[1]Department of Agricultural, Forest and Food Sciences (DISAFA), University of Turin

[2]Stirling University Management School
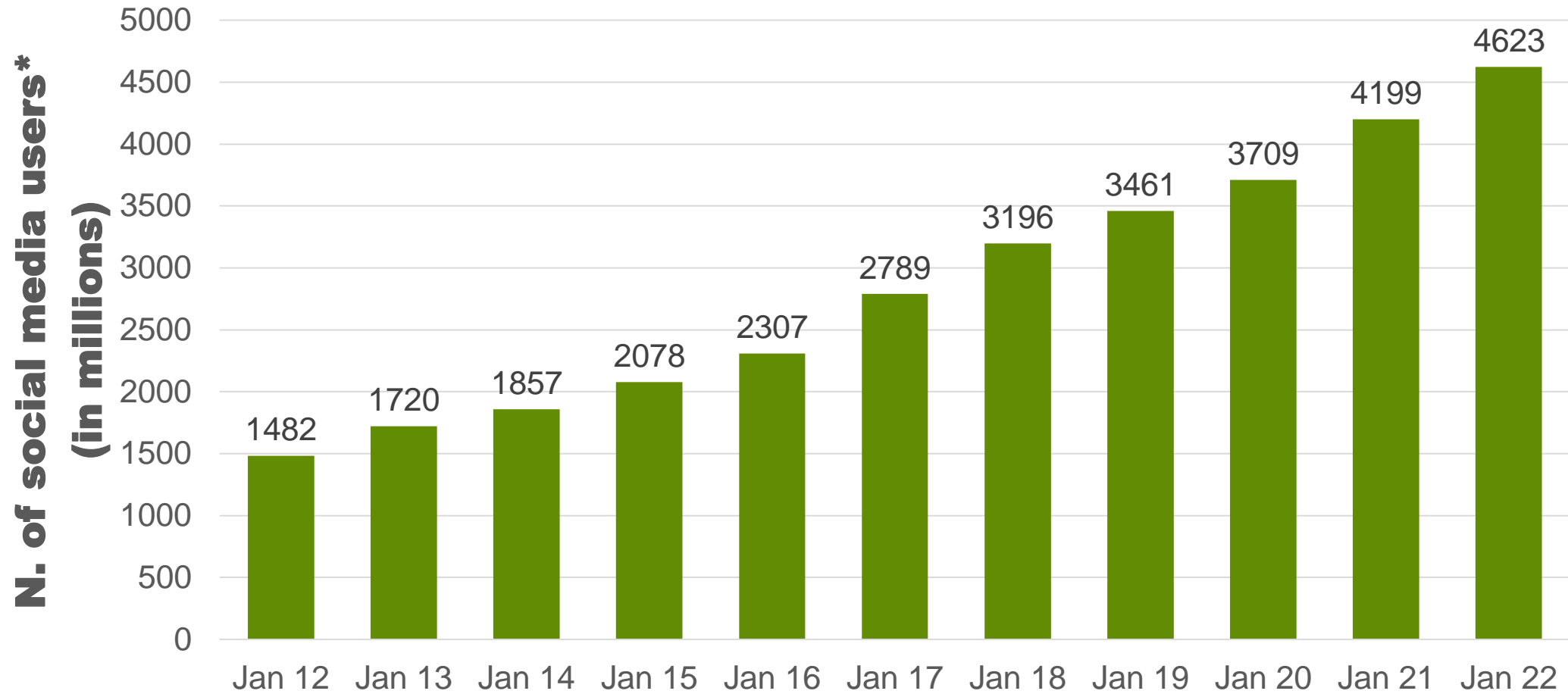
A social and semantic network analysis of Twitter users' perceptions of ecosystem services

Authors:

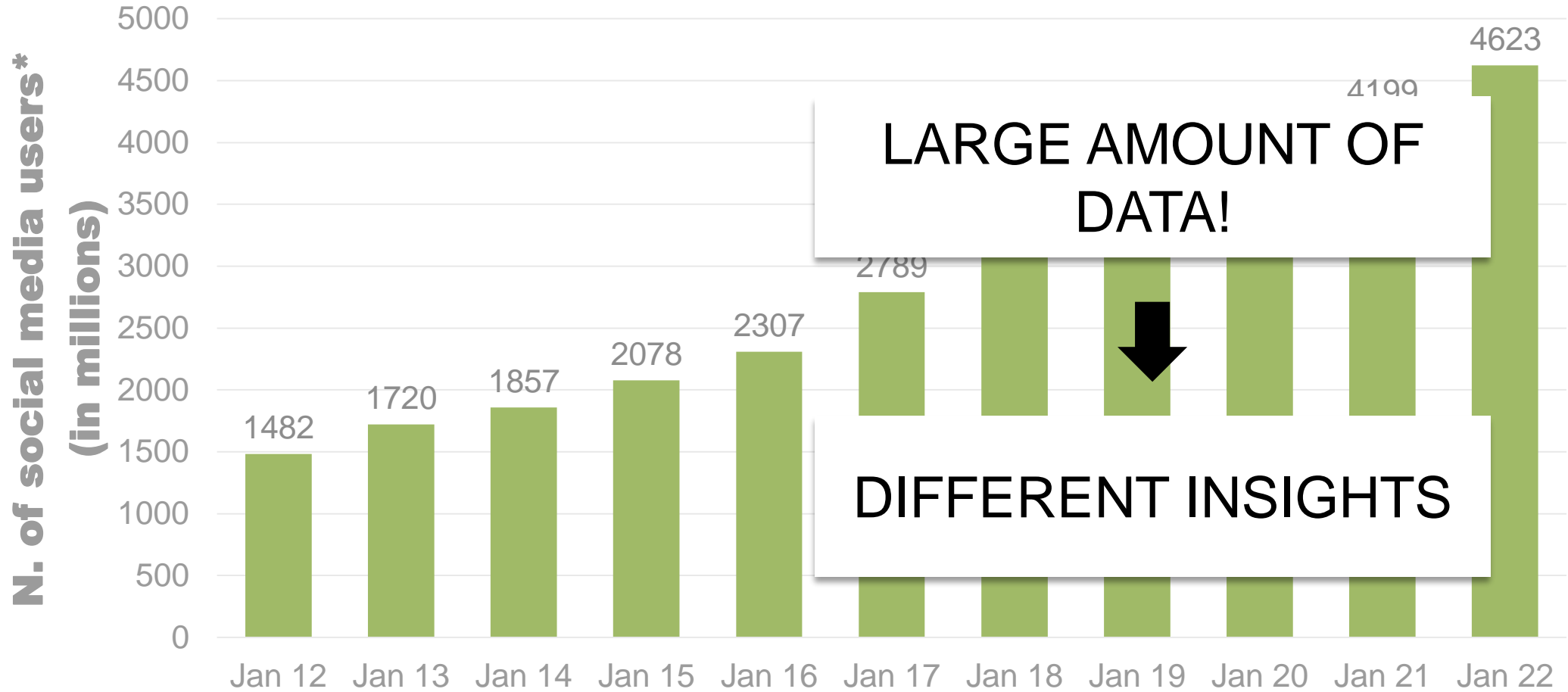**Stefano Bruzzese[1]**, Simone Blanc[1], Wasim Ahmed[2] and Filippo Brun[1]

THE CONTEXT

N. of social media users* (in millions)

Jan 12	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22
1482	1720	1857	2078	2307	2789	3196	3461	3709	4199	4623

*Users may not represent unique individuals. *Digital 2022 Global Overview Report (2022)*

THE CONTEXT

Bar chart: N. of social media users* (in millions)

- Jan 12: 1482
- Jan 13: 1720
- Jan 14: 1857
- Jan 15: 2078
- Jan 16: 2307
- Jan 17: 2789
- Jan 21: 4199
- Jan 22: 4623

LARGE AMOUNT OF DATA!

