

Imperial College London



LEVERHULME
Centre for Wildfires,
Environment and Society



A Q-methodology approach to understanding causes and drivers of wildfires in Crete, Greece

^{1,2}Haleema Misal, ^{1,2,3} Prof. Apostolos Voulgarakis, ⁴Dr. Aiora Zabala, ^{1,2} Dr. Ioannis Kountouris

¹Imperial College London, ²Leverhulme centre for wildfires, society and the environment, ³Technical University Crete, ⁴Cambridge Centre for Environment, Energy and Natural Resource Governance, University of Cambridge

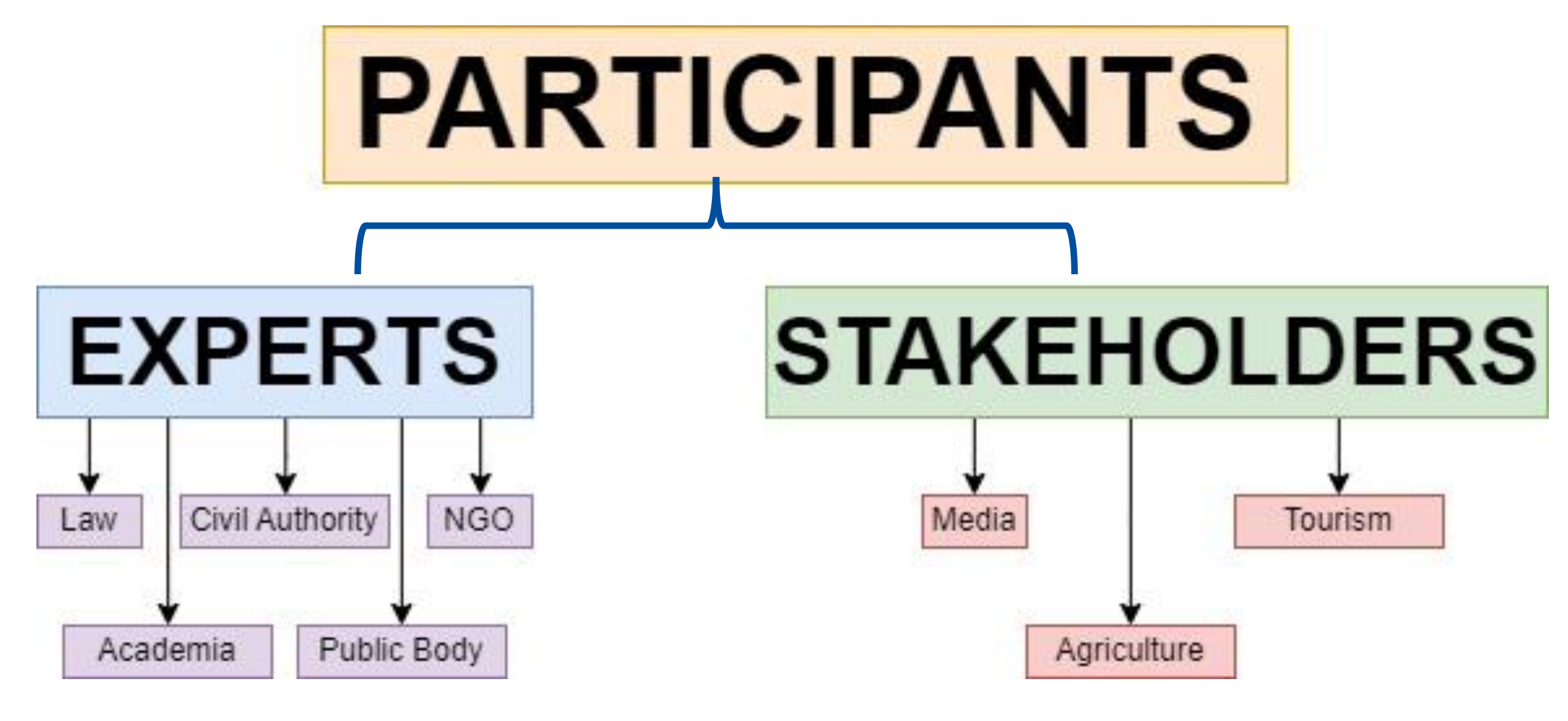
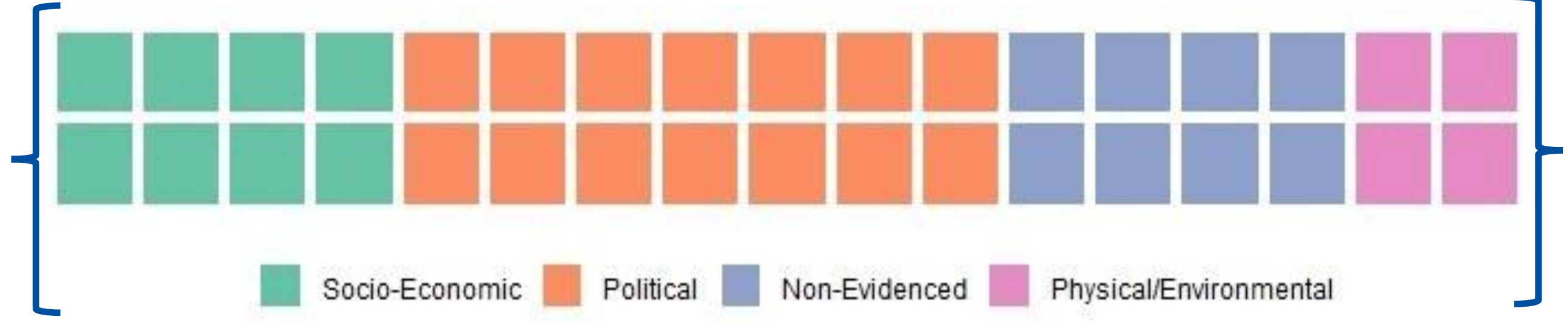
Introduction

