Water security, food security and health in pastoral systems in northern Kenya

Fuzzy Cognitive Mapping to understand opportunities and barriers for One Health programs

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Save the Children

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Community Jameel



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Contents

- Pastoralism as a One Health Socio-Ecological System
- Fuzzy Cognitive Mapping (FCM) to understand complex systems
- Leverage points - areas for intervention
- Primary vs secondary stakeholders
- Gender perspectives
- One Health sectors
- Silos in the pastoral system

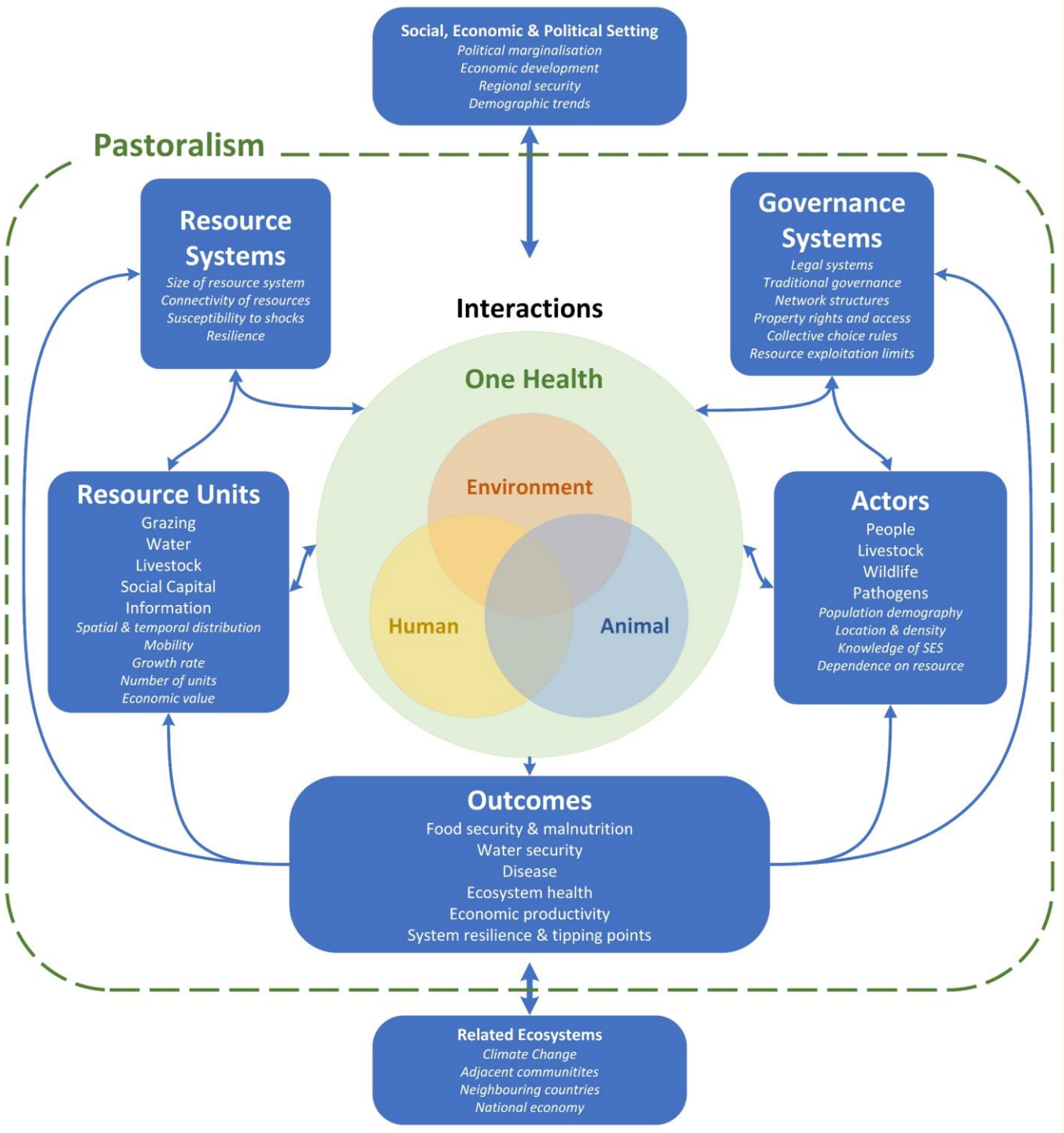


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Pastoralism is a socio-ecological system

