

Revealing synergies, interconnections and multiple perspectives as an aid to Natural Flood Management (NFM) delivery

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1. Introduction

NFM aims to create a more resilient fluvial system by harnessing hydrological processes through land management techniques to slow the flow of water to reduce flood risk while simultaneously improving water quality, habitat quality and the health and well-being of local communities. To date NFM has not been a widely adopted flood management strategy. Catchment wide NFM pulls in expertise and responsibilities from a wide range of sectors requiring collaborative working yet policy objectives and activities are not aligned.

Research objectives

What barriers impede delivery of catchment wide NFM and are the most important?
Can ideas and opinions of scientific and practical knowledge of a heterogeneous group be structured?
Do different perceptions of barriers exist between practitioner groups?

3. Methods

Group Concept Mapping

A mixed method approach combining qualitative and quantitative data collection and analysis to produce a visual representative of the ideas of a group.

Participants

Method	Total	(Disciplinary training (% of participants))				
		Ecology, Botany and Agriculture	Engineering and Hydrology	Environmental Science	Geography	Planning and Social Sciences
Qualitative	50	28	22	10	28	4
Quantitative	24	16	20	16	16	20

Stage 1. Qualitative problem identification and statement generation

Brainstorming activity where participants diagnose the problem using the Ketso methodology (<http://www.ketso.com/> Whitworth *et al.* 2014).

Barrier statement generation



A total of 247 individual barrier statements were generated, 108 repetitive or incomprehensible statements were removed.
New statements generated from the remaining 139 by combining closely related themes and ideas, creating a final list of 47 barrier statements.

Stage 2. Quantitative statement sorting and ranking

24 participants (12 local river catchment partnership and 12 government regulatory authorities) completed a grouping exercise and ranked the importance of each statement between 1 (unimportant) and 7 (important).
A similarity matrix showing the number of times in which the participants grouped the statements together. The greater the score the greater number of times those particular statements were grouped together and therefore assumed to be conceptually similar.

Reference

Whitworth, A; Torras I Calvo, M.C; Moss, B; Kifle, N.A; og Blåsternes, T. (2014) Changing libraries : facilitating self reflection and action research on organizational change in academic libraries. New Review of Academic Librarianship, 20(2),pp. 251-274

3. Results

Ranking

Synergies - What is NFM?

