

# Mapping social vulnerability and climate disadvantage: results & implications

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Justice, vulnerability and climate change

Full report available at

<http://www.jrf.org.uk/publications/climate-change-justice-and-vulnerability>

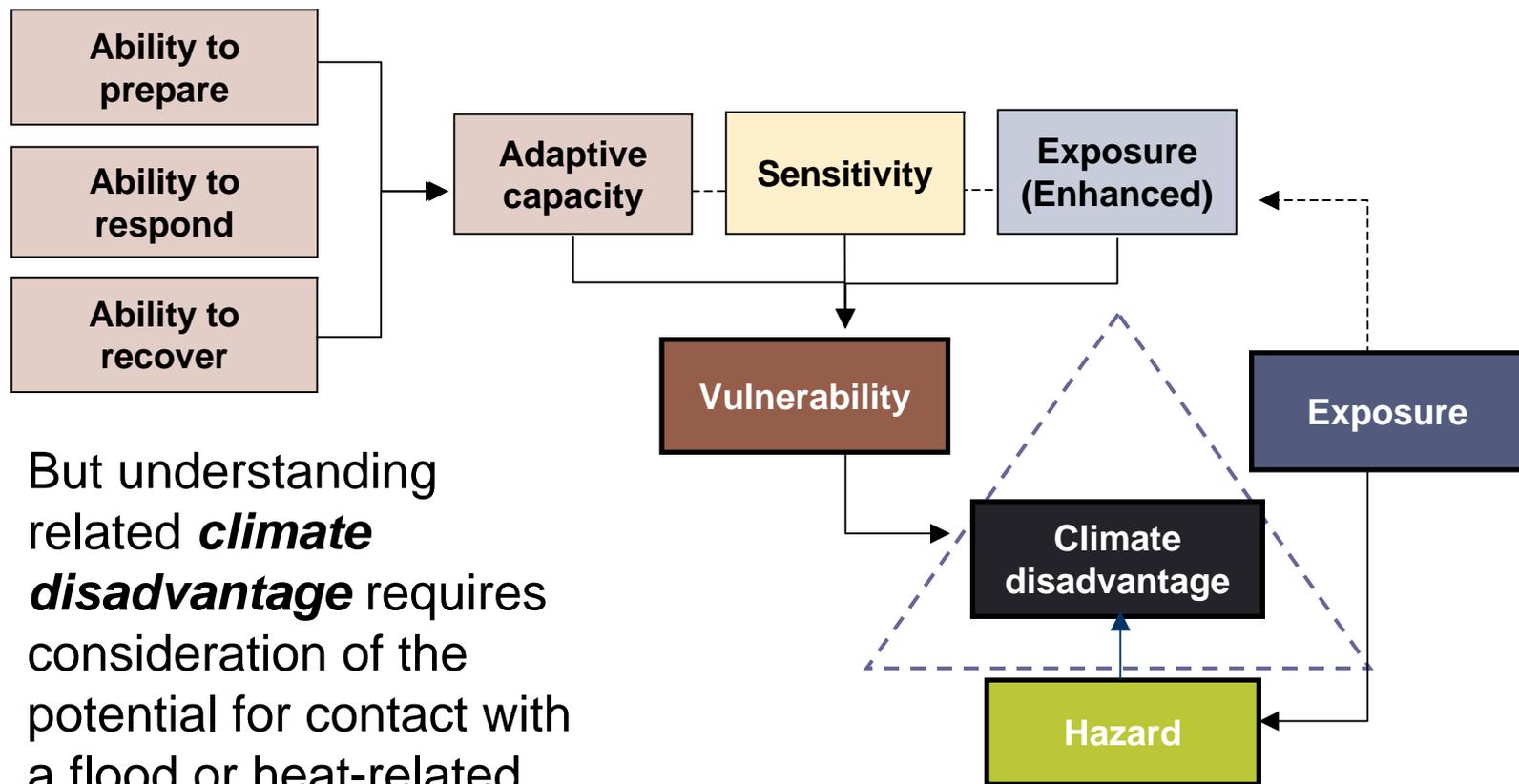
# Introduction

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- ▶ Concepts of **socio-spatial vulnerability** and **climate disadvantage** were used to measure and map UK distributions
- ▶ Mapping used neighbourhoods – Census zones of c7200 people
- ▶ 5 dimensions of socio-spatial vulnerability for heat and flood
  - ▶ Sensitivity → inherent susceptibility to impacts, due to age & health
  - ▶ Enhanced exposure → local physical characteristics which can make impacts better or worse, e.g. building type
  - ▶ Adaptive capacity → three groups of socially-related characteristics which can make impacts better or worse
- ▶ One measure of **hazard-exposure** → likelihood of contact with a flood or heat-related event