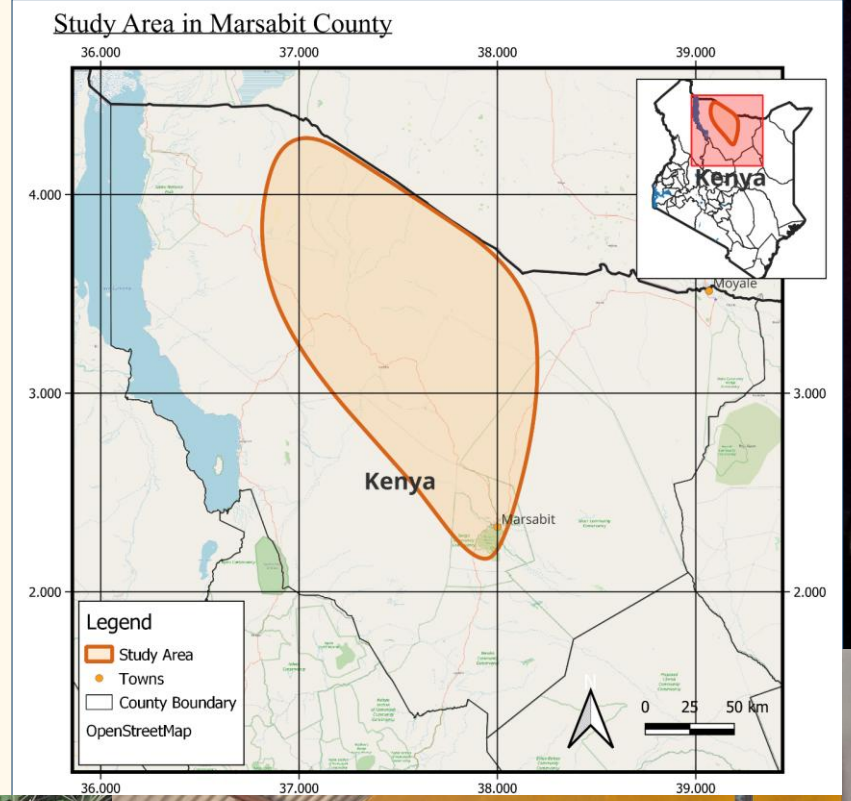
One Health is embedded in broader socio-ecological systems

How to handle this complexity?



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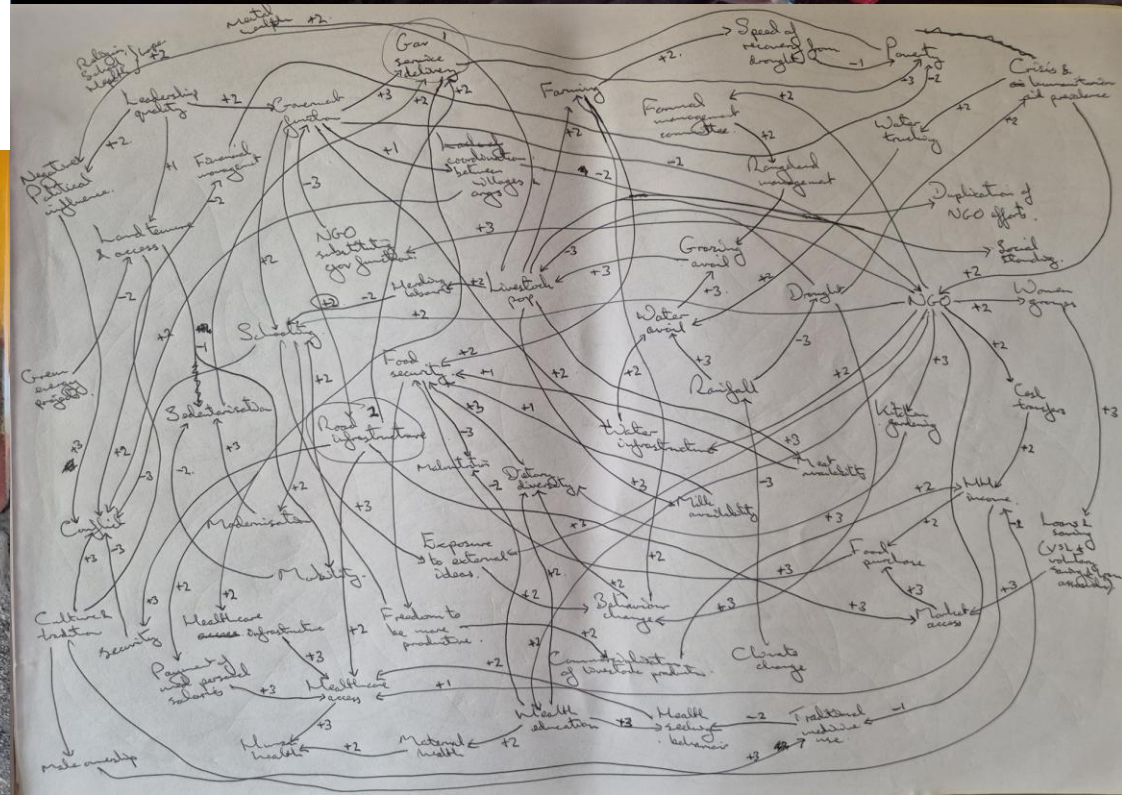
Fuzzy Cognitive Mapping











