**Disaster Risk Reduction Conference**
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# Social and Economic Factors Influencing Vulnerability to Floods in Southen Poland

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# VULNERABILITY PARADIGM

**Vulnerability paradigm –** 'recognizing differences in disaster' (Fordham, 1999)

**Vulnerability to natural hazards** – the capacity (or lack of capacity) of individuals, households or communities to forecast, prepare, cope, resist and recover from a disaster (Dwyer et al. 2004, Wisner et al. 2004)

**Dimensions of vulnerability** (UN/ISDR 2004)

| physical | social | economic | environmental |
|---|---|---|---|

**Social vulnerability** refers to a range of societal, cultural and economic features that contribute to social inequalities and, as a consequence, impact how communities, social groups and individuals react to natural disasters.

| **social vulnerability** | **resilience, social capacities** |
|---|---|
| focus on weaknesses | focus on strengths |

# SOCIAL VULNERABILITY

**Major factors** contributing to higher or lower levels of social vulnerability to natural hazards:

- socio-economic status
- gender
- age
- racial or ethnic status

Other factors discussed such as occupation, education, family structure, social dependencies are often **strongly correlated** with the factors mentioned above.

Theoretical and empirical studies **fail to agree** on the ultimate importance of each of these factors.

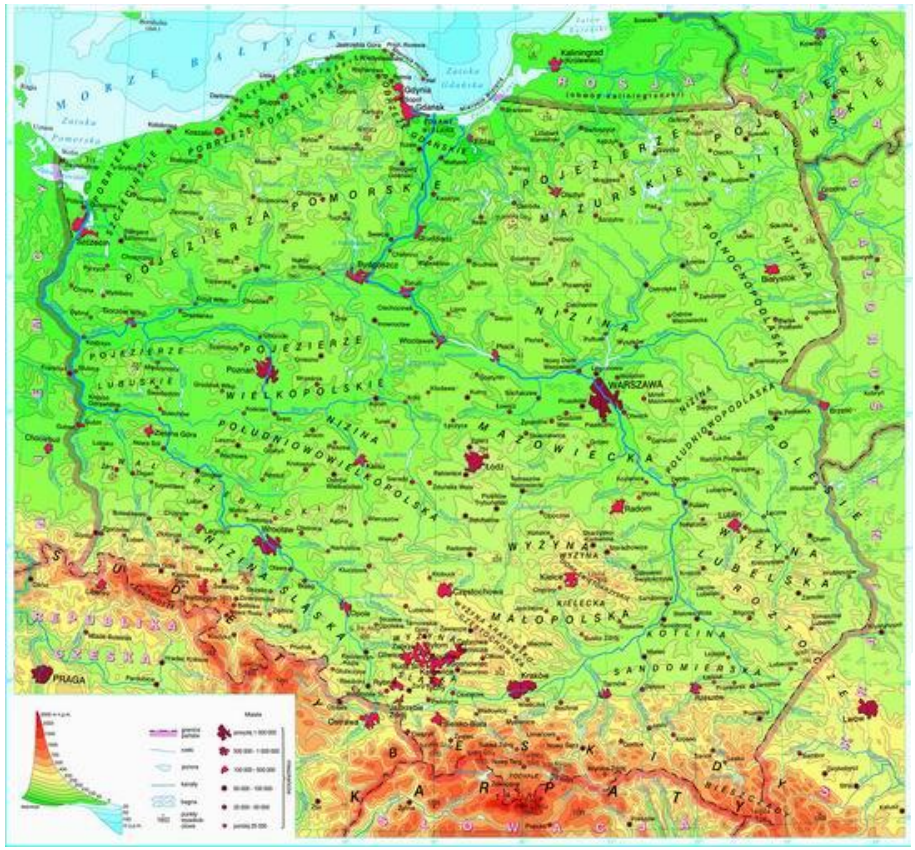
National, regional or local **social contexts** seem to play a significant role.

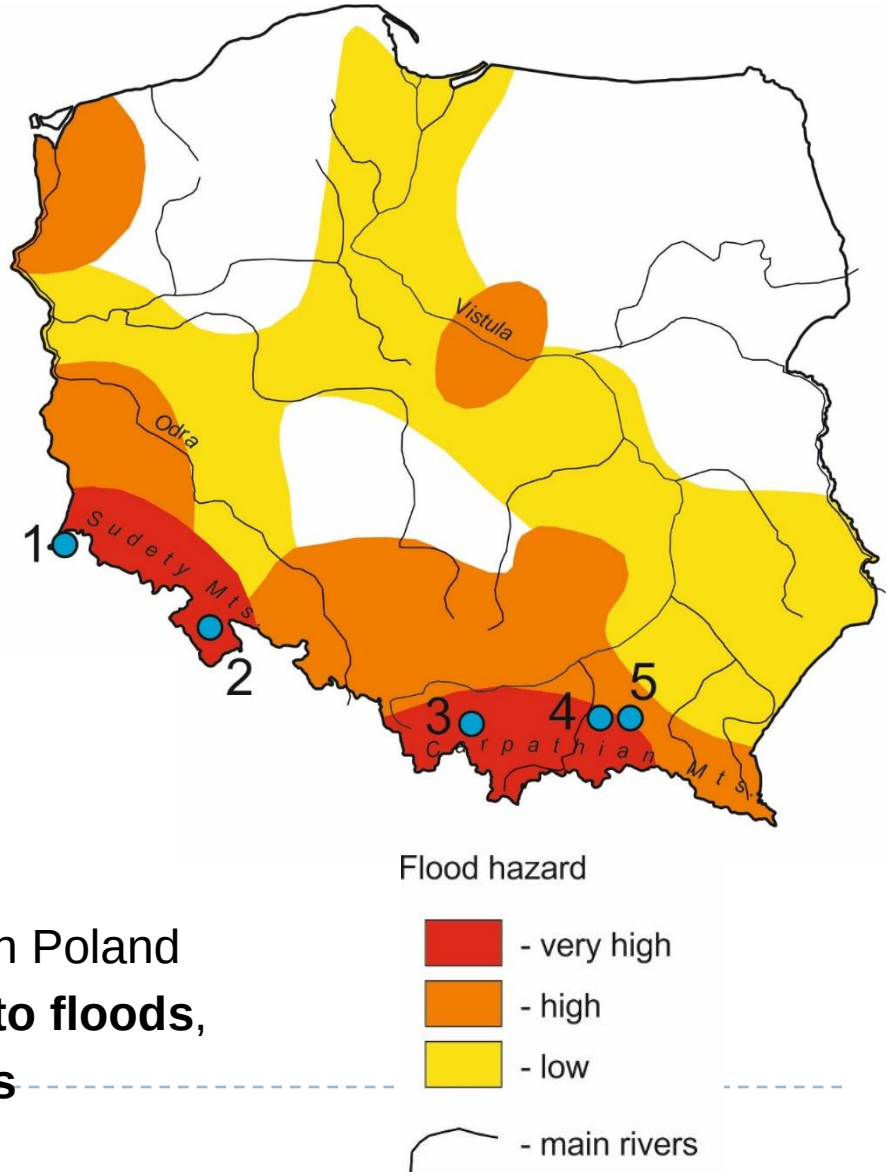
Social Vulnerability Concepts and Metrics