# Socio-spatial vulnerability & climate disadvantage

- ▶ Understanding socio-spatial vulnerability is an important part of understanding the problems to be tackled
  - ▶ Each dimension reveals a different picture and may require different actions



- ▶ But understanding related **climate disadvantage** requires consideration of the potential for contact with a flood or heat-related event too

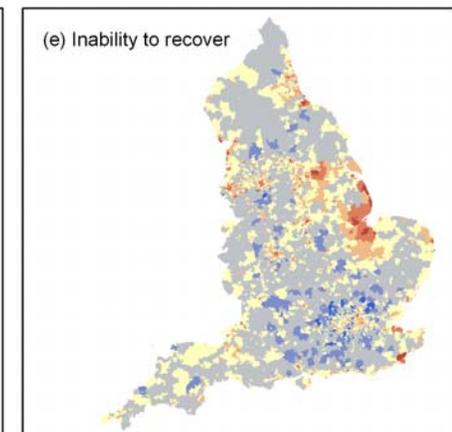
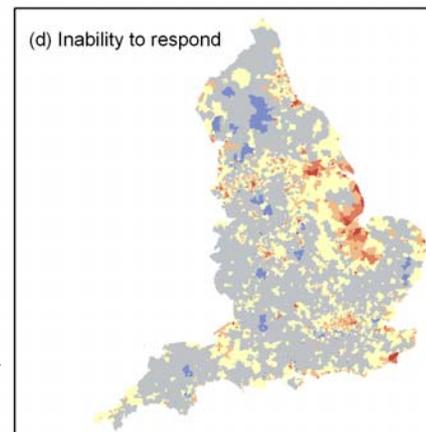
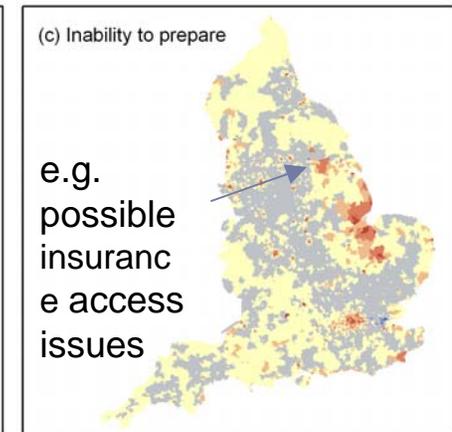
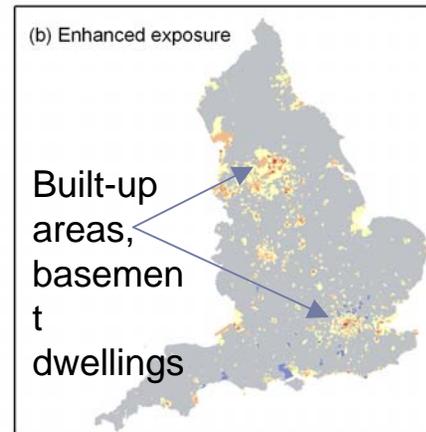
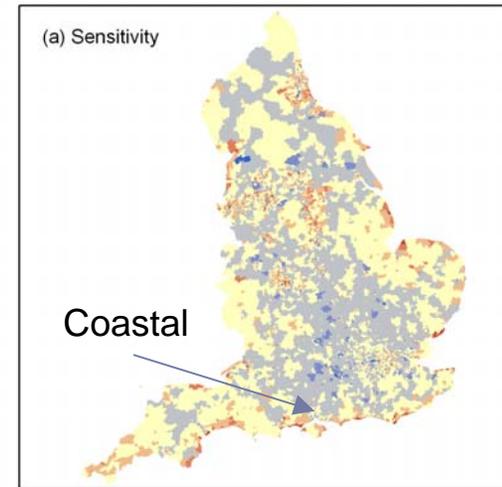
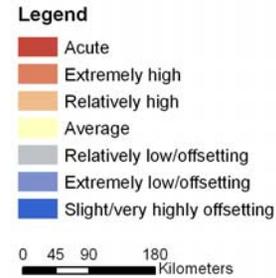
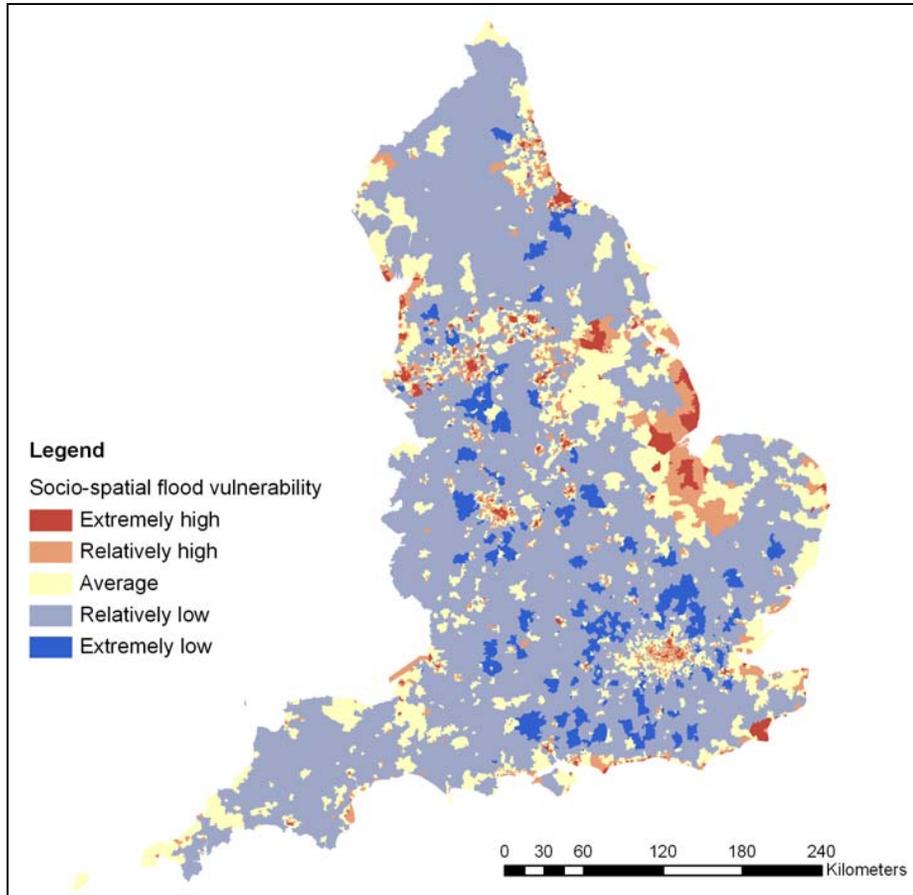
# Socio-spatial flood vulnerability domains