The pastoral system

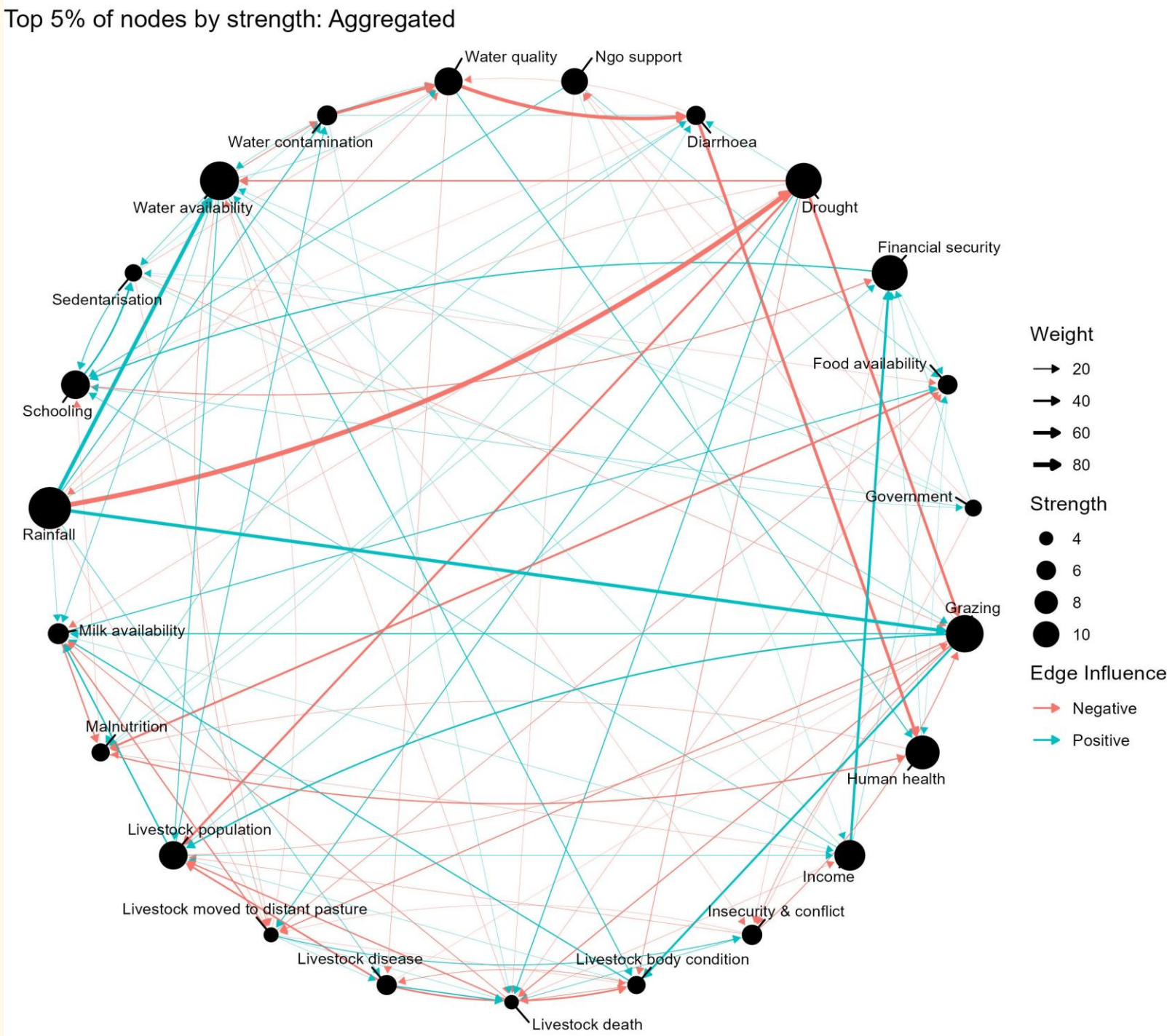
It’s complex!

