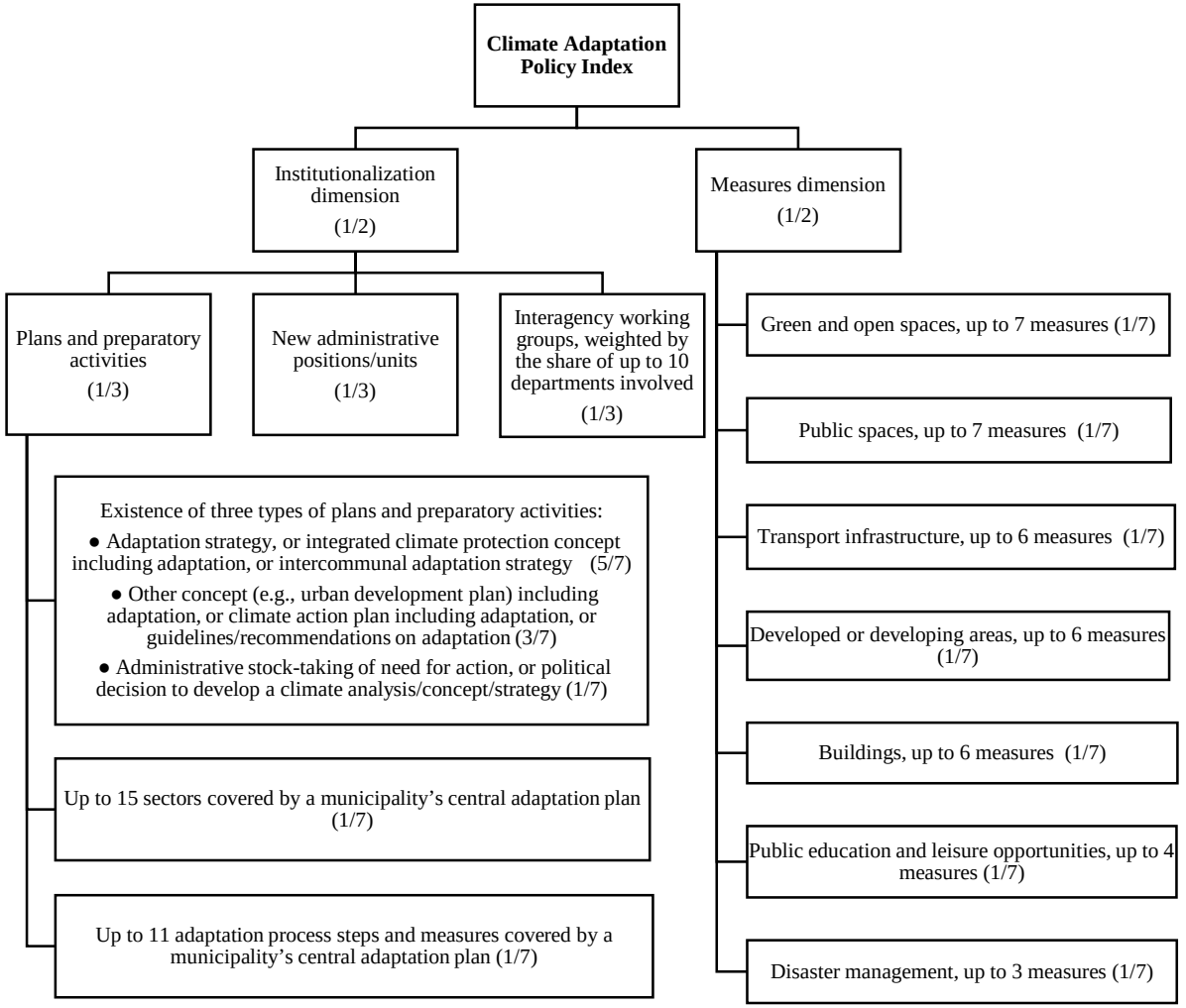
Source: Schulze & Schoenefeld, 2023

# INDEX CONSTRUCTION

- Policy ***output***
- ***Public*** policy
- ***Intentional*** adaptation policy
- Two **interdependent** dimensions:

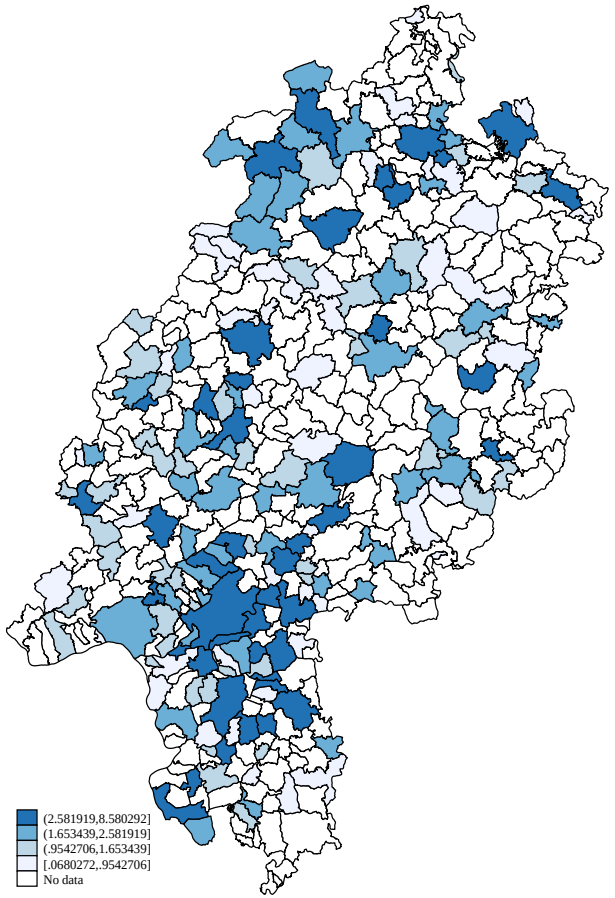
**(1) Institutionalization** (strategic and organizational resources)

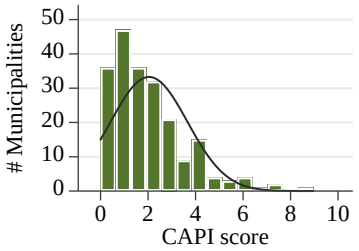
(2) Density of **measures** (action component)