The **attitudes and perceptions** of key **stakeholders** can influence wildfire management policy and outcomes¹. Identifying commonalities and differences in the views of a range of stakeholders can unravel the challenges involved in **wildfire management** and support the development of **effective wildfire policy**.

We choose Crete, Greece as our case study as to exemplify a typical Mediterranean landscape facing increasing wildfire risk² but also as there are **competing incentives amongst experts and stakeholders** with varying and **divergent views on the causes and drivers of wildfires**.

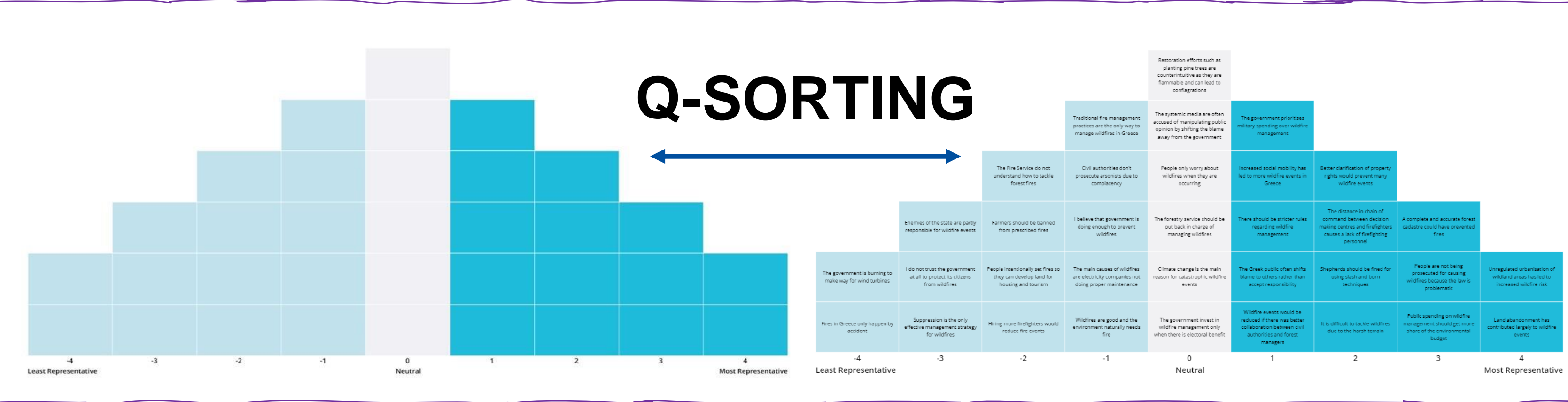
Analytical themes

To structure our understanding of conflict over wildfire management discourses and create statements we focus on the causes and drivers of wildfires over **four different themes**.



Q-Methodology (Q)