| Concept | Description | Increases (+) or Decreases (−) Social Vulnerability |
|---|---|---|
| Socioeconomic status (income, political power, prestige) | The ability to absorb losses and enhance resilience to hazard impacts. Wealth enables communities to absorb and recover from losses more quickly due to insurance, social safety nets, and entitlement programs. *Sources*: Cutter, Mitchell, and Scott (2000), Burton, Kates, and White (1993), Blaikie et al. (1994), Peacock, Morrow, and Gladwin (1997, 2000), Hewitt (1997), Puente (1999), and Platt (1999). | High status (+/−) Low income or status (+) |
| Gender | Women can have a more difficult time during recovery than men, often due to sector-specific employment, lower wages, and family care responsibilities. *Sources*: Blaikie et al. (1994), Enarson and Morrow (1998), Enarson and Scanlon (1999), Morrow and Phillips (1999), Fothergill (1996), Peacock, Morrow, and Gladwin (1997, 2000), Hewitt (1997), and Cutter (1996). | Gender (+) |
| Race and ethnicity | Imposes language and cultural barriers that affect access to post-disaster funding and residential locations in high hazard areas. *Sources*: Pulido (2000), Peacock, Morrow, and Gladwin (1997, 2000), Bolin with Stanford (1998), and Bolin (1993). | Nonwhite (+) Non-Anglo (+) |
| Age | Extremes of the age spectrum affect the movement out of harm's way. Parents lose time and money caring for children when daycare facilities are affected; elderly may have mobility constraints or mobility concerns increasing the burden of care and lack of resilience. *Sources*: Cutter, Mitchell, and Scott (2000), O'Brien and Mileti (1992), Hewitt (1997), | Elderly (+) Children (+) |

Source: Cutter, 2003

# FLOODS IN THE POLISH MOUNTAINS




Mountainous areas in southern Poland are among the **most exposed to floods**, especially **flash floods**

# RESEARCH AREAS

| | Areas | Characteristics | Recent large flash floods |
|---|---|---|---|
| **Sudety Mts.** | Bogatynia | town (19 th. inhabitants) | 2010 |
| | Kłodzko and Lądek Zdrój | rural area | 1997, 2009 |
| **Carpathian Mts.** | Budzów and Zembrzyce | rural area | 2001 |
| | Tuchów | small town (7 th. inh.) with a neighbouring rural area | 2010 |
| | Brzostek and Pilzno | two small towns (3-5 th. inh.) with a neighbouring rural area | 2010 |



Source: wiadomosci.wp.pl, intarnet.pl

# RESEARCH AREAS

| Areas | Number of households interviewed | More than one flood | One large flood | Moved after the last large flood |
|---|---|---|---|---|
| Bogatynia | 94 | 5.3% | **84.0%** | 10.6% |
| Kłodzko and Lądek Zdrój | 107 | **68.2%** | 25.2% | 6.5% |
| Budzów and Zembrzyce | 109 | **39.4%** | **32.1%** | **27.5%** |
| Tuchów | 124 | **36.3%** | **51.6%** | 13.0% |
| Brzostek and Pilzno | 102 | **69.6%** | 23.5% | 6.9% |
| Total | 536 | 44.2% | 42.7% | 13.1% |

466 households (86.9%) affected by floods

# RESEARCH AREAS

They represent two historically different regions of Poland which have followed different paths of development (Działek et al., 2013).


Source: Wikimedia Commons, Author: Willtron

**Sudety Mts.**

The history of these communities goes back to just after the WW2.

They have retained strong post-immigrant features with looser social ties (weak bonding social capital).

The collective memory of past floods was disrupted.

**Carpathian Mts.**

The settlements gradually evolved over several centuries into established, tightly-knit communities (strong bonding social capital).

# RESEARCH QUESTIONS

- Are there any differences between two mountain communities in the Sudety & Carpathian Mts. in terms of flood preparedness?
- What social vulnerability factors can explain the differences in flood preparedness among specific households?
- What social vulnerability factors can explain the differences in flood preparedness between these two mountain communities?

# RESEARCH FRAMEWORK


Social vulnerability is reflected
by the flood mitigation behaviour of households.

It indicates whether they are able to prepare for a potential disaster and whether they would be ready to cope with its aftermath.

The higher the social vulnerability the less households are prepared, and the more they would be vulnerable after a flood.