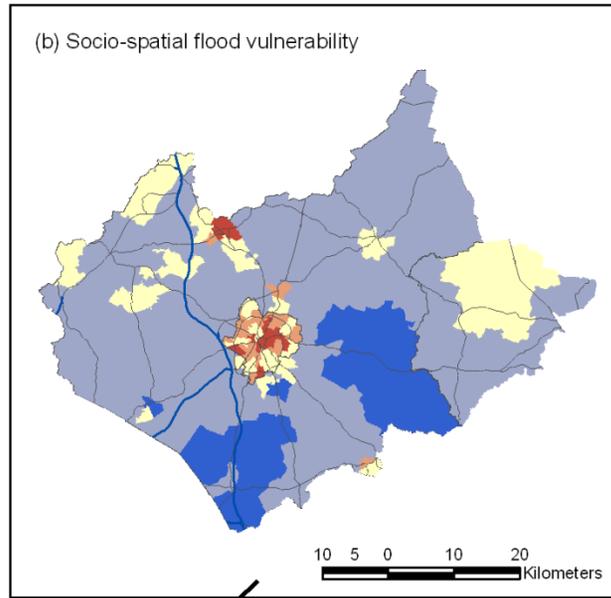
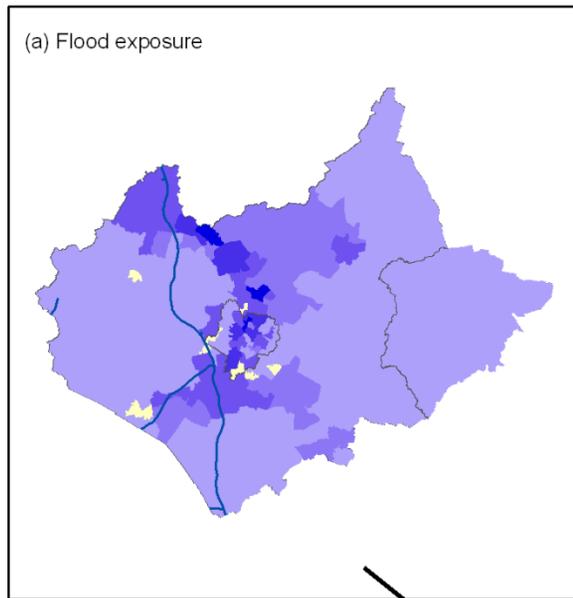
Dimension	Domain	Example explanation
Sensitivity: Biophysical characteristics	Age	Old and young are more physically susceptible
	Health	Those with pre-existing illnesses are more susceptible
	Special care	Those in care environments already require support
Exposure: Physical neighbourhood attributes	Physical environment	Amount of green or blue space; availability of gardens
	Housing characteristics	Type of building (basement and street-level dwellings)
Preparation: Taking precautions	Income	Ability to obtain technical solutions (e.g. floodgates)
	Tenure	Ability to modify living environments
	Information use	Ability to use/access information
	Local knowledge	Personal or community experience from past events in the area
	Insurance	Likelihood of insurance being available
Response: Avoiding losses	Income	Ability to use technical and other solutions
	Information use	Language & education affecting the response to warnings
	Local knowledge	Personal or community experience from past events in the area
	Insurance	Likelihood of insurance being available
	Social networks	Availability of personal or community networks
	Mobility	Availability of personal/household mobility
	Crime	Ability to deploy adaptive measure, e.g. floodgates
	General accessibility	General neighbourhood accessibility
Recovery: Recovering from a flood event	Income	Ability to replace lost goods, find temporary accommodation
	Information use	Ability to understand what help is available & what to do
	Insurance	Ability to claim for damages and re-insure
	Social networks	Availability of personal/community networks
	Mobility	General mobility/disability
	Housing mobility	Ability to move away from an area

