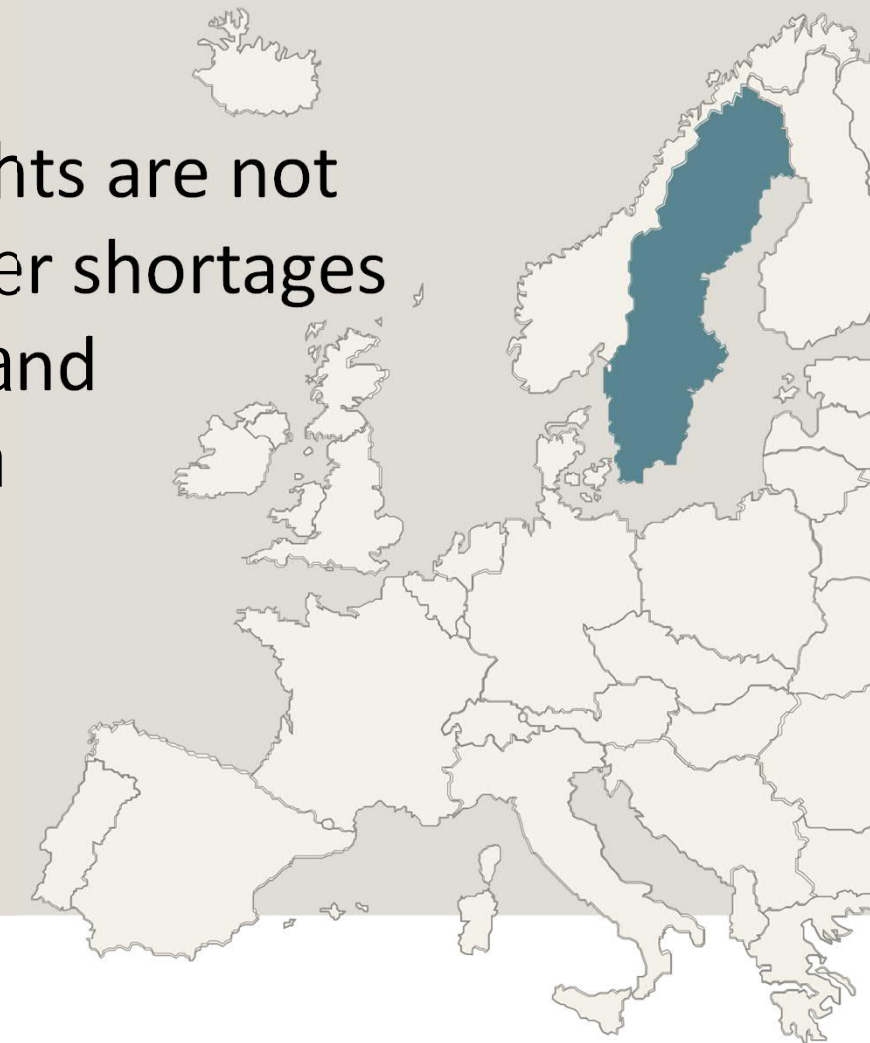


Drought hazards and stakeholder perception: Unraveling the interlinkages between drought severity, perceived impacts, preparedness and management

Droughts in Sweden

Despite being located in Northern Europe where droughts are not typically expected, Sweden experienced significant water shortages during the most recent droughts of 2016/2017, 2018, and 2022. These droughts had far-reaching impacts on both the environment and Swedish society, leading to forest fires, crop failures, emergency slaughter of livestock, reduced tourism revenues, and challenges in ensuring access to safe drinking water.



Drought Management

Drought planning and collaboration across different governance levels are essential to mitigate drought impacts providing large economic and social benefits. The Swedish governance system relies to a large extent on the municipal self-government, which is important in development of drought management strategies and has the legal obligation to create local action plans. However, results from a 2017 survey showed that only 27% of surveyed municipalities had an action plan for water shortages.

How are drought hazards and their impacts perceived, assessed and managed by practitioners?

How do practitioners view their local water resources & future risks of droughts?

Do these perceptions reflect the objective severity?