# FLOOD PREPAREDNESS INDEX

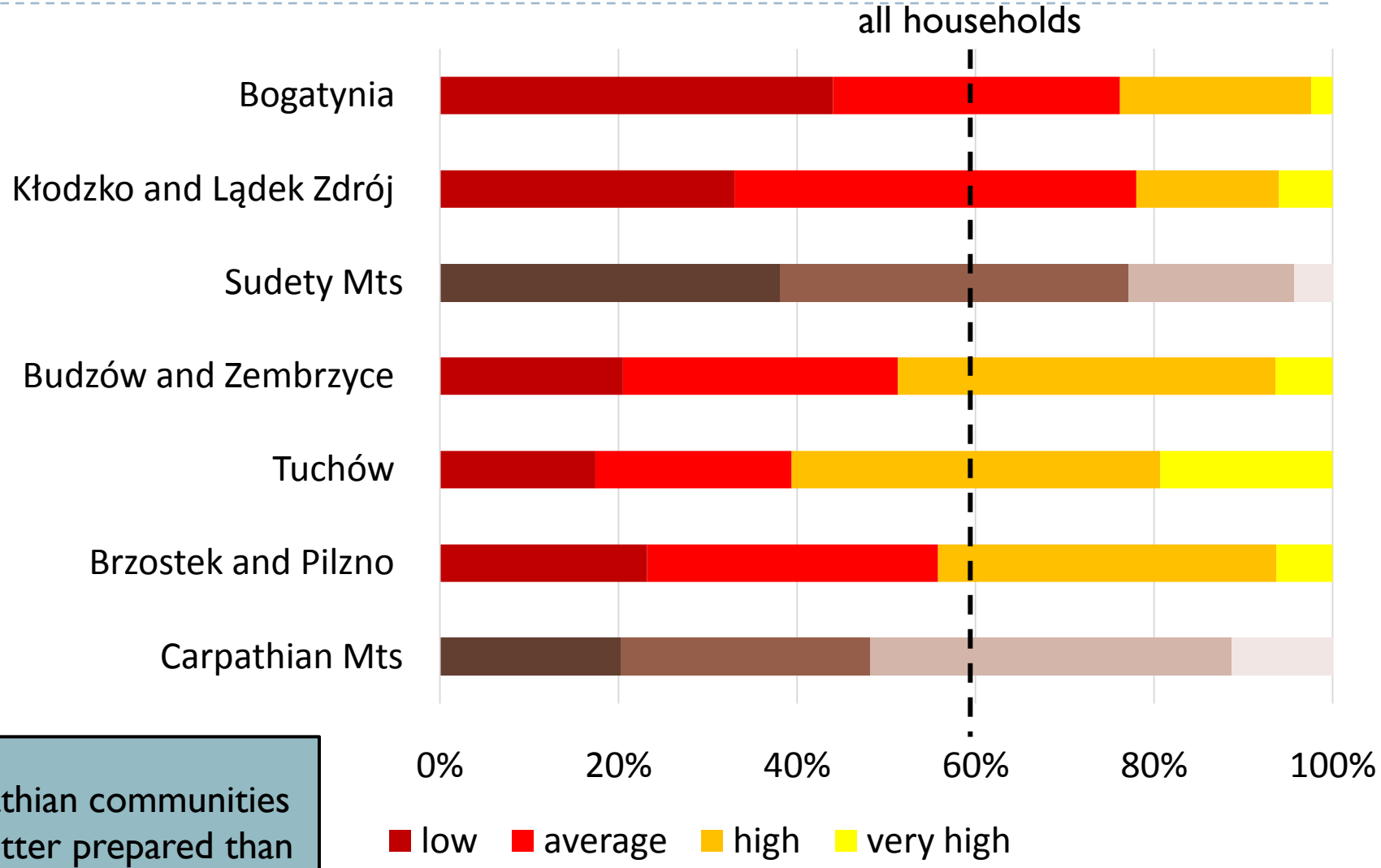
| Questions | Answer | Points |
|---|---|---|
| Self-assessment of being prepared for a flood | high or very high | 1 pt |
| Individual flood mitigation behaviour | yes | 1 pt |
| Number of flood mitigation activities | 1-2 / 3 or more | 1 pt / 2 pts |
| Possession of flood insurance | yes | 1 pt |
| Collective flood mitigation behaviour with neighbours | yes | 1 pt |
| Has contacted local authorities regarding flood hazards | yes | 1 pt |

**Flood preparedness index is from 0 (min) to 7 (max)**

# FLOOD PREPAREDNESS INDEX

| Flood preparedness index | Number of households | % of households |
|---|---|---|
| low (0-1 pts) | 127 | 27.3 |
| average (2-3 pts) | 151 | 32.4 |
| high (4-5 pts) | 148 | 31.8 |
| very high (6-7 pts) | 40 | 8.6 |
| Total | 466 | 100.0 |

# FLOOD PREPAREDNESS INDEX




Carpathian communities are better prepared than those in the Sudety Mts.