# Socio-spatial heat vulnerability domains

Dimension	Domain	Example explanation
Sensitivity: Biophysical characteristics	Age	Old and young are more physically susceptible to harm
	Health	Those with pre-existing illnesses are more susceptible
	Special care	Those in care environments already require additional support
Exposure: Physical neighbourhood attributes	Physical environment	Amount of green or blue space; availability of gardens
	Physical geography	Physical location (e.g. elevation)
	Housing characteristics	Type of building (high-rise dwellings)
Preparation: Taking precautions	Income	Ability to obtain technical solutions (e.g. air conditioning)
	Tenure	Ability to modify living environments
	Information use	Ability to use/access information
Response: Avoiding heat stress during an event	Income	Ability to use technical and other solutions
	Information use	Language and education affecting the ability to respond to warnings
	Social networks	Availability of personal or community networks
	Mobility	Availability of personal/household mobility
	Crime	Ability to deploy adaptive measure, e.g. open windows
	General accessibility	General neighbourhood accessibility
Recovery: Recovering from heat stress if it occurs	Information use	Ability to understand what help is available and what to do
	Social networks	Availability of personal/community networks
	Mobility	General mobility/disability
	Service access	Availability of GPs and hospitals

# Socio-spatial flood vulnerability in England





**Legend (top left)**

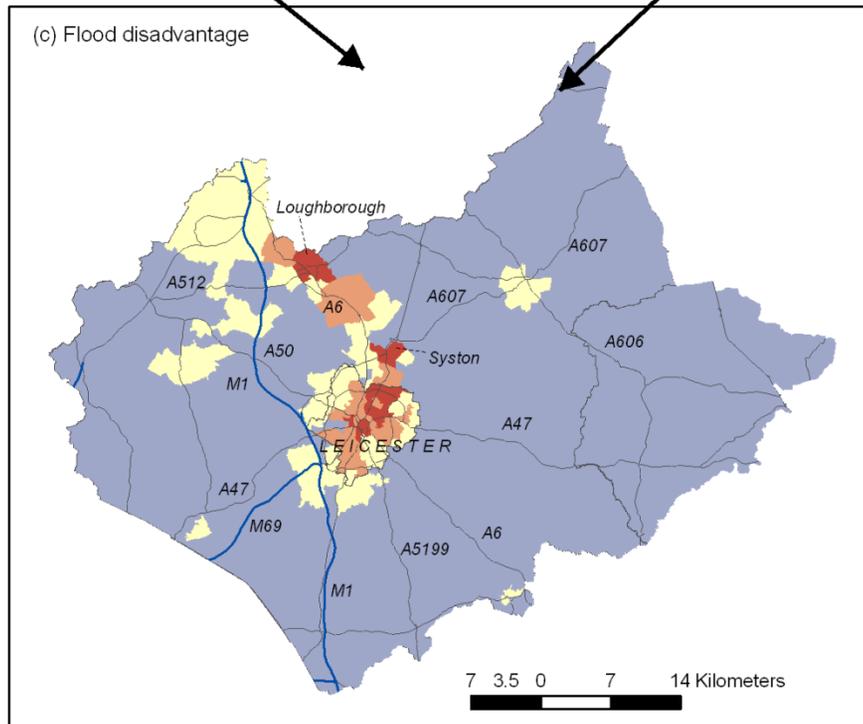
- Leicestershire
- % in area in a flood zone\*
- \*moderate or significant
- Not exposed
- < 5%
- 5 - 10%
- 10 - 25%
- 25 - 50%
- > 50%