455 nodes

1726 edges

Interactive network

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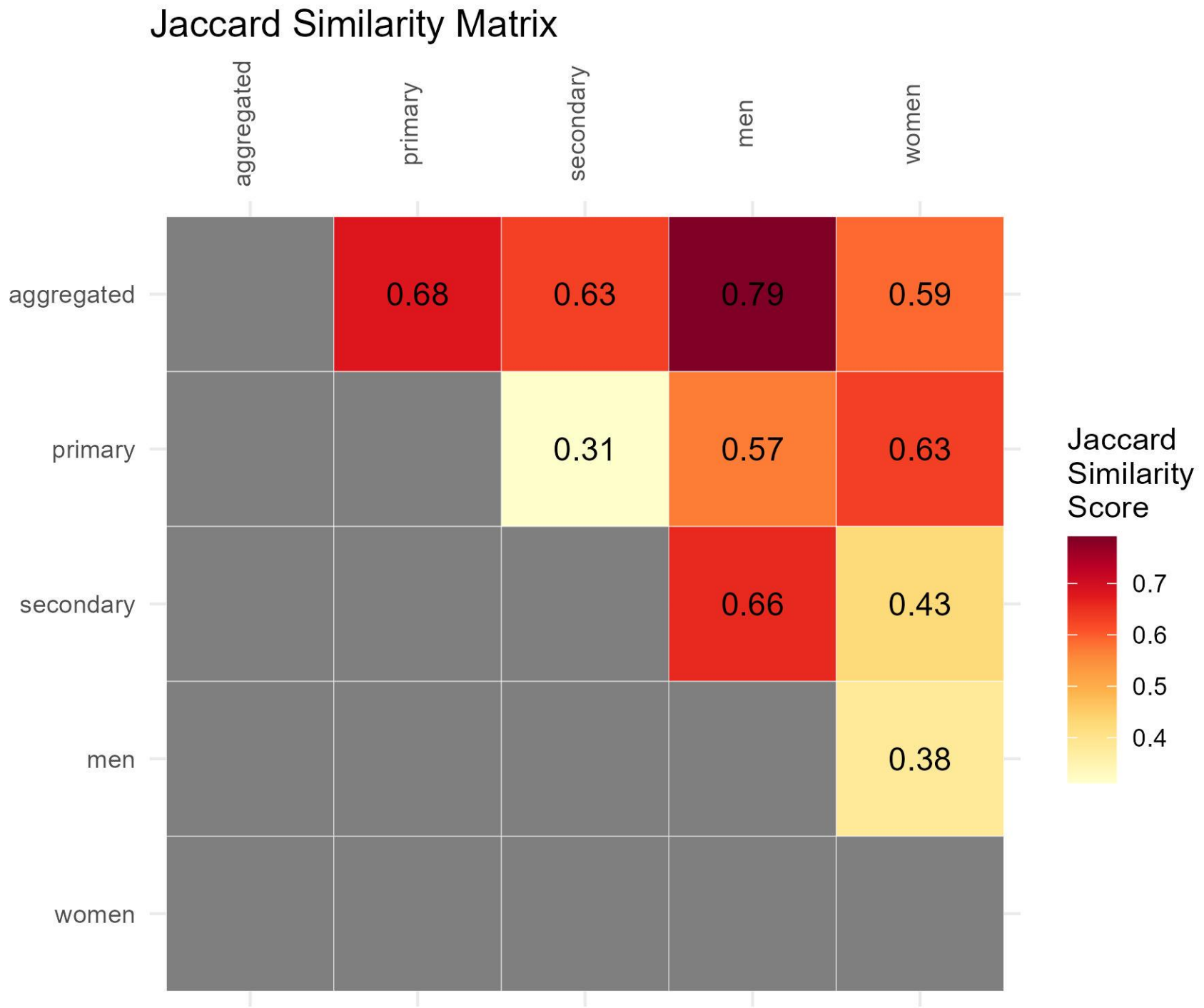
Top 10 Strongest Nodes

Rank	Aggregated (all FCMs)	Primary Stakeholders (community)	Secondary Stakeholders (NGO, government & researchers)	Men	Women
1	Rainfall	Rainfall	Financial security	Grazing	Rainfall
2	Water availability	Water availability	Grazing	Rainfall	Income
3	Grazing	Drought	Water availability	Water availability	Drought
4	Drought	Grazing	Drought	Drought	Financial security
5	Financial security	Human health	Rainfall	Financial security	Water quality
6	Human health	Livestock population	Human health	Human health	Human health
7	Income	Water quality	Schooling	Livestock population	Water availability
8	Schooling	Income	NGO support	Schooling	NGO support
9	Livestock population	Financial security	Income	Insecurity & conflict	Schooling
10	Water quality	Food availability	Insecurity & conflict	Livestock disease	Grazing