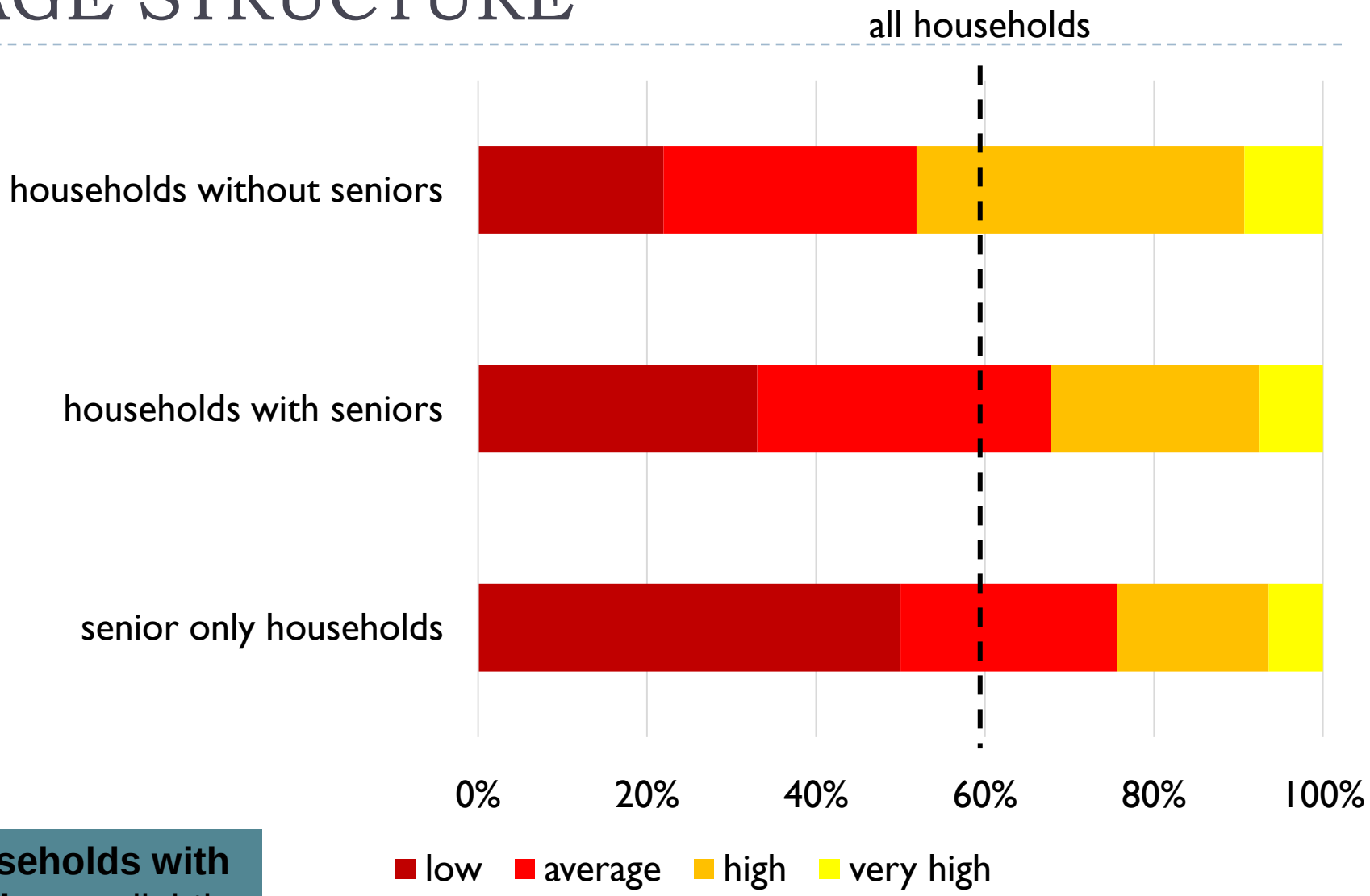
# SOCIAL VULNERABILITY INDICATORS

| | |
|---|---|
| **Age structure** | children 0-5 |
| | children 6-12 |
| | children 13-18 |
| | children all |
| | seniors 65+ |
| **Gender structure** | women more than 2/3 |
| | men more than 2/3 |
| | only women |
| | only men |
| **Family structure** | more than 3 kids |
| | single parents |
| | seniors only |
| **Household size** | one person |
| | 6 people or more |
| | with handicapped person |

| | |
|---|---|
| **Human Capital** | with higher educational status |
| | with lower educational status |
| **Social Capital** | assessment of local social relations |
| | how long their family lives there |
| | volunteer firefighter membership |
| | other association membership |
| **Economic capital** | main source of income |
| | assessment of economic situation |
| | change of economic situation |
| | ownership of a car |
| | ownership of a computer with internet access |
| | ownership of a landline |
| | ownership of a mobile phone |
| | ownership of a house/flat |
| | with an unemployed person |

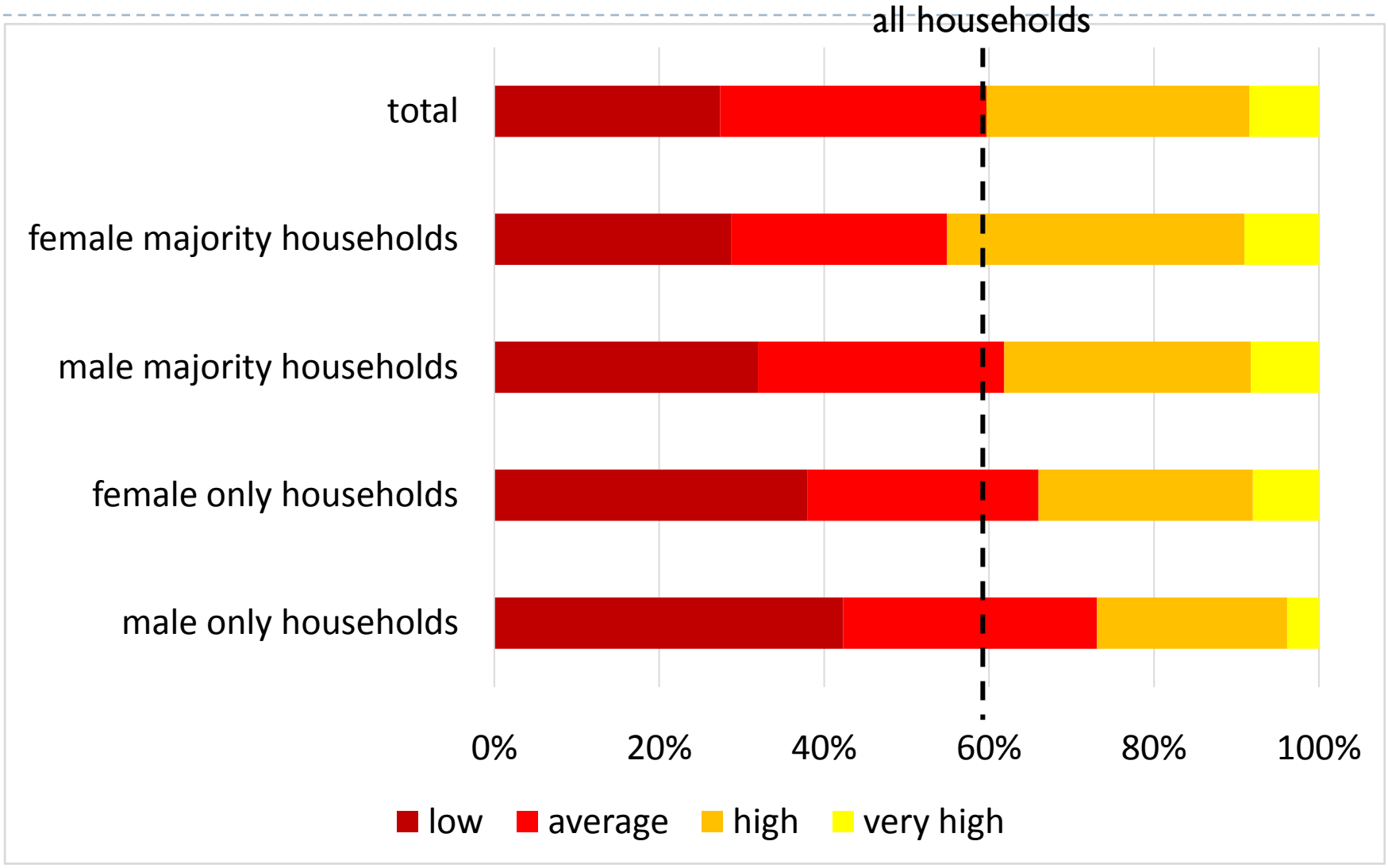
There are strong correlations between some indicators

