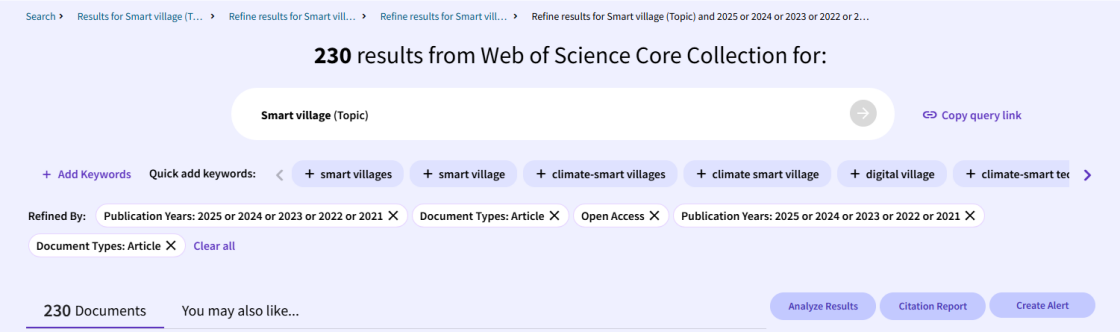
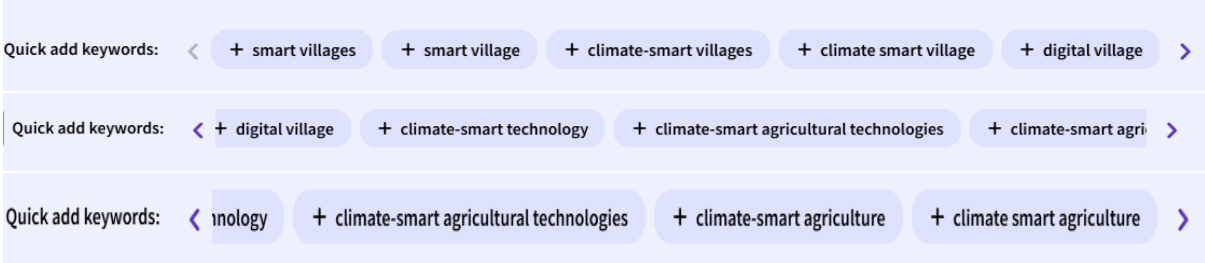
Smart Village and Climate-Smart Agriculture Researches, Publication Networks, Author Collaborations and Keyword interactions





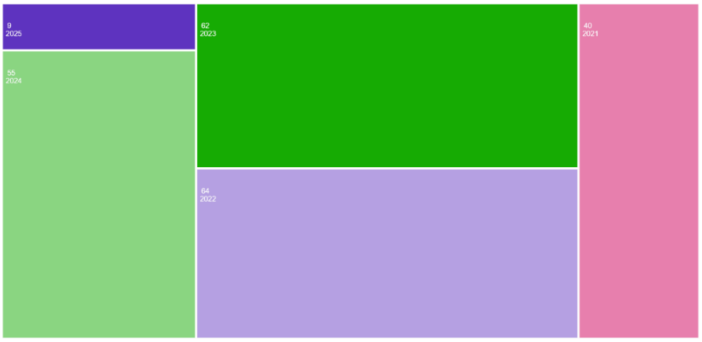
Distribution of scientific fields by publications

Web of Science Categories	Record Count	% of 230
Environmental Sciences	50	21.739
Environmental Studies	49	21.304
Green Sustainable Science Technology	30	13.043
Agronomy	17	7.391
Geography	14	6.087
Energy Fuels	13	5.652
Engineering Electrical Electronic	13	5.652
Agriculture Multidisciplinary	11	4.783
Food Science Technology	11	4.783
Economics	10	4.348
Multidisciplinary Sciences	10	4.348
Public Environmental Occupational Health	10	4.348
Computer Science Information Systems	9	3.913
Regional Urban Planning	8	3.478
Plant Sciences	7	3.043
Telecommunications	7	3.043
Urban Studies	7	3.043
Social Sciences Interdisciplinary	6	2.609
Geosciences Multidisciplinary	5	2.174
Construction Building Technology	4	1.739
Imaging Science Photographic Technology	4	1.739
Remote Sensing	4	1.739
Agricultural Economics Policy	3	1.304
Area Studies	3	1.304
Development Studies	3	1.304