DIFFERENT INSIGHTS

Users may not represent unique individuals.   *Digital 2022 Global Overview Report (2022)*

GLOBAL ONLINE TREND IN ECOSYSTEM SERVICES

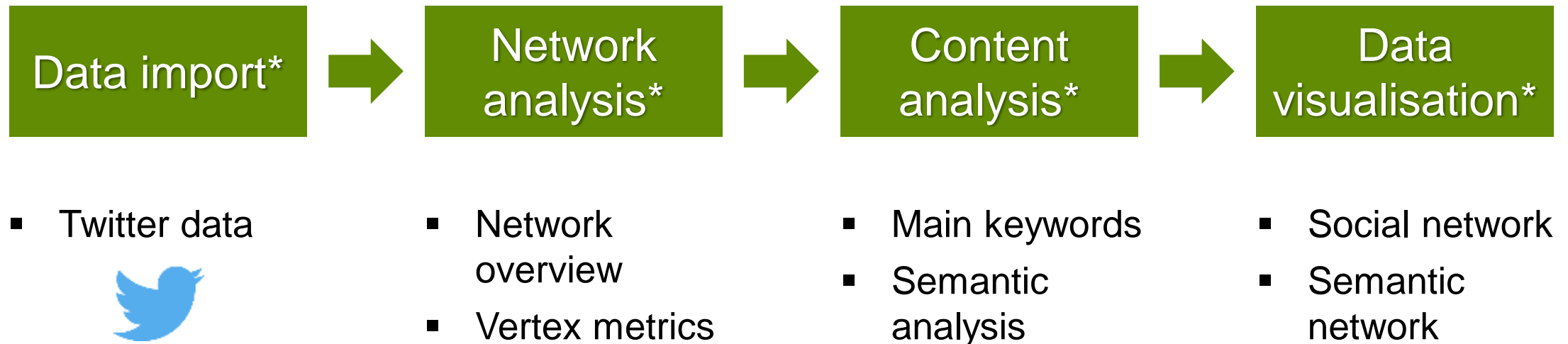Probably due to the COP26
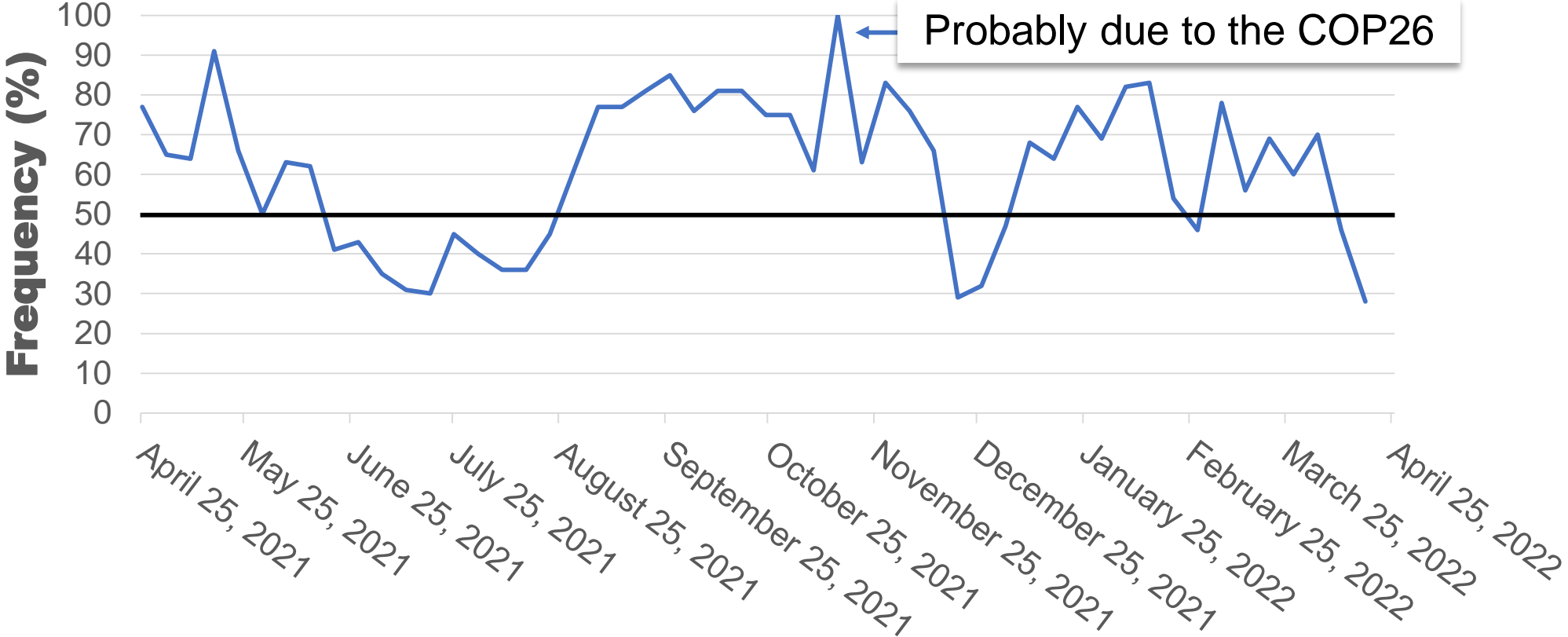
Google Trends (2022)