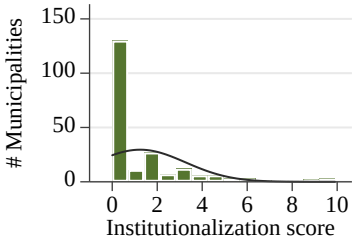


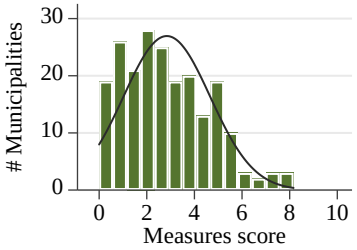

Source: Schulze & Schoenefeld, 2023

# DISTRIBUTION



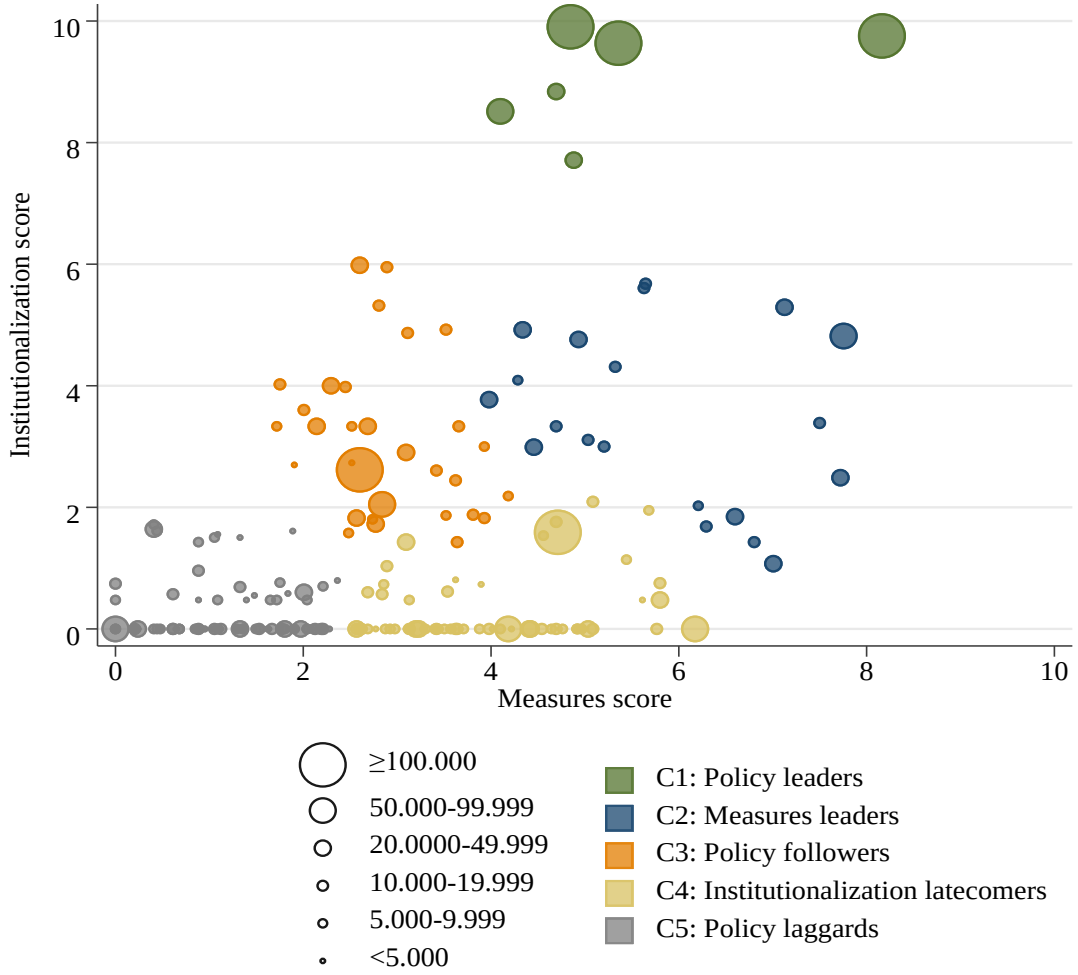




Source: Schulze & Schoenefeld, 2023

# INSTITUTIONALIZATION AND MEASURES




Source: Schulze & Schoenefeld, 2023

# EMPIRICAL USE

- Analysis of policy processes, drivers and barriers of adaptation policy (CAPI as **dependent variable**) → in progress (policy diffusion, etc.)
  - Comprehensive measure
  - Differential results for institutionalization and measures

- Analysis of policy effects (CAPI as **independent variable**) → possible, but difficult due to lacking aggregate measures of (changing) vulnerability/risks and lacking longitudinal data

- Advice for policy makers

- Possibilities for adaptation and extension
  - More institutions
  - More fine-grained policy characteristics, e.g. instrument types and calibrations
  - Different levels of government
  - Different data may be used
  - Other policy areas

# CHALLENGES AND SUCCESSES

- Comprehensive measure
  - Which sectors and measures should be considered (adaptation as a cross-sectoral issue)?
  - What counts as climate adaptation (conceptual boundaries)?
- Data protection issues
- Response rate (address, supporting organizations and networks)
- Social desirability and response bias (size, adaptation activity)
- Validation of survey data
- Limited understanding how the measure should look like by the time of questionnaire design
  - Some survey questions turned out to be problematic
  - Dimensionality
- Aggregation and (indirect) weighting

# LITERATURE


- Schulze, Kai and Jonas J. Schoenefeld. 2023. Measuring climate change adaptation policy output: Towards a two-dimensional approach. *Review of Policy Research* 40(6), 1058–1092. https://doi.org/10.1111/ropr.12553
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# THANK YOU FOR YOUR ATTENTION!