Drought Management

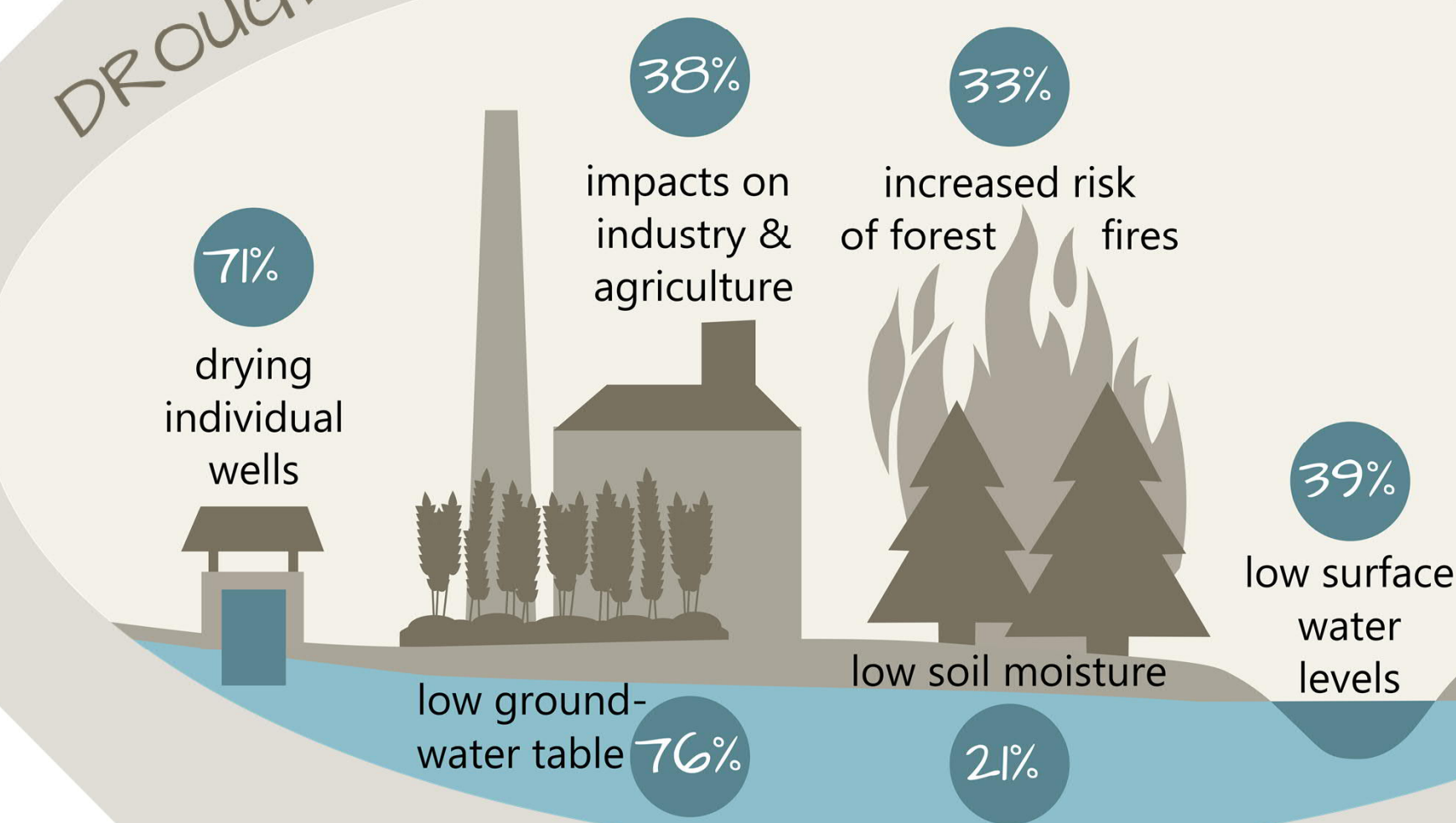
- ✓ 81% have no operational drought definition
- ✓ 72% have no drought action plan
- ✓ 97% belief drought hazards will increase in the future