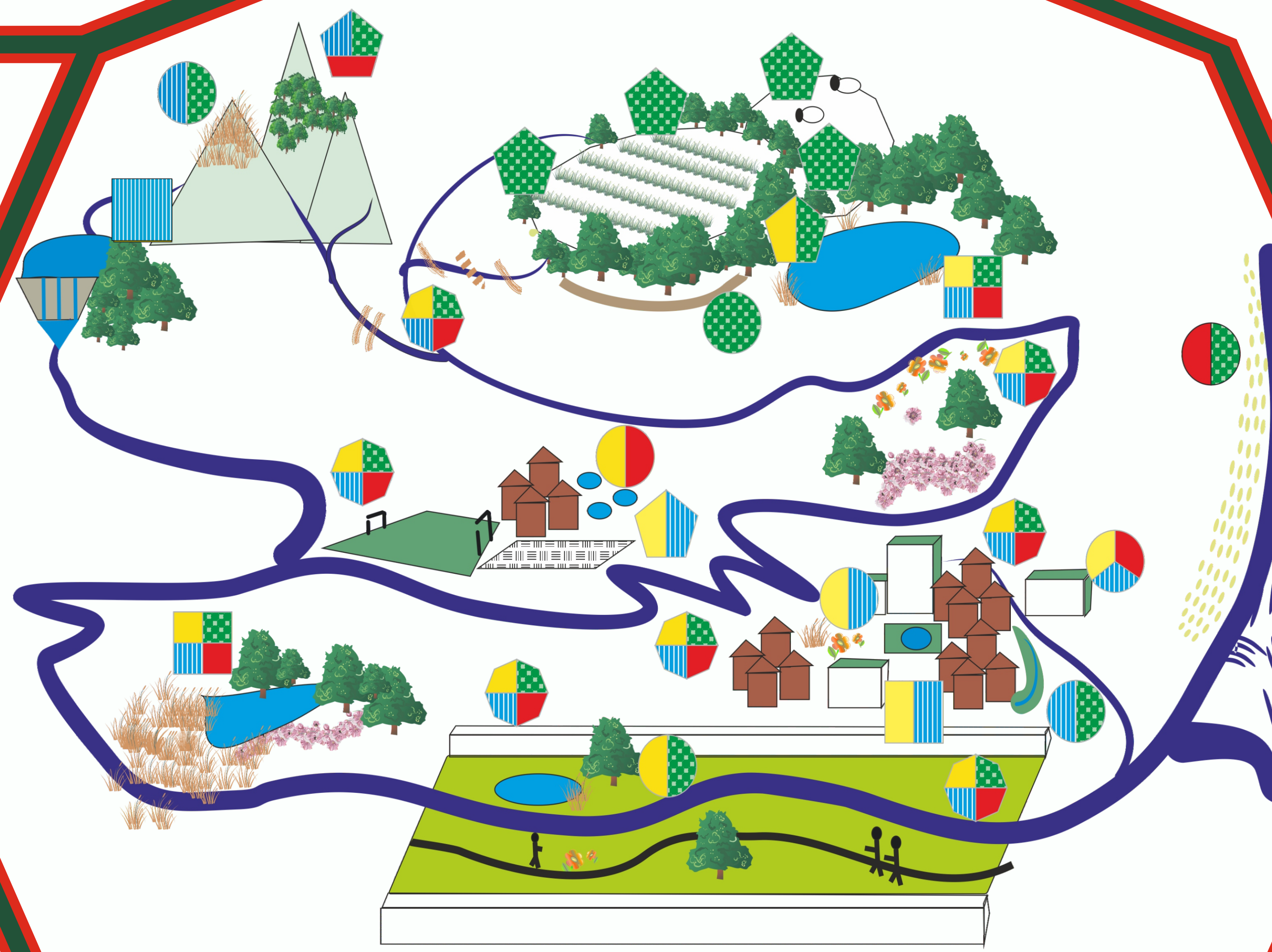


Figure 1. Natural in NFM refers to hydrological processes establishing NFM as an integrated catchment management approach. The NFM interventions are categorised as the initial step in the hydrological cycle:



Figure 3.

Comparison of top down and bottom up governance and the perceived importance of barriers within the sub-system NFM barrier clusters.
Mean rank importance score:
Top 5 barrier = 6, 5-10 = 5, 11-20 = 4, 21-30 = 3, 31-40 = 2 and bottom 7 barriers = 1

Table 1. Top 5 Barriers ranked mean score for bottom up catchment partnership and top down regulatory government

rank	Top down Regulatory Government Top 5 barriers	Bottom up Catchment partnership
	Top 5 barriers	Top 5 barriers
1	37. The government - the buy in from MPs' that is needed is not there, they give the public conflicting messages for example both working with natural processes and dredging and they work to short government timescales	37. The government - the buy in from MPs' that is needed is not there, they give the public conflicting messages for example both working with natural processes and dredging and they work to short government timescales
2	16. There is still a reluctance to use 'new techniques' amongst the community. This includes the public, farmers, consultants and planners.	3. Conflicting priorities for land; food, housing, biodiversity, flood defence, and conservation
3	18. Scientific uncertainties - There are many variables involved and to understand, changing rainfall patterns, cumulative impacts, influence of scale, climate change and the behaviour of the floodplains	40. Funding - insufficient, difficult to access and inappropriate; for example will not pay for staff time or does not join with other funding streams
4	25. The time to develop a collective community buy in is significant	22. Organisations do not resource staff to do these types of projects. They can be on short term contracts so there is no consistency or they do not have the capacity or time.
5	1. Landowners have power and influence and are not convinced by NFM. They will only agree if they are paid compensation.	14. Poor integration of planning and design policy on a catchment scale, strategically and politically