**Legend (top right)**

- Major roads
- Motorways
- Leicestershire
- Scores
- 13
- 19
- Extremely high
- Relatively high
- Average
- Relatively low
- Extremely low

**Legend (bottom centre)**

- Major Roads
- Motorways
- Flood disadvantage
- 11
- 21
- Extreme disadvantage
- Relative disadvantage
- Average
- Relative advantage
- Extreme advantage

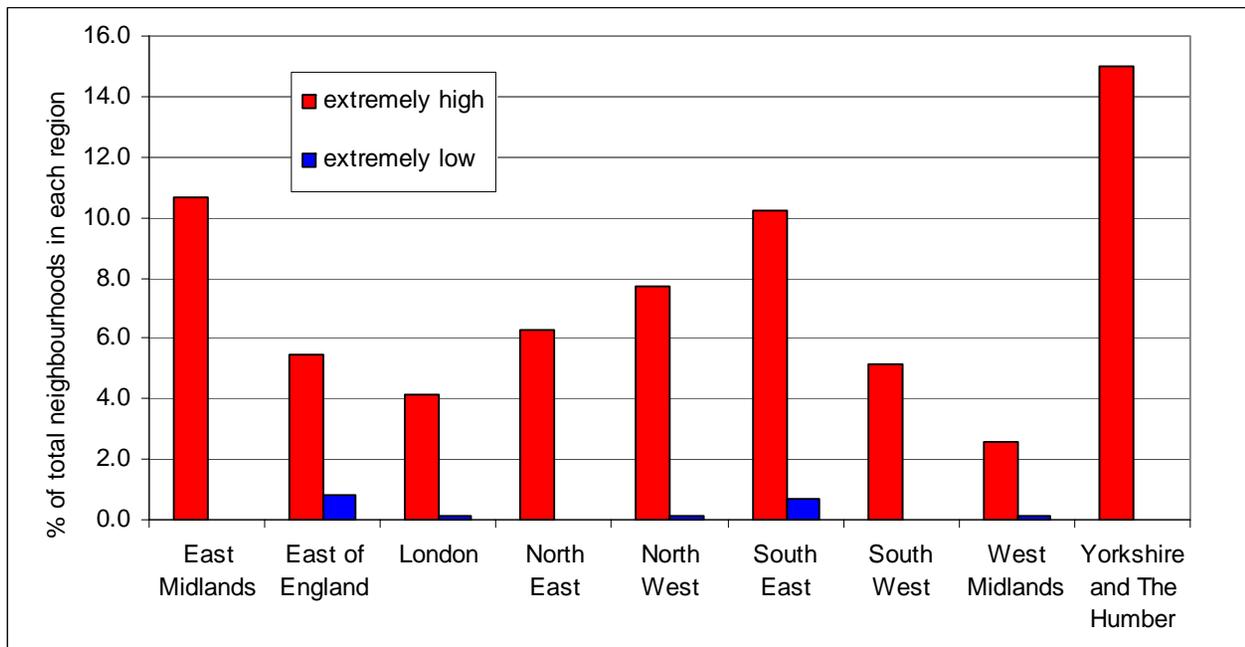
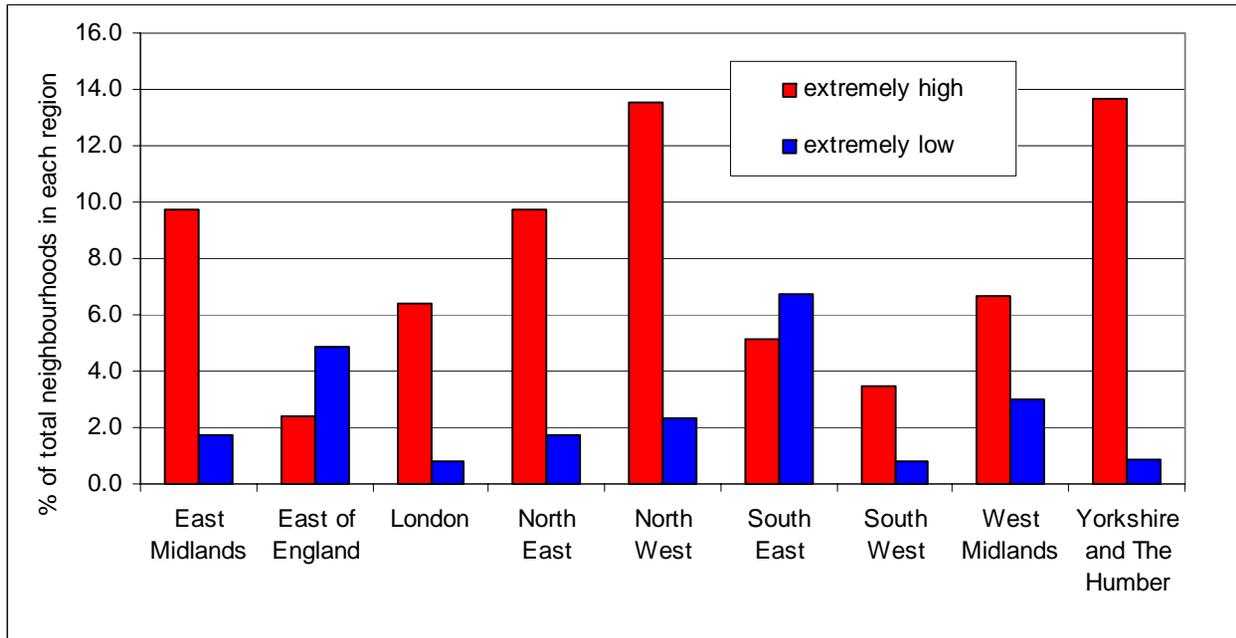