MAIN RESEARCH GOALS

- **RQ1:** How is Twitter's social network on ecosystem services composed?

- **RQ2:** What are the most discussed contents on Twitter regarding ecosystem services?

Hypothesis: In recent years, partly due to the current pandemic, the perception of ecosystem services by civil society has changed

METHODOLOGICAL FRAMEWORK

| Data import* | → | Network analysis* | → | Content analysis* | → | Data visualisation* |

- Twitter data

- Network overview
- Vertex metrics

- Main keywords
- Semantic analysis

- Social network
- Semantic network

*NodeXL plugin was used for analysis

Socialmedia Research Foundation (2022)

# DATA IMPORT

SEARCH STRING: "ecosystem services OR #ecosystemservices"

Tweet type	25 January 2022	3 February 2022
Tweet	221	244
Retweet	895	755
Replies to	88	71
Mentions	376	362
MentionsInRetweet	737	649
Total	**2,317**	**2,081**

NETWORK ANALYSIS

	25 January 2022	3 February 2022
Twitter Users	1,427	1,359
Unique Relationships B/w Users	2,034	1,905
Relationships With Duplicates	283	176
Total Relationships B/w Users	2,317	2,081
Self-Loops	227	246
Diameter	14	11
Average Distance	5.68	4.44
Density	0.00097	0.00096
Modularity	0.82	0.84