Seeks to understand and **quantify an individual's self-perception** by categorising their **beliefs, opinions and attitudes**³. Participants were intentionally selected based on their knowledge and relevance to the problem under consideration and were presented with a series of statements and asked to rank from **'Most Representative'** to **'Least Representative'**. Rankings are then reduced using **PCA** to a set of statements that represent common perspectives known as **factors**.



ANALYSIS
PCA
Principle Component Analysis

| Factors | n | Eigen-values | Explained variance |
|-----------------------------|---|--------------|--------------------|
| 1 'Holistic Managers' | 4 | 3.30 | 18% |
| 2 'Anti Status-Quo' | 4 | 2.90 | 16% |
| 3 'Institutional Reformers' | 3 | 2.53 | 14% |
| 4 'Pro-Government' | 3 | 2.46 | 14% |

Factor statistics (n = number of flagged participants with significant loadings)

Results

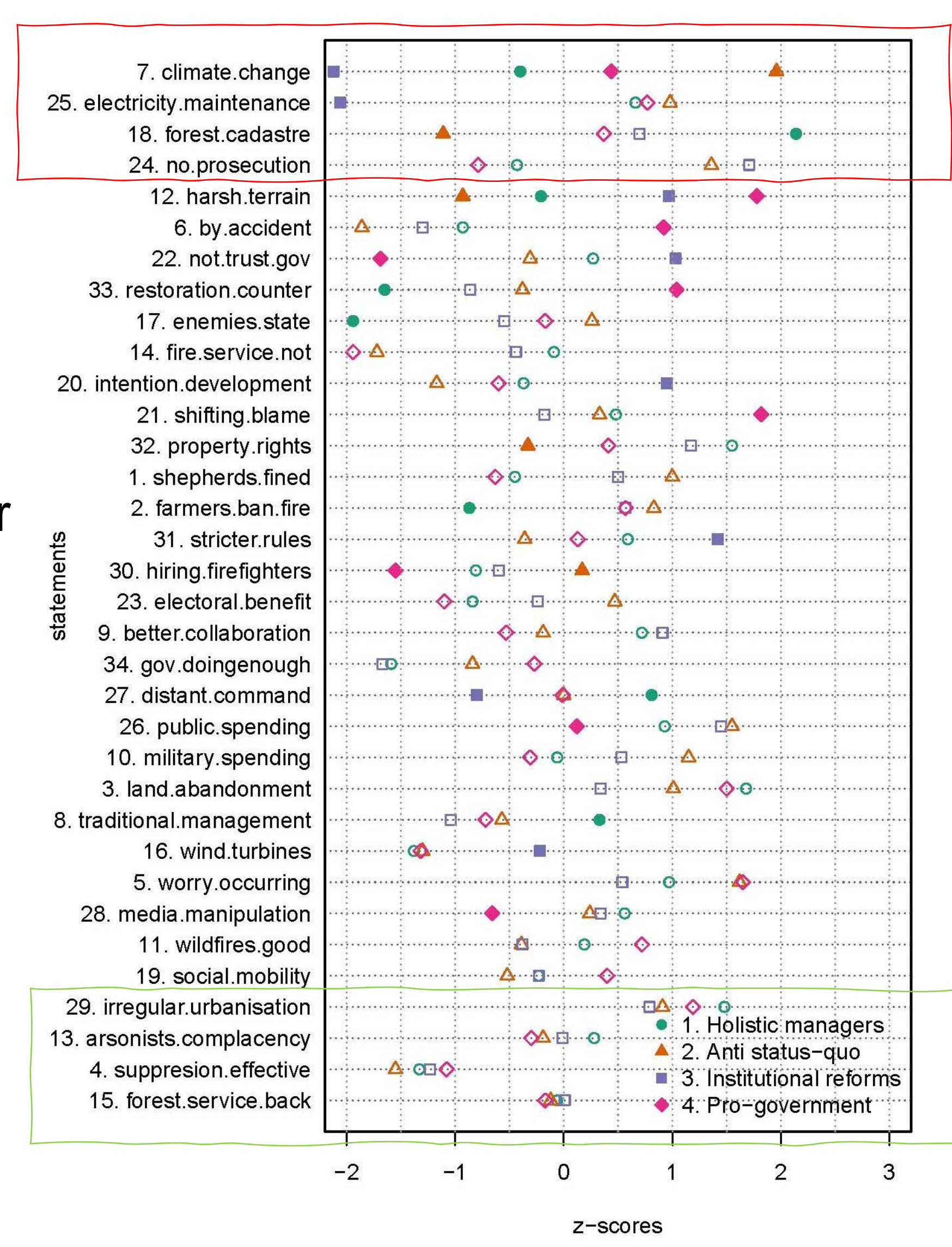
We identified 4 factors and labelled accordingly