Cluster analysis

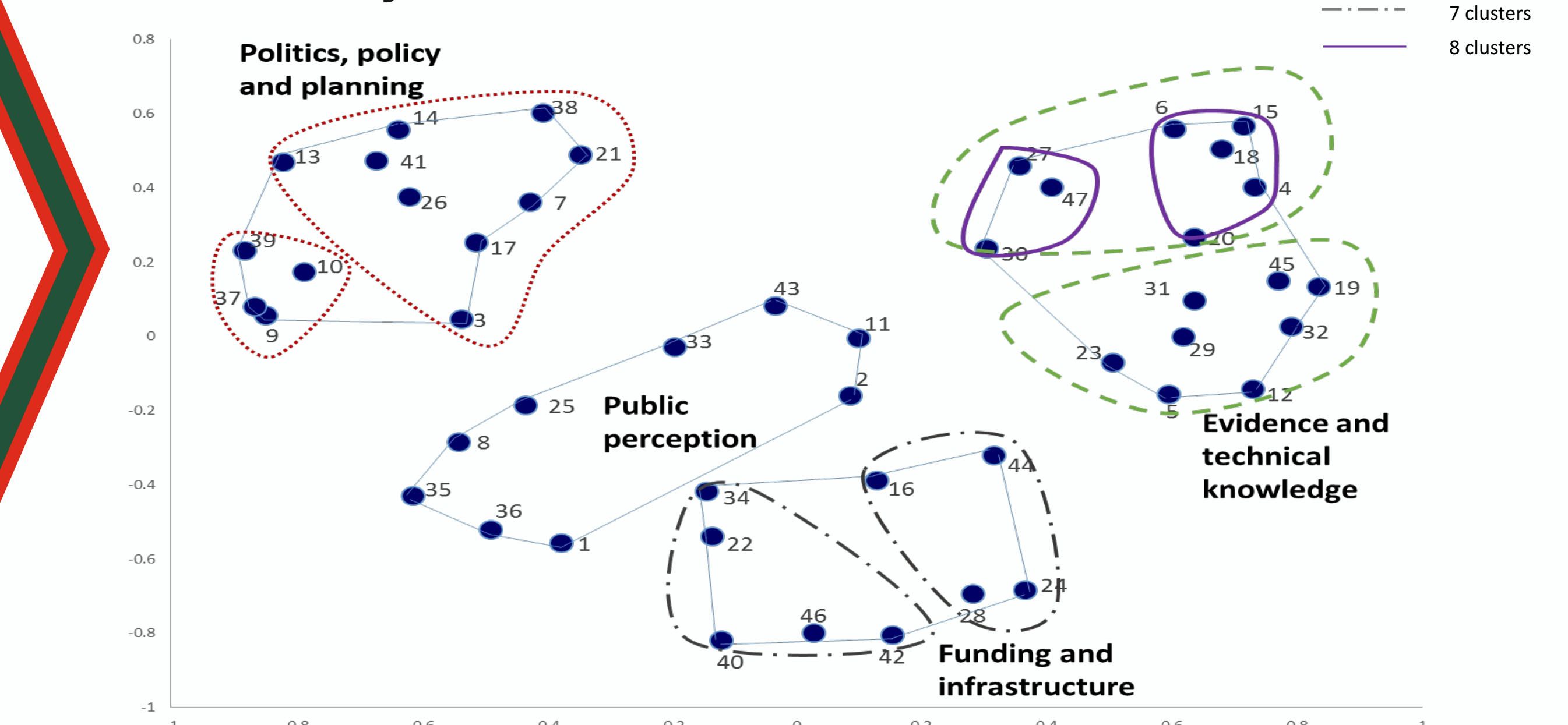
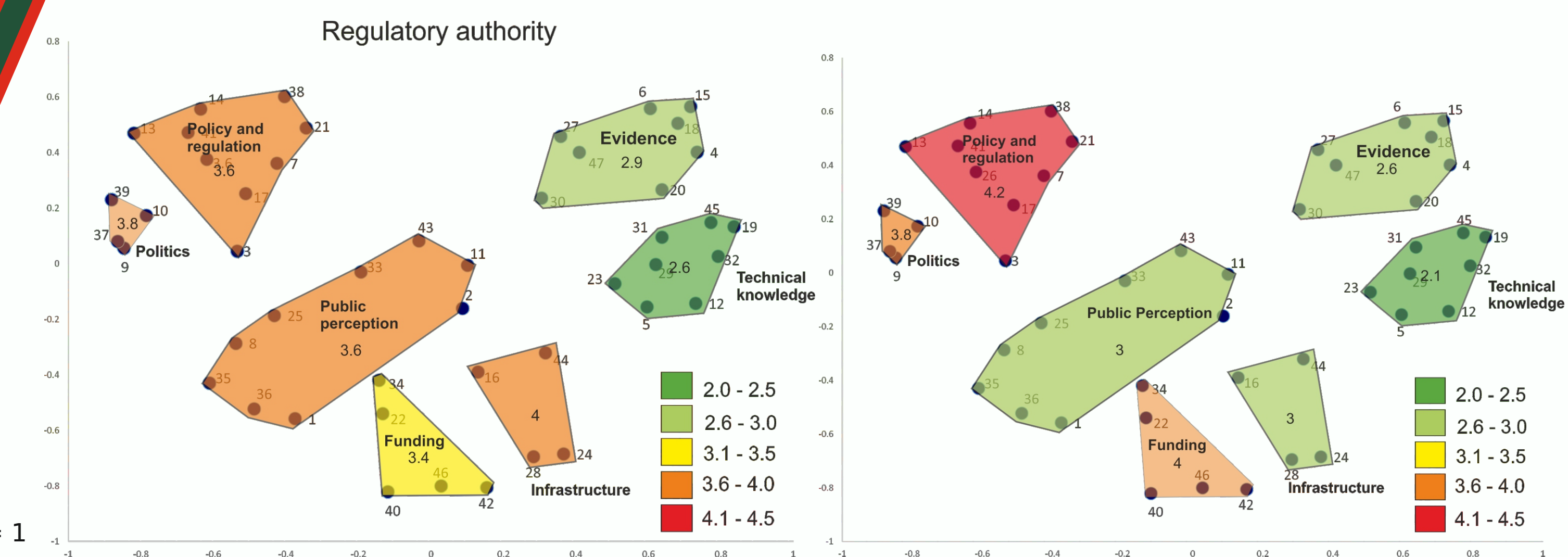


Figure 2. Similarity and dissimilarity of 47 barrier statements through multidimensional scaling, transforming data into coordinates on a grid. Ward's hierarchical cluster analysis groups the data into clusters.



4. Discussion and Conclusion

The participants identified interconnections to arrange the 47 barriers into four overarching systems and three sub-systems, offering a new view of NFM delivery.

Within the top five barriers both groups agree that a lack of engagement from the government is the most significant barrier but have different perspectives of the remaining four most significant barriers.

From the regulatory authority's perspective public perception is the most significant barrier but the River catchment partnership perspective is that policy and regulation and funding are the most significant barriers.

The outputs are being applied in conflict resolution and are opening pathways to explore and establish mutually beneficial ways of delivering NFM.

Acknowledgments

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