Jaccard Similarity Score

Primary Stakeholders vs Secondary Stakeholders

Men vs Women

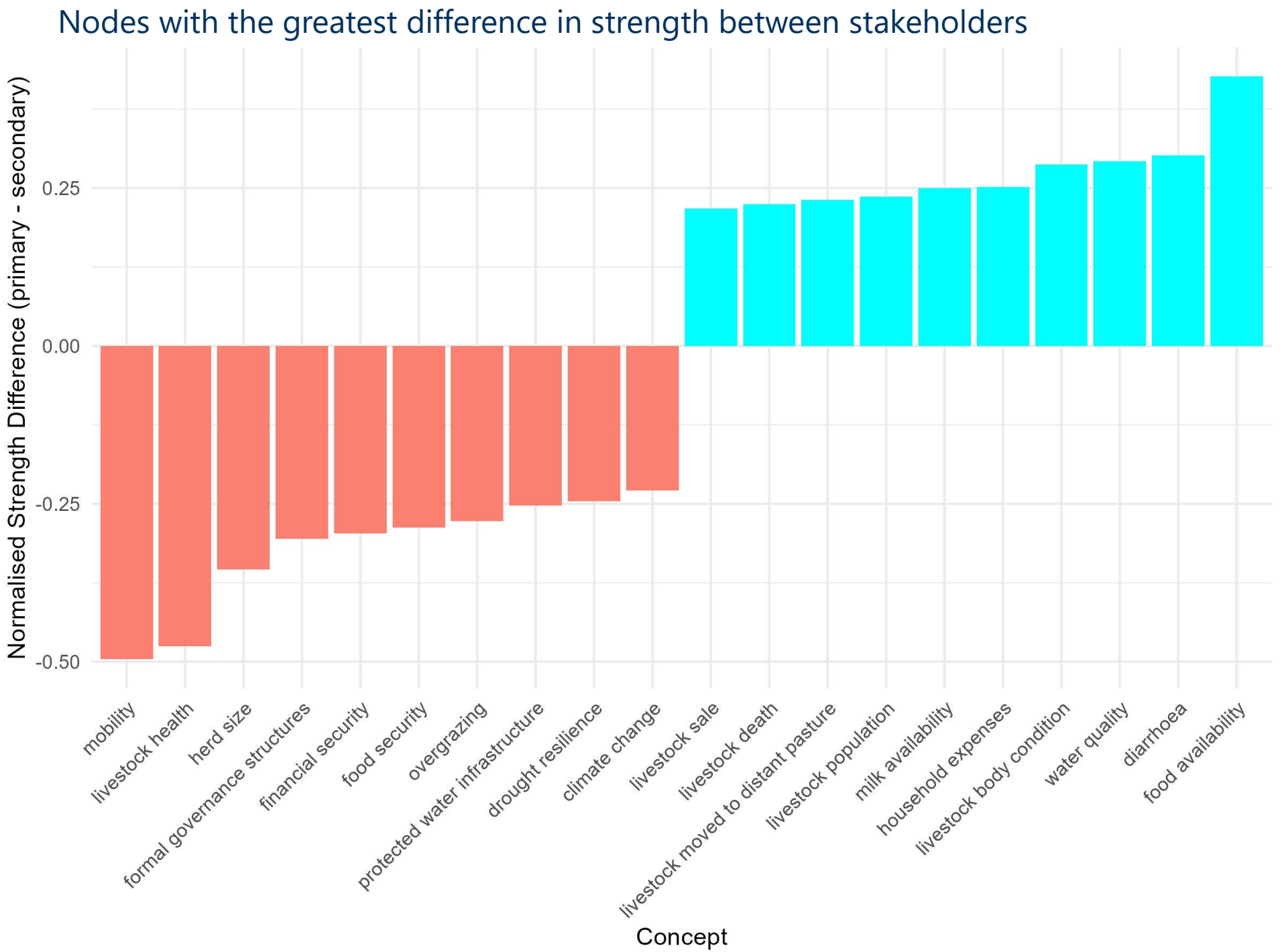


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Normalised Strength Difference: Stakeholders