# OPERATIONALIZATION

| Dimension | Indicator | | Operationalization | Score | Weight |
|---|---|---|---|---|---|
| *Institutionalization* | (1) Plans | | Sum of three subindicators | 7/7 | 1/3 |
| | | | 1. Existence of three types of adaptation plans or strategic activities (only the most advanced type is scored):<br>a) Adaptation strategy, (integrated) climate mitigation concept including adaptation, intercommunal adaptation strategy | 5 | |
| | | | a) Other concept (e.g., urban development plan) including adaptation, climate action plan including adaptation, guidelines/recommendations on adaptation | 3 | |
| | | | a) Administrative stock-taking of need for action, political decision to develop a climate analysis/concept/strategy | 1 | |
| | | | 1. Share of 15 sectors covered by a municipality's central adaptation plan (human health; planning; construction; transport, mobility, and communication; water management, flood control; soil; biological diversity, nature and environmental protection; agriculture; forestry; energy economy; finance; disaster management; industry; tourism; and education) | 15/15 | |
| | | | 1. Share of 11 adaptation process steps and measures covered by a municipality's central adaptation plan (preliminary studies of climate change (impacts); impact studies, risk analyses; (public) participation of citizens, businesses, civil society groups and others; adaptation measures in land-use planning or urban development; mainstreaming in administrative processes; adaptation measures to extreme precipitation; adaptation measures to extreme heat; adaptation measures in green and open spaces; educational measures; monitoring of adaptation measures; and evaluation of adaptation measures) | 11/11 | |
| | (2) Resources | | Establishment of new staff positions dealing with adaptation | 1/1 | 1/3 |
| | (3) Collaboration | | Existence of an interagency working group dealing with adaptation, weighted by the number of up to 10 departments involved (environment; urban development; urban planning; building construction; transport; green space; civil engineering; water disposal; water supply; and health) | 10/10 | 1/3 |
| *Measures* | | | Share of adaptation measures adopted in 7 equally weighted action areas (up to 39 measures in total) | | |
| | (1) | Green and open spaces, forestry and agriculture | Open air-corridors; new and near-natural restructuring of green spaces (e.g., parks); connecting green spaces and green strips; watering of public green spaces and/or farmland during heat periods; support of mixed forest and diversity of species (e.g., in forests and parks); climate-resilient tree and plant species; and support of climate-ready water governance | 7/7 | 1/7 |
| | (1) | Public spaces | Creation of drainage and retention areas; planning of multifunctional areas as 'water plazas' (e.g., play-, sports-, and parking grounds as temporary precipitation storage); creation of 'green oases'/shading in public space; creation of public drinking water fountains; creation, maintenance or raise of dams, dikes or flood protection walls; creation or maintenance of flood retention basins, barrage dams and polders; and ecological flood control (e.g., through renaturation of water bodies or pasture land) | 7/7 | 1/7 |
| | (1) | Transport infrastructure | Protection of underpasses (e.g., with drainage or seepage ditches); greening of streets; greening of railway tracks; climate-ready public transport stops (heat protection etc.); light surfaces for traffic areas; and shadowing of parking spaces | 6/6 | 1/7 |
| | (1) | Developed or developing areas | Greening of brownfields; setting development limits; creation of retention areas within settlements; surface unsealing; coloring of traffic routes and plazas; and creation of open water surfaces and streams | 6/6 | 1/7 |
| | (1) | Buildings | Greening of roofs and facades; thermal insulation; cooling of buildings; shadowing of buildings; shadowing elements on buildings; and backwater protection | 6/6 | 1/7 |
| | (1) | Public education and leisure opportunities | Creation of new, sustainable leisure activities (e.g., in case of reduced snowfall); creation of new educational offers related to sustainability/nature; sensitization and information of citizens about climate change and climate adaptation in general; and sensitization and information of citizens about specific topics/hazards (e.g., handouts about heat-related behavior, information about heavy rainfall, brochure for builders or farmers) | 4/4 | 1/7 |
| | (1) | Disaster management | Expansion of technical capacities (e.g., vehicles, equipment, etc.); expansion of personnel capacities; and creation of early warning system (e.g. in collaboration with hospitals and care facilities, retirement homes, housing companies and other social service providers) | 3/3 | 1/7 |