# AGE STRUCTURE

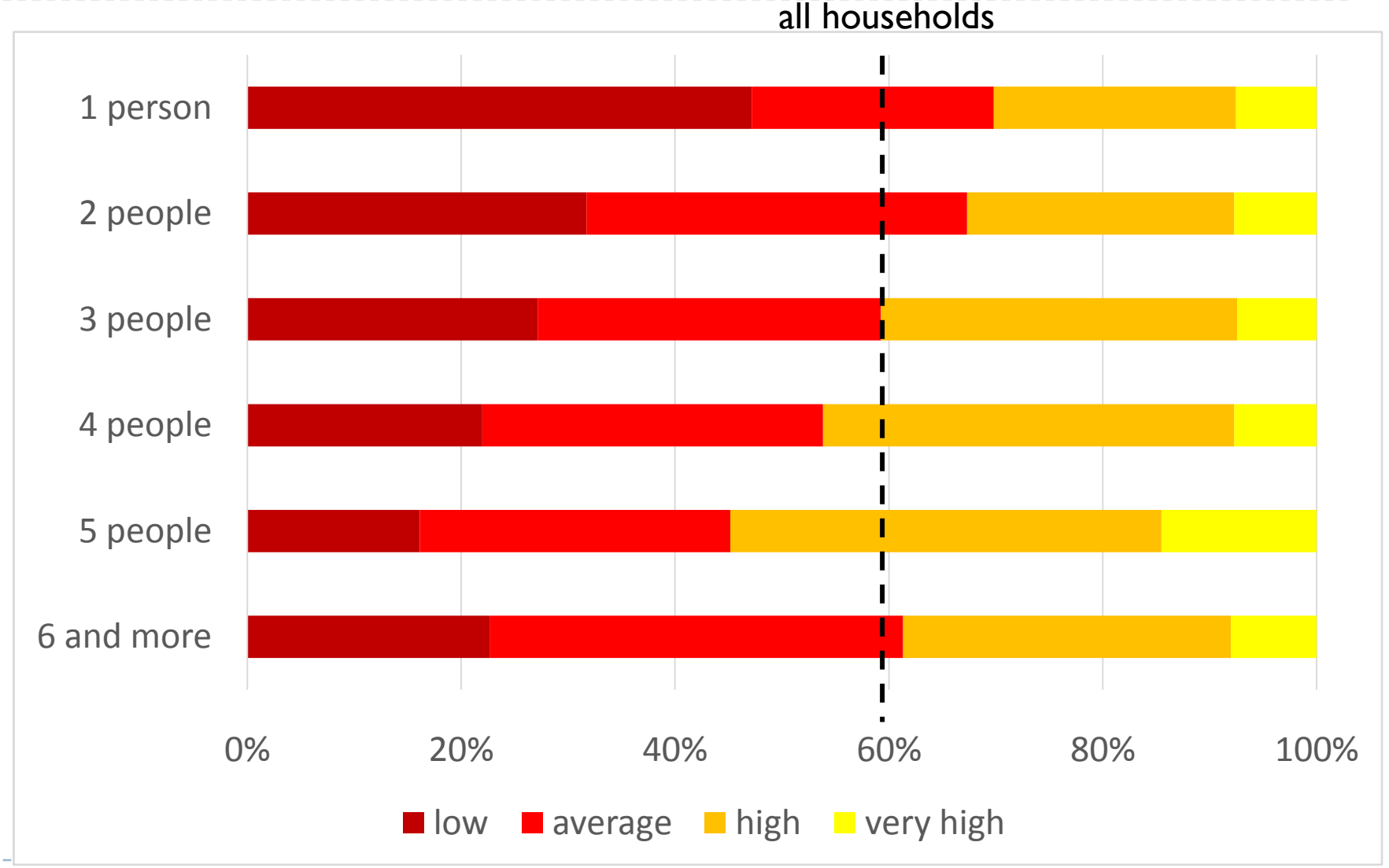



**Households with children** – slightly less vulnerable

# GENDER STRUCTURE



# HOUSEHOLD SIZE



# AGE, GENDER, HOUSEHOLD STRUCTURE

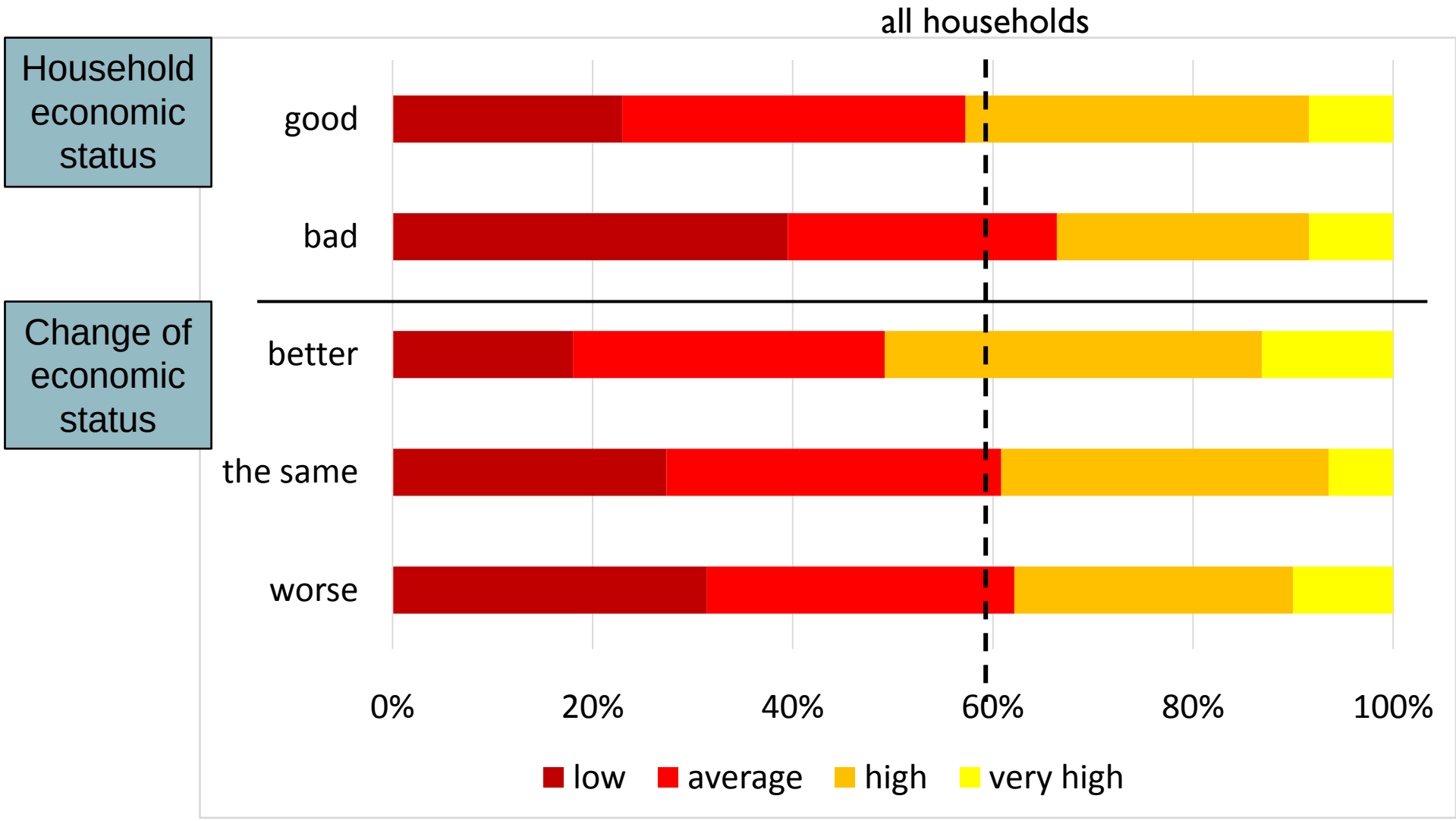
**Low preparadness** is related to:

**age** (senior only households)
**gender** (male/female only households)
**household size** (single, two-person households)

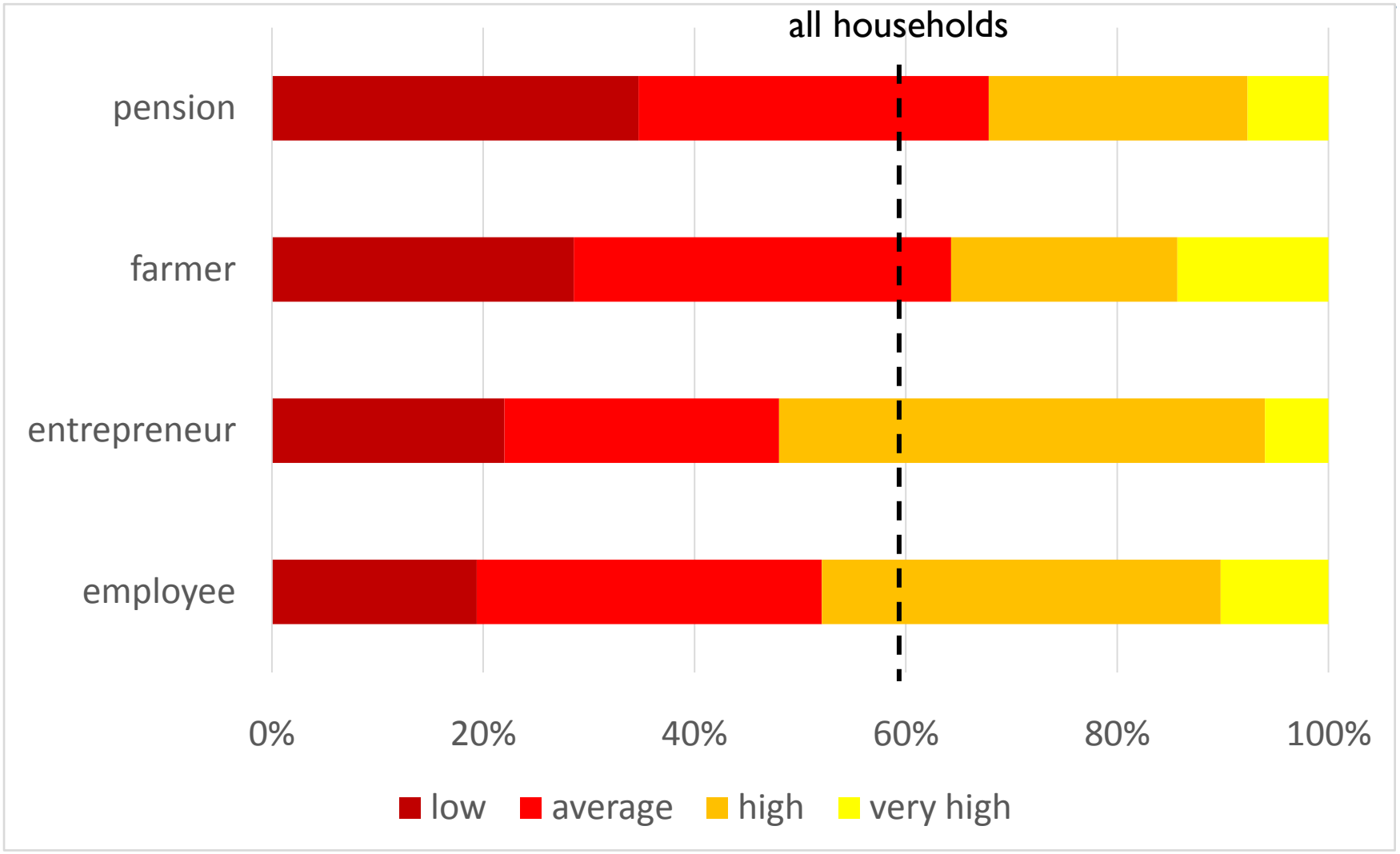
These factors are interrelated
and their impact on preparedness is
a **combination of other vulnerability factors** such as:

insufficient economic resources
lower educational status
social isolation
health issues