Red: Secondary stakeholder preference

Blue: Primary stakeholder preference

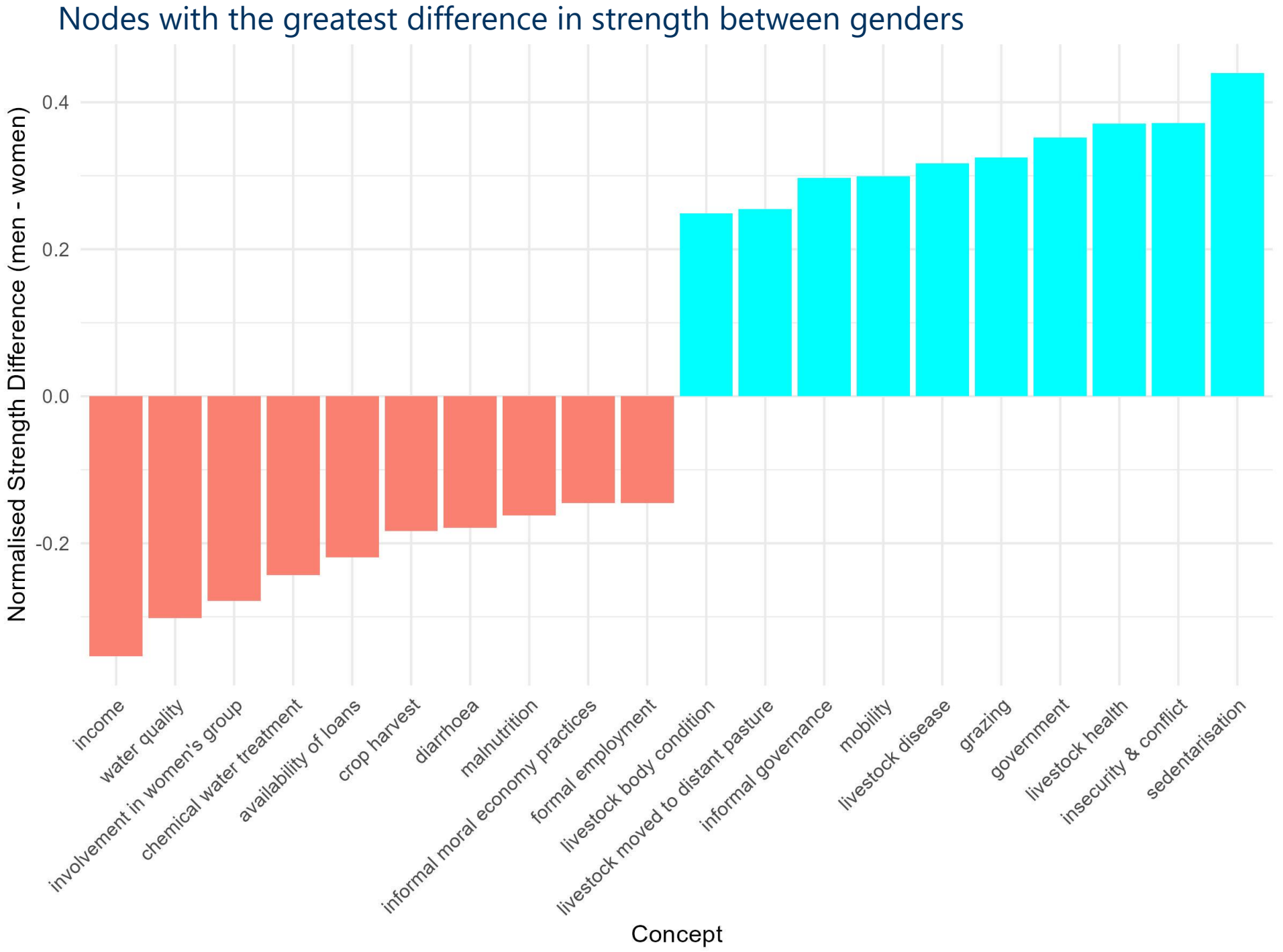


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Normalised Strength Difference: Genders