Socio-spatial index results are contextualized by considering the potential for flood exposure in individual neighbourhoods

Please note: the flood exposure measure in this study is limited to a % unit area cover by moderate or significant flood zones

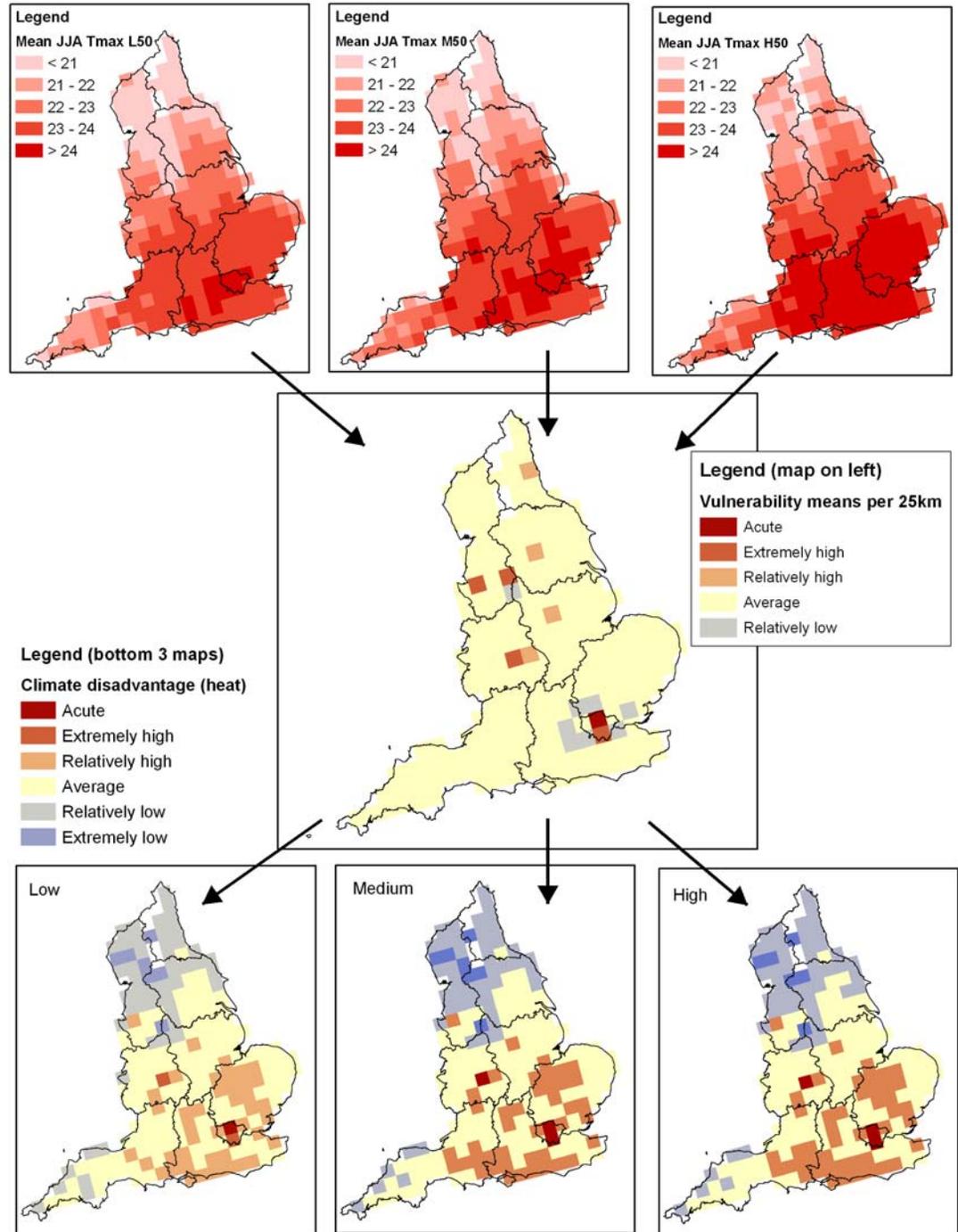
# Regional breakdowns

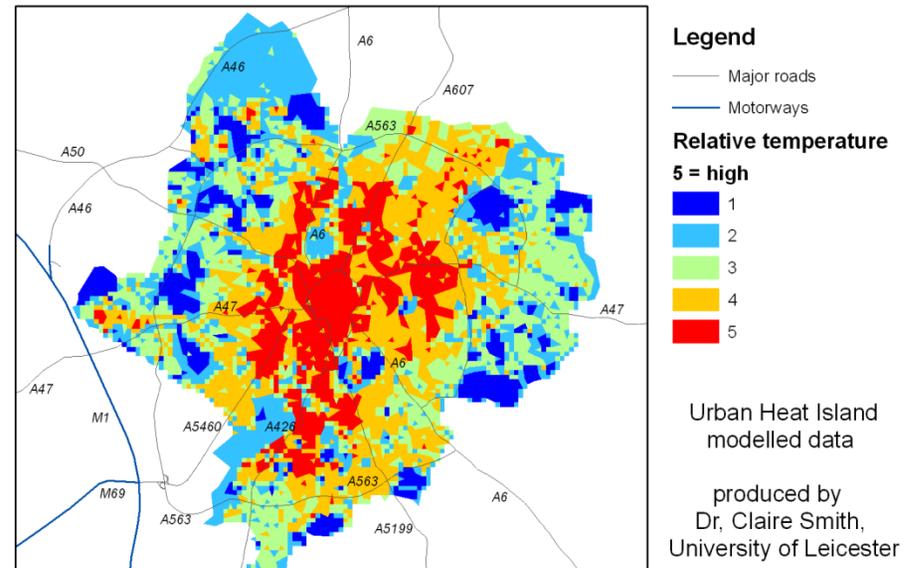