Drought Perception

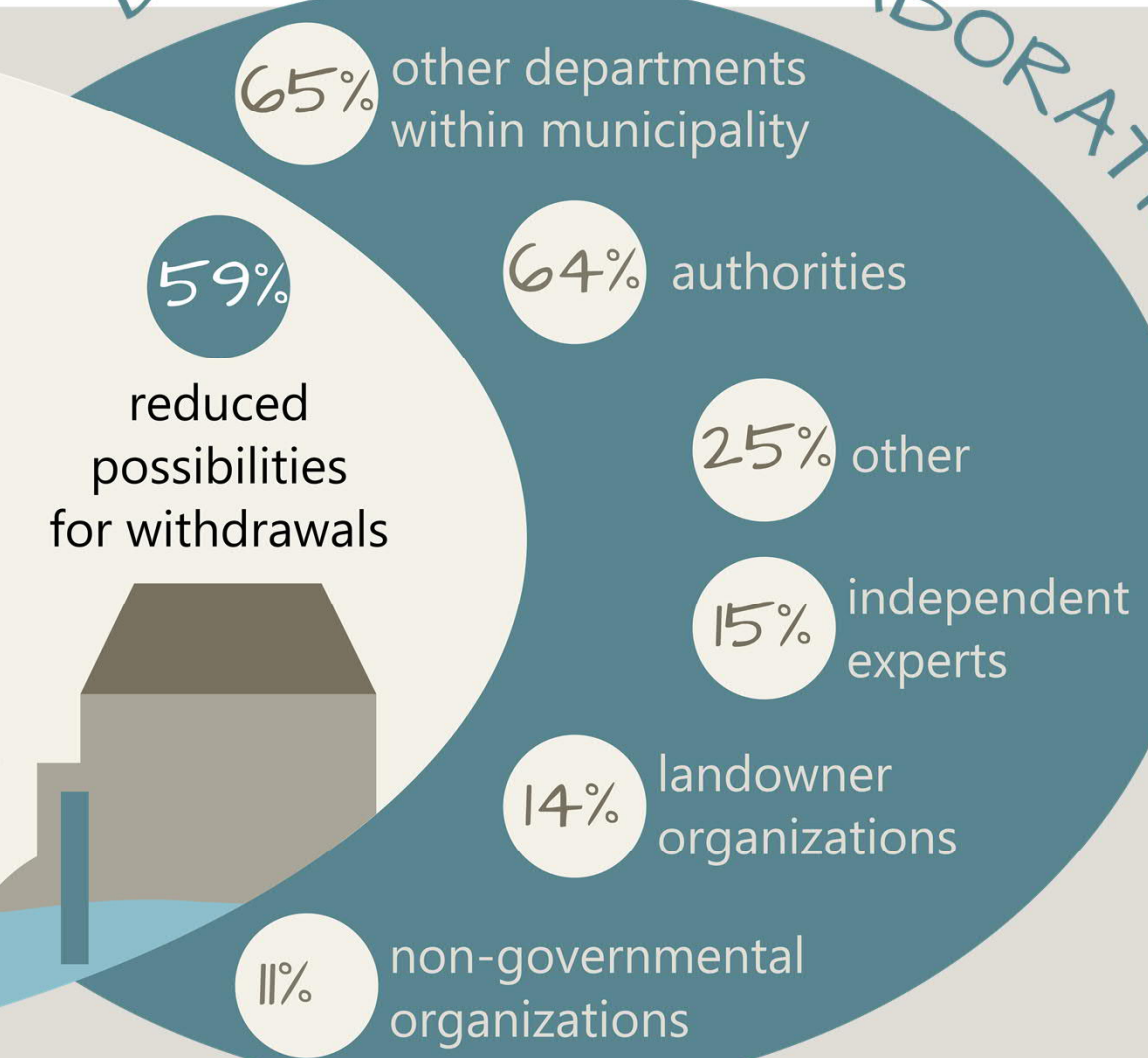
Respondents perceived ...

- ✓ the 2018 drought as much more severe than 2017
- ✓ stronger impacts in 2018 (vs 2017)
- ✓ a better preparedness in 2018 than in 2017
- ✓ the management better in 2018 than in 2017
- ✓ droughts more severe in the South (S) compared to the North (N)
- ✓ droughts more severe in rural (R) compared to urban (U) areas

DROUGHT IMPLICATIONS



DROUGHT COLLABORATIONS



Literature review: Assessment of water governance in Sweden



Survey: Analysis of drought perception, impacts, crisis preparedness and management across 127 municipalities for 2 drought events: 2017 and 2018