Red: Women's preference

Blue: Men's preference

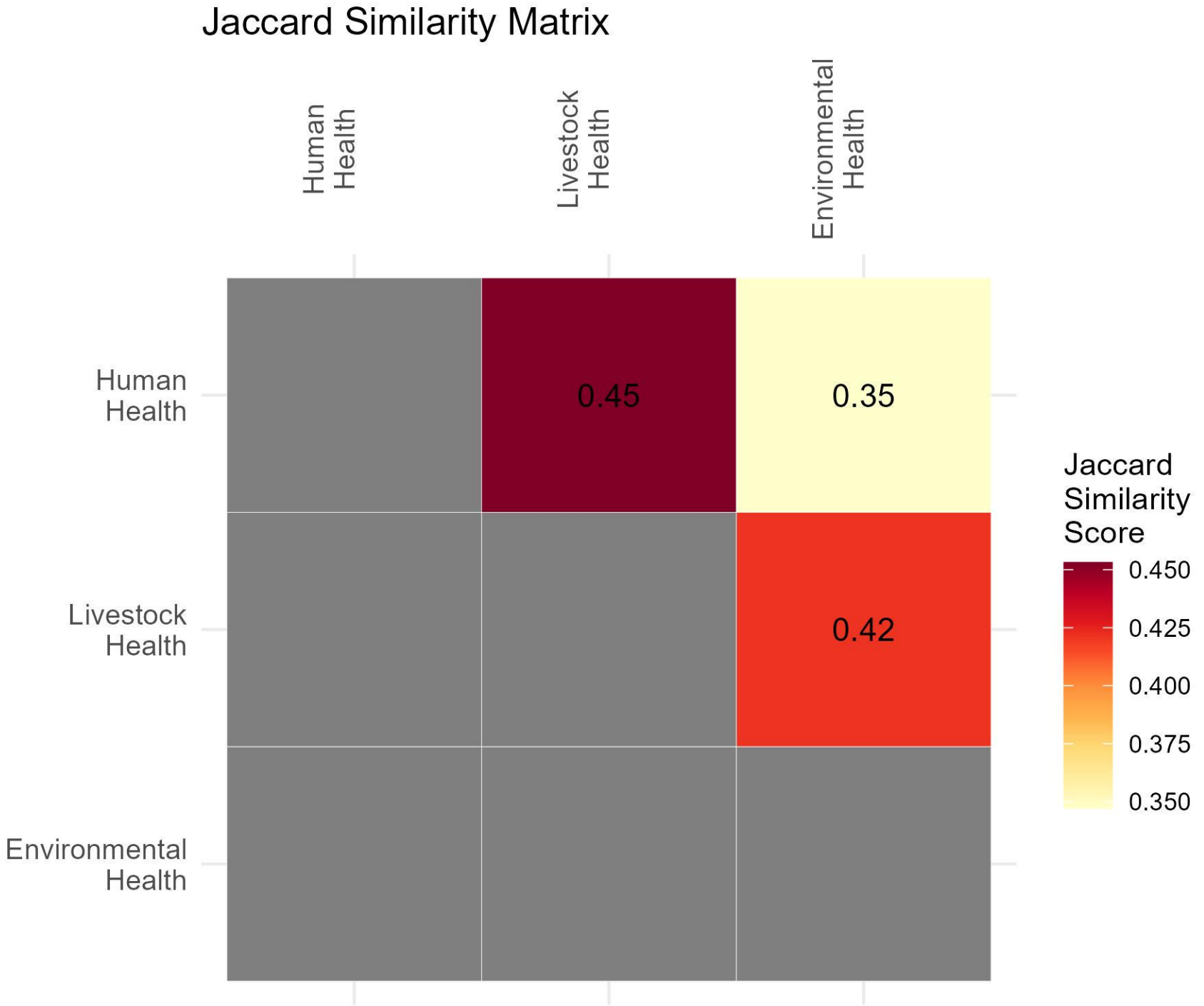


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One Health

Sub graphs defined by 2nd degree connections to each ‘One Health’ concept

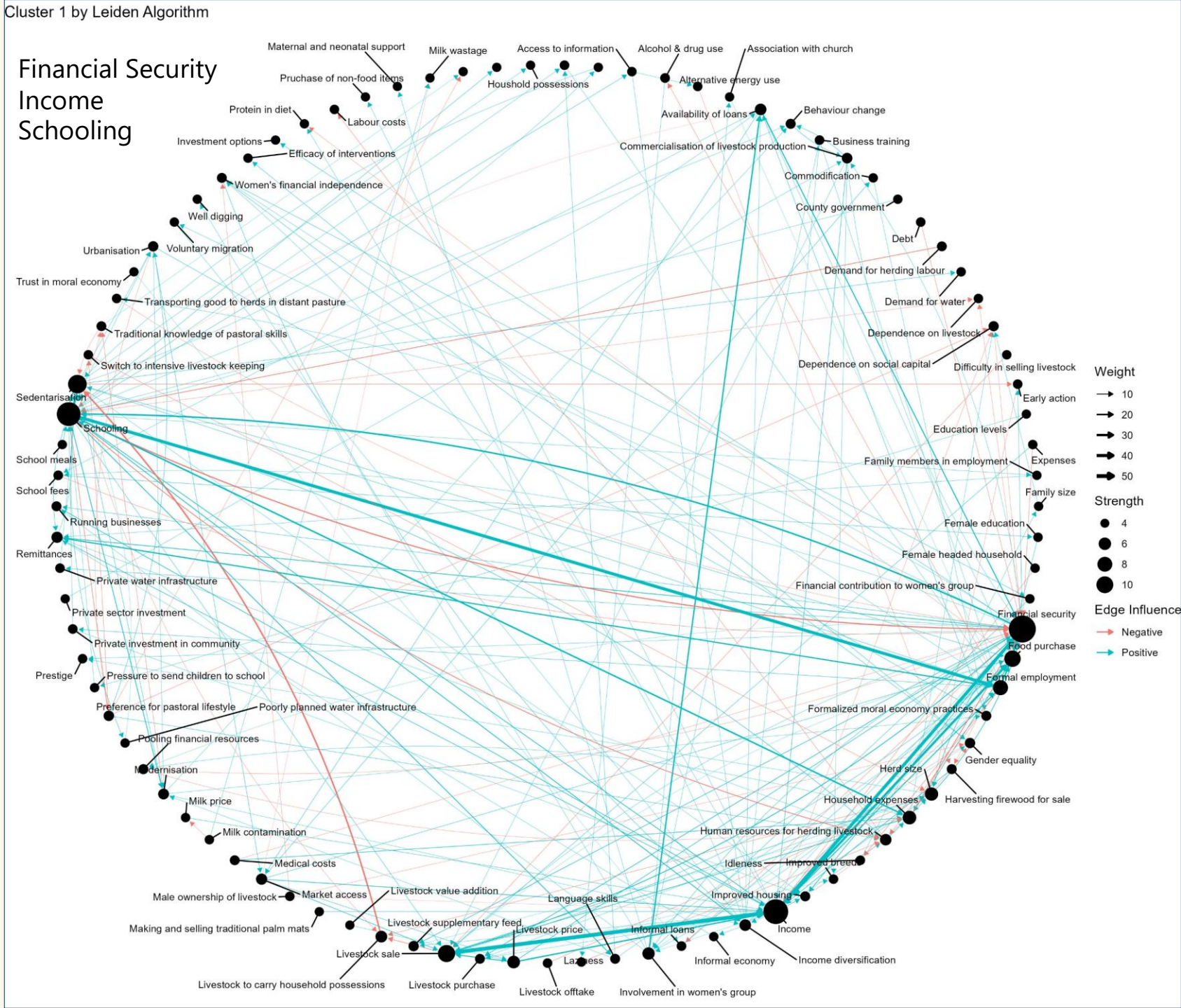
Jaccard similarity between these sub graphs