- Poorly connected network but good dissemination of information within groups

- Good structure of network groups

GEOGRAPHICAL DISTRIBUTION OF TWITTER USERS
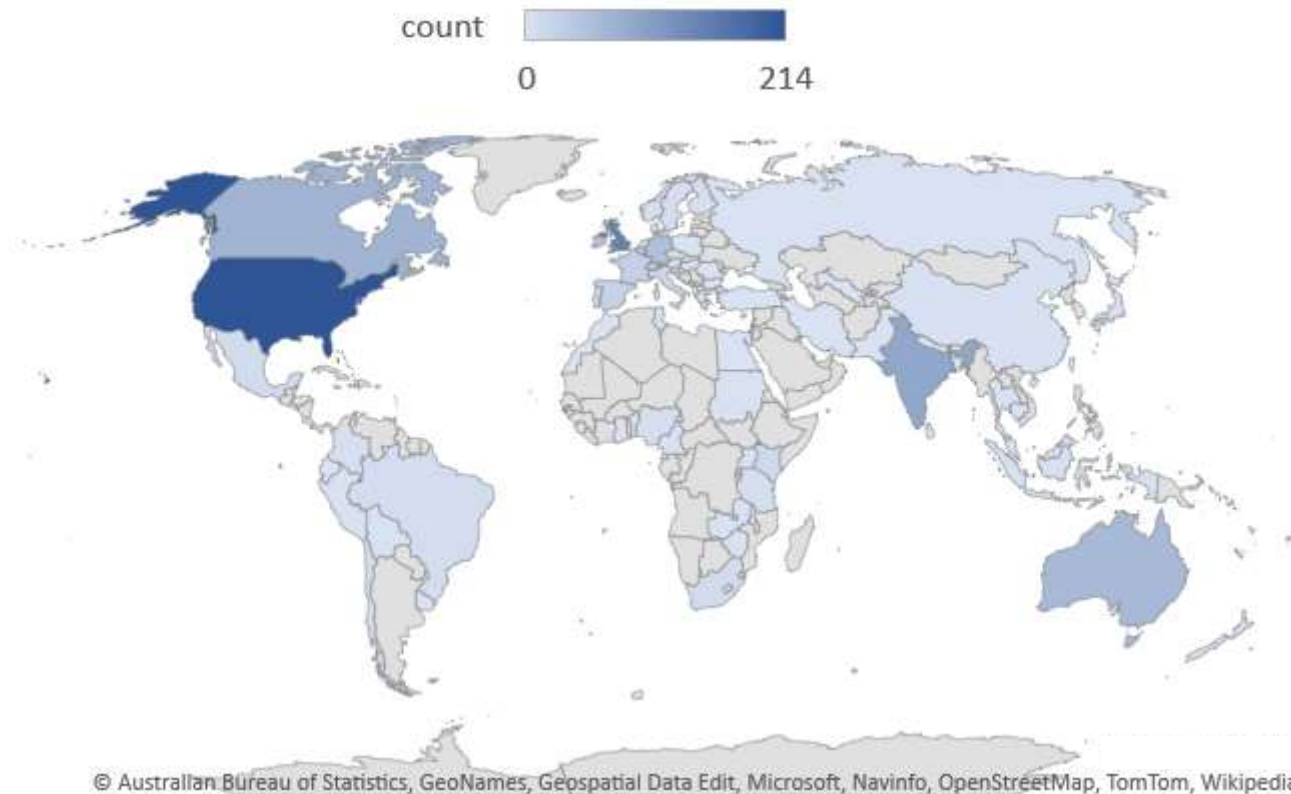
- Mainly from USA, UK India and Canada