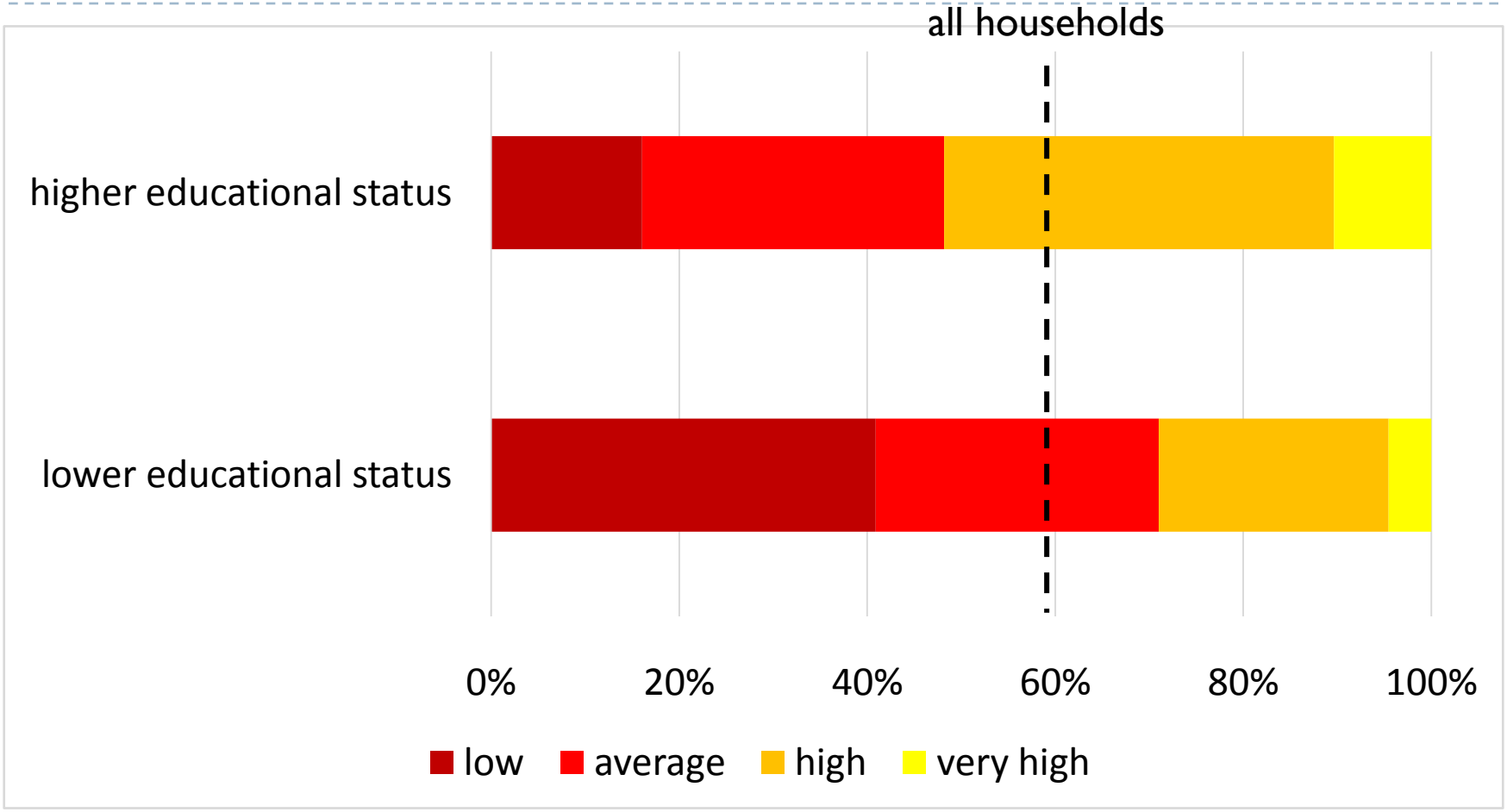
# ECONOMIC CAPITAL – ECONOMIC STATUS



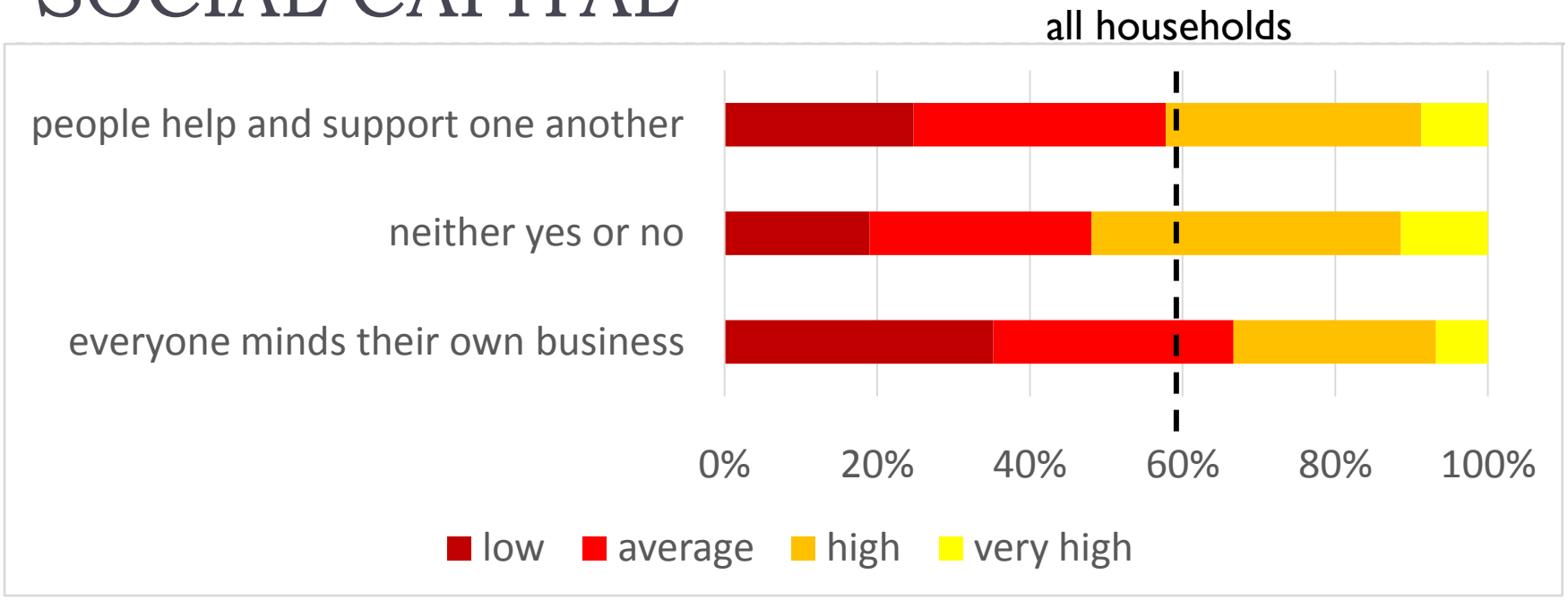
# ECONOMIC CAPITAL – MAIN SOURCE OF INCOME