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Clusters

Leiden community detection algorithm



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Cluster Connectivity

Financial Security, Income, Schooling

Rainfall, Water Availability, Grazing

Human Health, Water Quality, Water Contamination

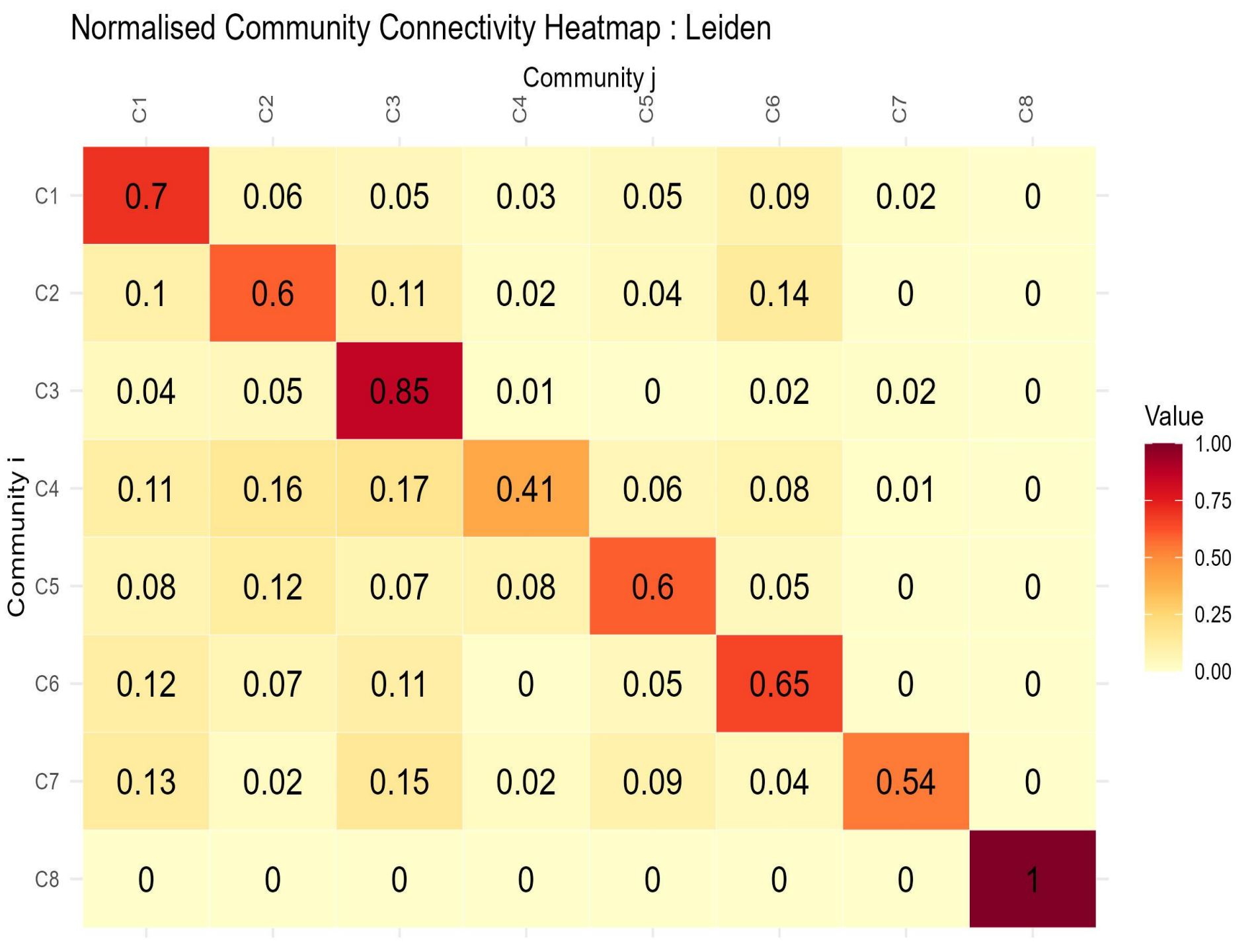
NGO Support, Government, Protected Water Infrastructure

Insecurity & Conflict, Mobility, Informal Governance

Milk Availability, Food Availability, Malnutrition

Cultural Preferences, Health Seeking Behaviour, Traditional Medicine

Short Term Funding Cycles, Short-termism of NGOs



Conclusion

- **Systems approaches are important**
- **Primary and secondary stakeholders have very different understanding of the pastoral system**
- **Men and women have very different understanding of the pastoral system**
- **Human and environmental health are least integrated**
- **The pastoral system is still heavily siloed**



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Thank you!



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