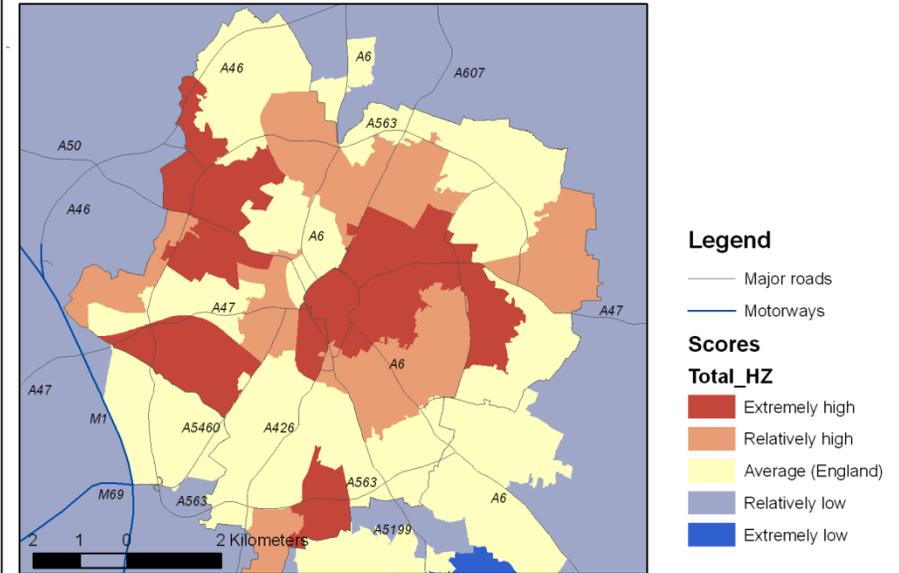
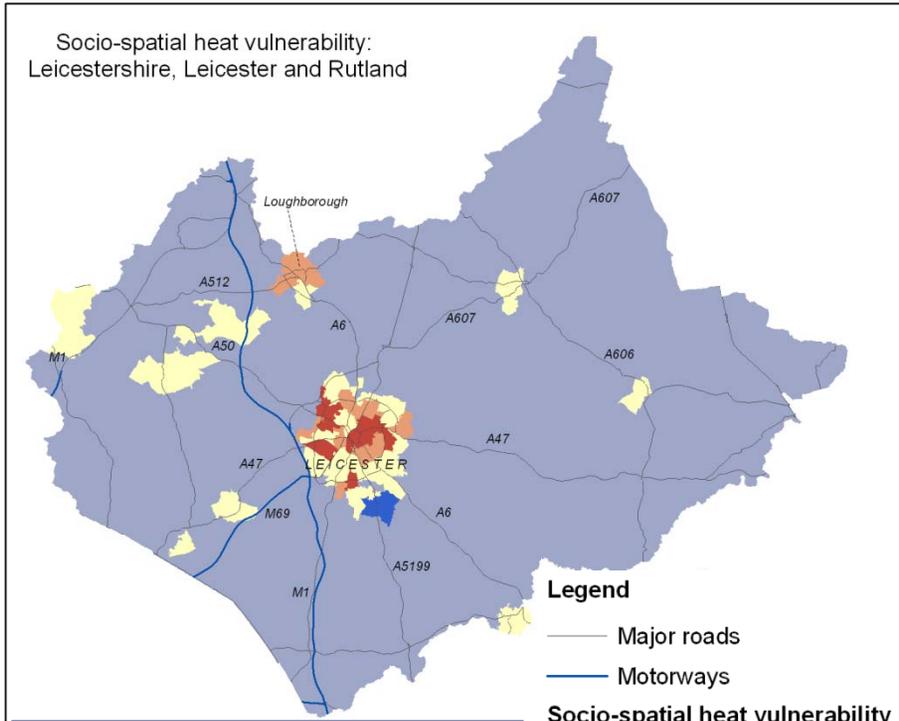
- ▶ % of total neighbourhoods in each English region estimated to be **extremely socially flood vulnerable**
- ▶ % estimated to be **extremely flood disadvantaged** (high socio spatial vulnerability & high potential for flood exposure)