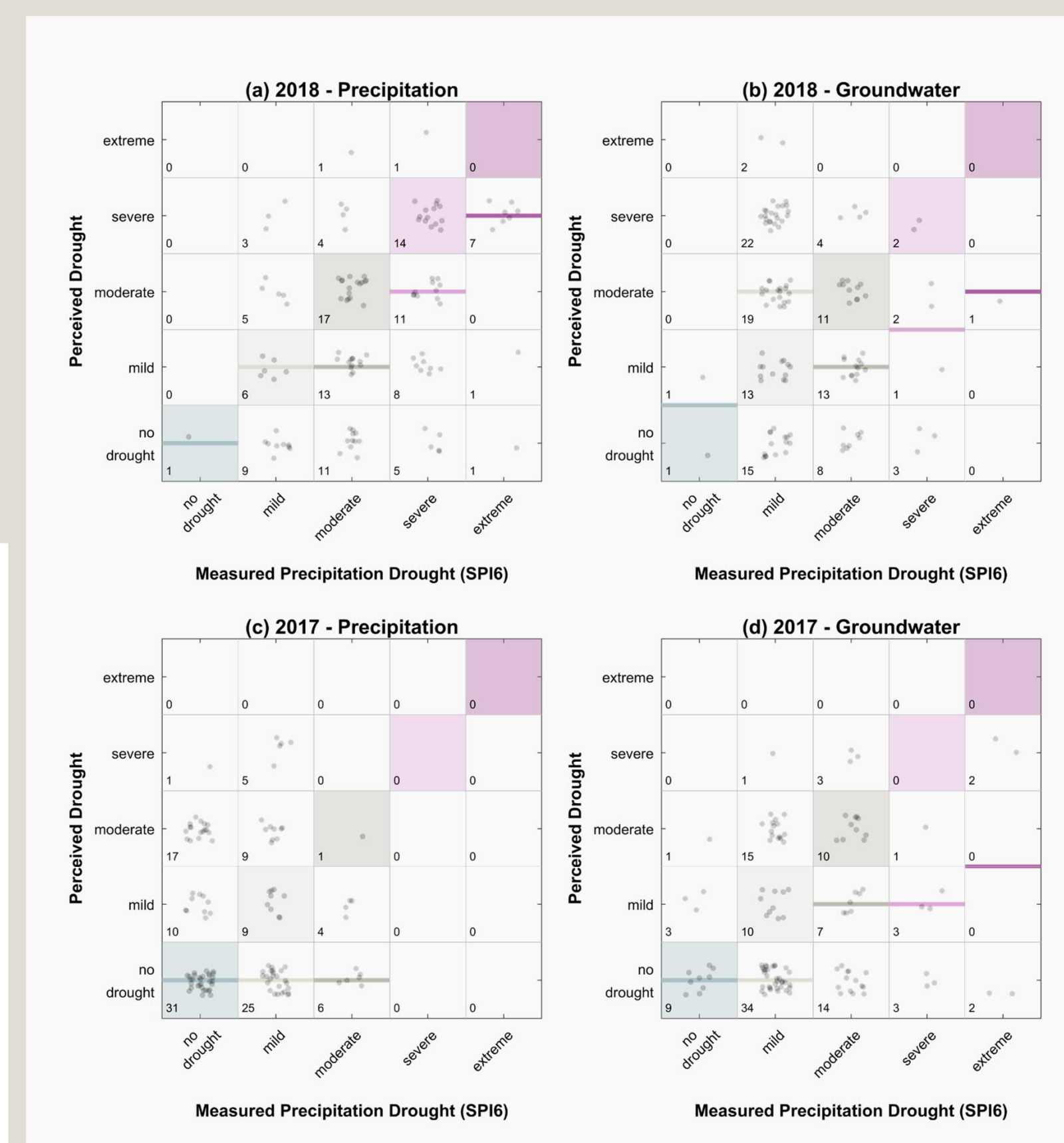
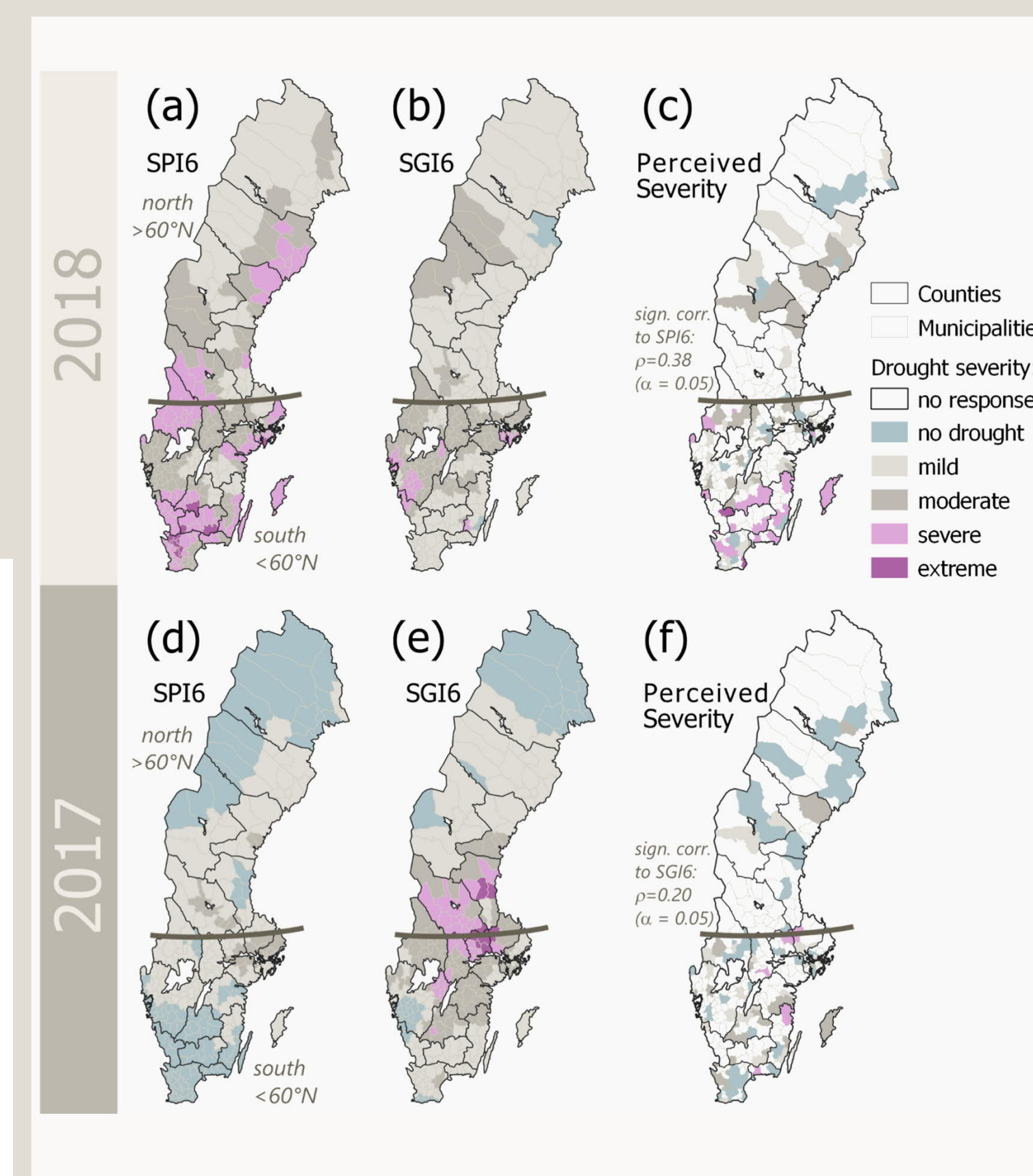
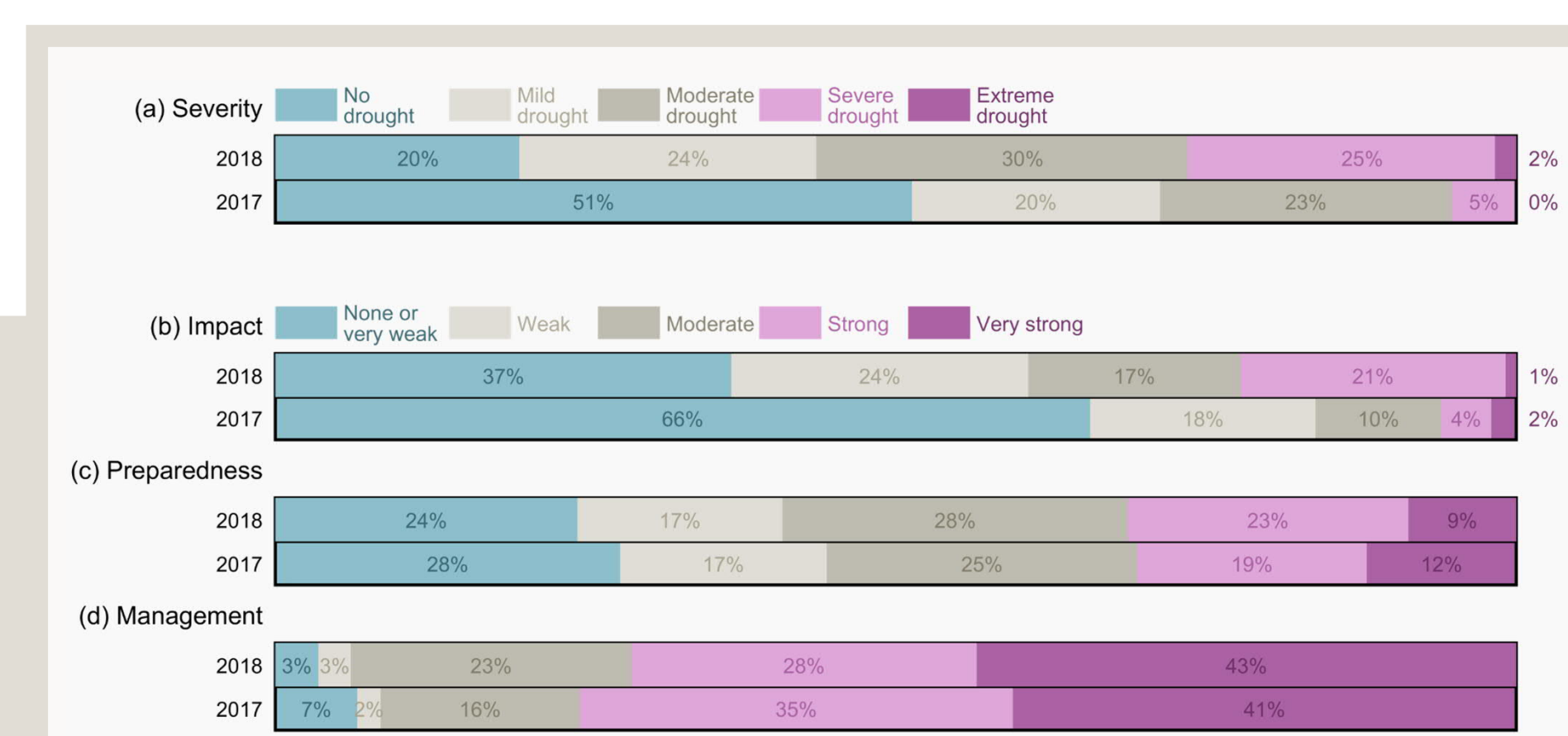
Regional Analysis: Comparison of practitioners' drought perception with observed drought severity, measured by drought indices: SPI6 (precipitation deficit) & SGI6 (groundwater deficit).