Participant viewpoints are shaped by affiliation as opposed to actor groupings (Expert-Stakeholder)

Statements of **consensus and disagreements** provides entry points for conflict resolution and highlights the degree of common sentiments

All experts and stakeholders unanimously agreed that fire suppression is not the only effective management strategy to manage wildfires (S4)

There was general consensus on the socio-economic drivers of wildfire events, with all respondents agreeing that unregulated urbanisation of wildland areas has led to increased wildfire risk (S29)



Q-Statements with z-scores: This plot shows statement z-scores ordered by distinguishing statements at the top, and consensus statements towards the bottom. Filled markers indicate that the statement is distinguishing for this particular statement. The wider the horizontal gap is between markers indicate increased disagreement, whereas markers that are closer together indicate agreement.

Conclusion and Discussion

Across the 4 factors we find overall a strong emphasis placed on the **socio-economic** and **political** analytical themes.

Some factors are dominated by particular affiliations whereas others were varied e.g F2^{heterogeneous} v F1^{homogenous}

Some factors (*Pro-Government*◆) displayed contrasting views and a lack of willingness to collaborate relative to the majority (*Holistic Managers*●*Institutional Reformers*■)

Despite the contrast- there is some common ground that decision makers can use to engage in a process of shared learning and minimise conflict-maximise collaboration.

The consensus statements can be used to facilitate discussion and offer a pathway to potential solutions and progression towards a common goal.

New management strategies for wildfires are likely to be better received when tailored and developed considering the perceptions of experts and stakeholders⁴.

References
¹ Cuppen, E. (2013). 'Q methodology to support the design and evaluation of stakeholder dialogue', *Operant Subjectivity* 36(2), 135-161
² Rovithakis, A., Gillakis, M. G., Seiradakis, K. D., Giannakopoulos, C., Karali, A., Field, R., Lazaridis, M. & Voulgarakis, A. (2022). 'Future climate change impact on wildfire danger over the mediterranean: the case of greece', *Environmental Research Letters* 17(4), 045022.
³ Watts, S., Stenner, P. et al. (2012). 'Doing q methodological research', *Theory, method and interpretation* p. 2012.
⁴ Lewicki, R., Gray, B., Elliott, M. et al. (2003). *Making sense of intractable environmental conflicts: Concepts and cases*, Island press.