- Moderate distribution from all over the world

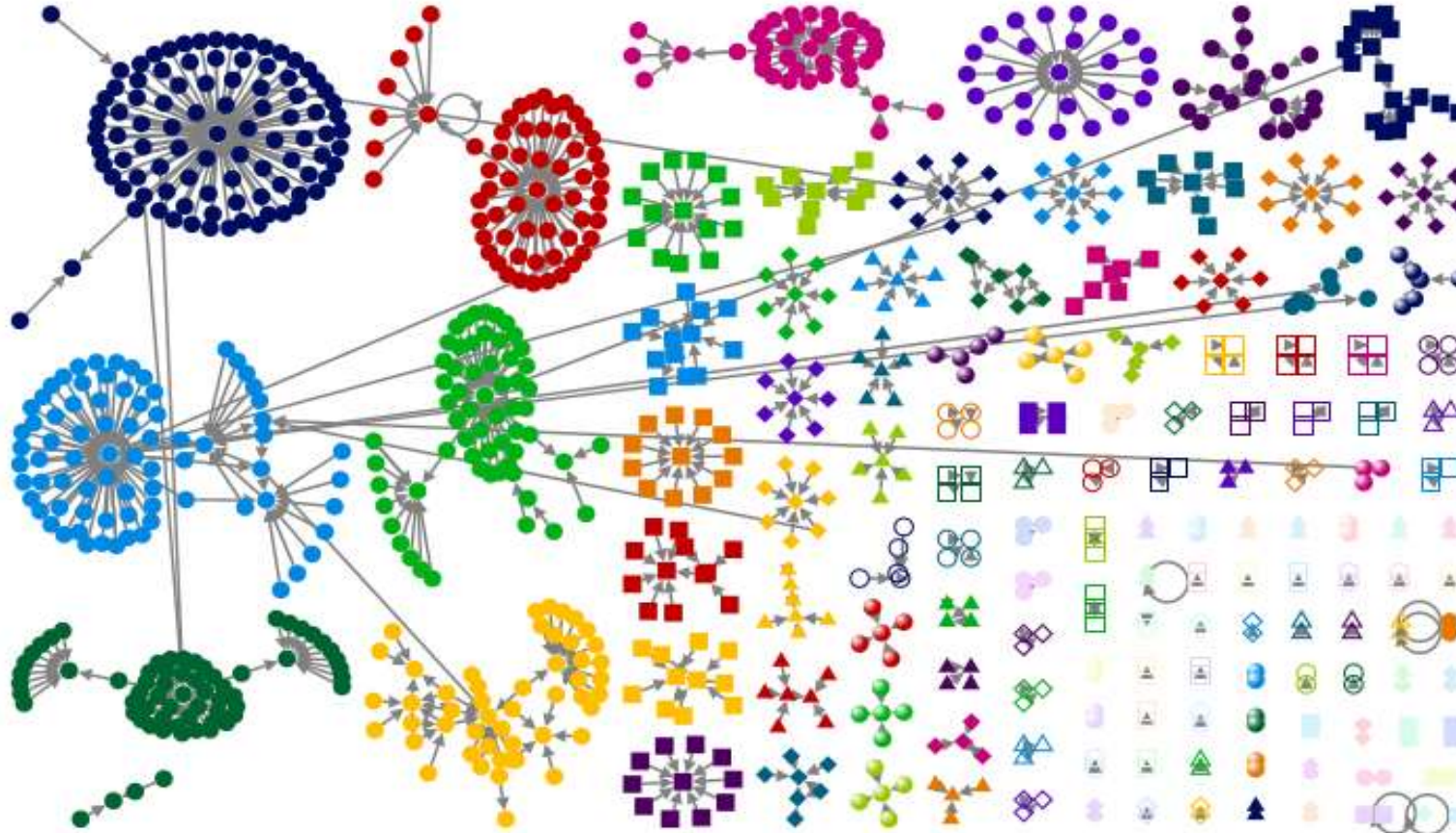Dataset of 3 February 2022

CONTENT ANALYSIS – MAIN KEYWORDS

- Celebrations
- Buzzwords

CONTENT ANALYSIS – SEMANTIC ANALYSIS

25 January 2022		Occurence	3 February 2022		Occurence
socio	ecological	103	climate	change	51
ecological	networks	95	wetlands	life	45
interactions	people	92	life	livelihoods	45
people	environment	92	livelihoods	wetlands	45
environment	socio	92	wetlands	heatlh	45

Most frequent word-pairs are linked to the
interaction between society and the environment

DATA VISUALISATION – SOCIAL NETWORK

COMMUNITY CLUSTER STRUCTURE

- Small-medium size groups
- Moderate connections

In accordance with Smith et al. (2014)

Dataset of 25 January 2022

DATA VISUALISATION – SEMANTIC NETWORK

SOCIO-ECOLOGICAL SYSTEMS (SES)

REGULATION SERVICES

NATURE-BASED SOLUTIONS (NBS)

SUSTAINABLE FOOD PRODUCTIONS

MARKET FOR ECOSYSTEM SERVICES (MES)

CONCLUSIONS

- High retweeting, but poor creation of new contents

- Slow dissemination of information around the network

- Most frequent word-pairs are related to society-ecosystem interaction and climate change

- Main topics deal with social, economic and environmental aspects of ecosystem services

- Greater understanding of Twitter users' thinking on ecosystem services -> better policies and governance

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Stefano Bruzzese
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SCAN ME

THANKS FOR THE ATTENTION!

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