Role of Action Plans

Perceived drought values	2017		p-value	2018		p-value
	with action plan	without action plan		with action plan	without action plan	
Severity	moderate	no drought	0.041*	mild	no drought	0.001*
Impact	none/very weak	none/very weak	0.862	strong	weak	0.025*
Preparedness	moderate	weak	0.007*	moderate	weak	0.023*
Management	strong	strong	0.123	strong	strong	0.903
No. of affected sectors	1.6	0.6	<0.001*	2.4	1.5	0.007*
No. of measures	3.4	1.4	<0.001*	4.9	2.4	<0.001*

Hydrologic Reality

- ✓ 2018 much more severe/wide-spread than 2017
- ✓ Perceived drought severity did not always match actual precipitation or groundwater deficits
- ✓ Practitioners underestimated drought severity in moderately to severely affected municipalities



Conclusions

- ✓ 2018 Lack of drought definitions and operation plans at municipal level in Sweden
- ✓ Rural areas in southern Sweden with high agricultural activity and reliance on private wells experienced the strongest impacts during recent droughts
- ✓ Integrating drought action plans and management strategies could lower present-day drought vulnerability, but time and resources are limiting factors
- ✓ Perceived drought severity was correlated to observed water deficits in 2018, but not in 2017
- ✓ Short-lived social memory, cognitive bias, and lack of harmonized drought conceptualization and terminology may contribute to discrepancies
- ✓ Urgent need to increase practitioner awareness, develop a common understanding, and align perceptions of drought hazard
- ✓ Improved risk management strategies are necessary to deal with drought vulnerability and adapt to a changing climate

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SCAN ME