# Heat disadvantage in England

- ▶ London's high average socio-spatial heat vulnerability is coupled with tendency for higher temperatures
- ▶ England's climate gradient also offsets some of the low socio-spatial heat vulnerability in South East
- ▶ But
  - ▶ There is a differential in the tolerance of high temperatures from place to place
  - ▶ Alternative measures required





Socio-spatial heat vulnerability  
compared to local temperature  
patterns



# Key findings & selected recommendations

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- ▶ Evidence of joint socio-spatial vulnerabilities in the UK – up to 2/3 of the top 10% most socially vulnerable neighbourhoods were so for both flood & heat
- ▶ Key socially vulnerable groups could be identified, associated with:
  - ▶ Poverty and deprivation
    - ▶ MDIs useful indicators for some aspects of social vulnerability
    - ▶ Some adaptations can be facilitated through social housing
    - ▶ ‘mainstreaming’ of measures/messages into activities of those working to reduce social deprivation
  - ▶ New residents
    - ▶ Frequency and type of information provision
  - ▶ Mobility and access
    - ▶ Potentially linked to other means of enhancing accessibility for affected groups
  - ▶ Sensitivity (inherent susceptibility to impacts, age & health)
    - ▶ can also be linked to other indicators such as poor mobility
  - ▶ Enhanced exposure (physical characteristics of neighbourhoods)
- ▶ Superimposing measures of hazard-exposure shows an uneven pattern of climate disadvantage
- ▶ Drivers vary → local case studies provide fl

# Conclusions

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- ▶ Climate adaptation policy needs to be understood much more broadly than is often supposed to take account of
  - ▶ the full range of losses in well-being and associated conversion factors
  - ▶ not just direct impacts, but losses in well-being that are a consequence of the insecurity of increased likelihood of events
- ▶ Adaptation strategies and measures need to
  - ▶ target specific places and groups, nationally and locally
  - ▶ be informed by multi-dimensional assessments of social vulnerability
- ▶ For Leicestershire, Leicester and Rutland the work identifies that relative to the rest of England there are
  - ▶ 13 extremely high socially flood vulnerable neighbourhoods
  - ▶ 11 neighbourhoods with extremely high flood disadvantage
  - ▶ 12 extremely high socially heat vulnerable neighbourhoods
- ▶ ***Almost all neighbourhoods will have some socially vulnerable people*** but the key characteristics of neighbourhoods can help in targeting and designing local measures alongside other activities