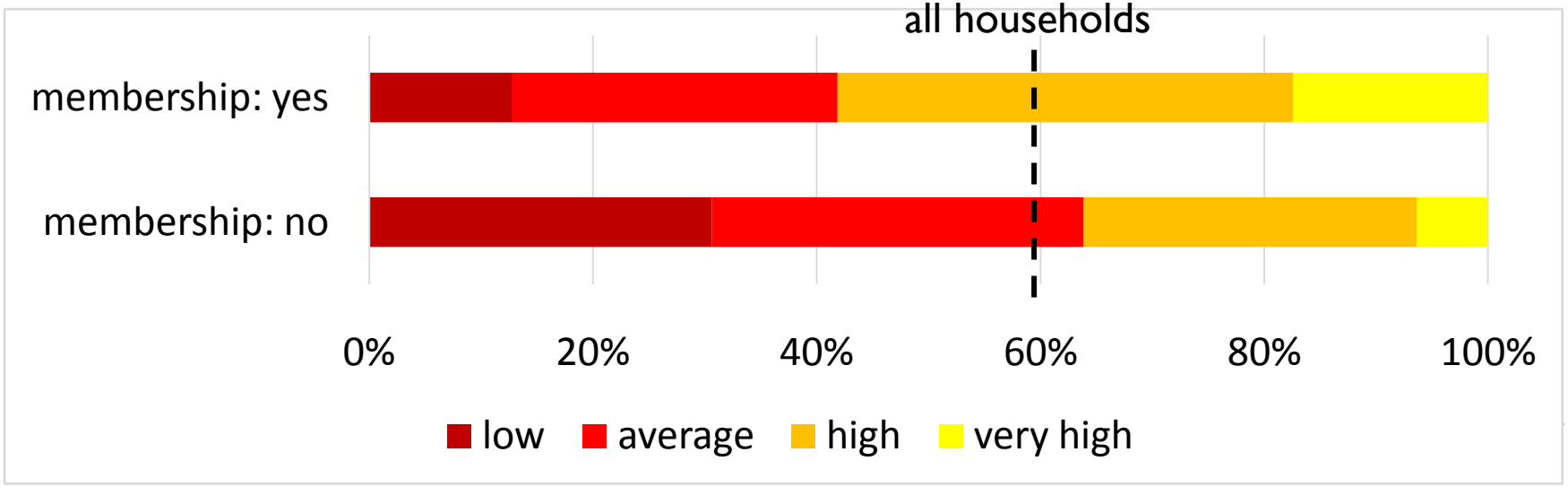


# HUMAN CAPITAL



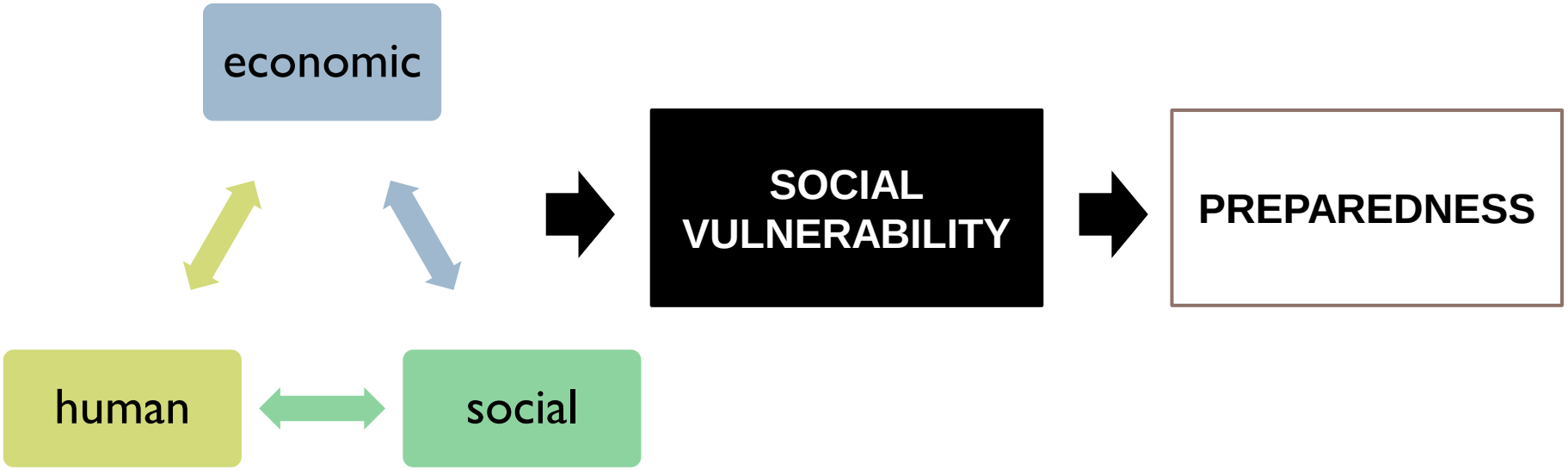
# SOCIAL CAPITAL



# ECONOMIC, HUMAN, SOCIAL CAPITAL

Again, these three forms of capital are interrelated




What social vulnerability factors are the most significant in explaining level of preparedness?

**Ordinal regression:**
dependent variable = flood preparedness index
independent variables = theoretical social vulnerability factors

# ORDINAL REGRESSION

FLOOD PREPAREDNESS

| Categories | Indicators | All | Sudety | Carpathian |
|---|---|---|---|---|
| **Age structure** | **senior only household** | **LOWER** | **lower** | **LOWER** |
| **Economic capital** | bad economic situation | | lower | |
| | ownership of a house/flat | HIGHER | HIGHER | |
| **Human capital** | **higher educational status** | **HIGHER** | **HIGHER** | **higher** |
| **Social capital** | association membership | HIGHER | | HIGHER |
| | volunteer firefighter membership | higher | | |
| | have lived in the community for less than 10 years | | HIGHER | |

Note: LOWER/HIGHER – very high significance (less than .05);

lower/higher – high significance (less than .1)

# CONCLUSIONS

- **Universal factors of higher social vulnerability (lower preparedness):**
  - households with lower educational status
  - senior only households

- **Specific factors of higher social vulnerability (lower preparedness):**
- Sudety Mts.
  - households with lower economic resources
  - households that rent rather than own
- Carpathian Mts.
  - households with lower bridging social capital (a lack of associational activities)

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The preliminary results of the research done within the framework of the research grant: 'Socio-economic factors of social vulnerability to floods with a special focus on the role of communication' awarded by the Polish National Science Centre, Grant agreement no. UMO-2012/05/D/HS4/01328.

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