Figure 2. Web of Science Categories on Smart village thematic (2021-2025)

```
import matplotlib.pyplot as plt
import pandas as pd
# Duomenys
data = {
   "Field": [
      "Environmental Sciences", "Environmental Studies", "Green Sustainable Science Technology", "Agronomy",
      "Geography", "Energy Fuels", "Engineering Electrical Electronic", "Agriculture Multidisciplinary",
      "Food Science Technology", "Economics", "Multidisciplinary Sciences", "Public Environmental Occupational Health",
      "Computer Science Information Systems", "Regional Urban Planning", "Plant Sciences", "Telecommunications",
      "Urban Studies", "Social Sciences Interdisciplinary", "Geosciences Multidisciplinary",
      "Construction Building Technology", "Imaging Science Photographic Technology", "Remote Sensing",
      "Agricultural Economics Policy", "Area Studies", "Development Studies"
   ],
   "Count": [
      50, 49, 30, 17, 14, 13, 13, 11, 11, 10, 10, 10, 9, 8, 7, 7, 7, 6, 5, 4, 4, 4, 3, 3, 3
   ],
   "Percent": [
      21.739, 21.304, 13.043, 7.391, 6.087, 5.652, 5.652, 4.783, 4.783, 4.348, 4.348, 4.348,
      3.913, 3.478, 3.043, 3.043, 3.043, 2.609, 2.174, 1.739, 1.739, 1.739, 1.304, 1.304, 1.304
   ]
}
df = pd.DataFrame(data)
# Rikiuojame pagal Count
df_sorted = df.sort_values("Count", ascending=True)
# Braižome
plt.figure(figsize=(10, 8))
plt.barh(df_sorted["Field"], df_sorted["Percent"])
plt.xlabel("(%) of 230")
plt.title("Web of Science Categories")
plt.tight_layout()
plt.show()
```

Publication Years



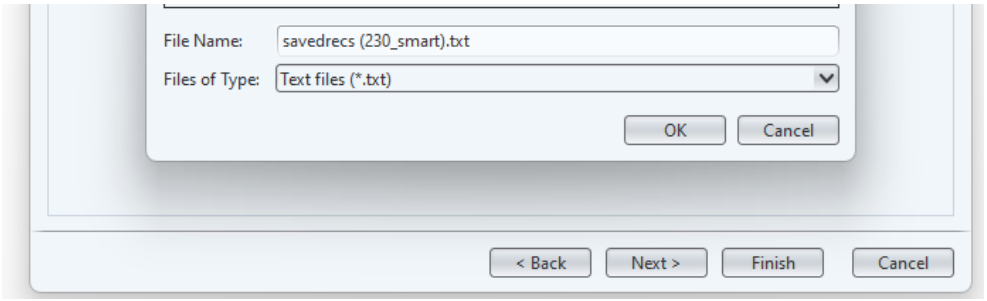
Publication Years

Publication Years	Record Count	% of 230
2025	9	3.913
2024	55	23.913
2023	62	26.957
2022	64	27.826
2021	40	17.391

1 Figure. The percentage of published papers on Smart village thematic (2021-2025)

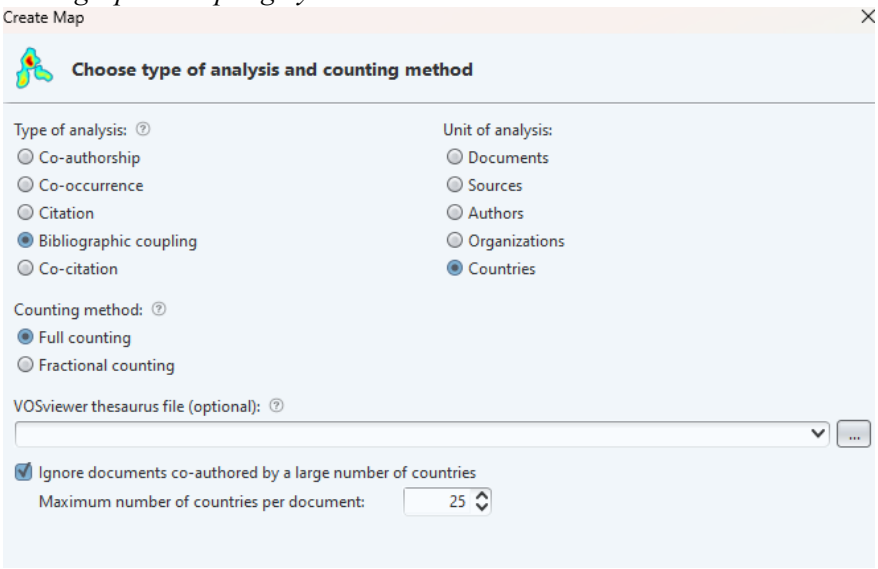
```
import matplotlib.pyplot as plt
import pandas as pd
# Nauji duomenys
data_years = {
   "Publication Year": [2021, 2022, 2023, 2024, 2025],
   "Record Count": [40, 64, 62, 55, 9],
   "Percent": [17.391, 27.826, 26.957, 23.913, 3.913]
}
df_years = pd.DataFrame(data_years)
# Braižome
plt.figure(figsize=(8, 6))
plt.bar(df_years["Publication Year"].astype(str), df_years["Percent"])
plt.ylabel("Percent (%)")
plt.xlabel("Year ")
plt.title()
plt.tight_layout()
plt.show()
```

2025	26	2016	46	2007	2
2024	101	2015	24	2006	3
2023	103	2014	14	2005	1
2022	121	2013	13	2004	1
2021	101	2012	8	2003	1
2020	87	2011	7	2002	3
2019	89	2010	6	2001	1
2018	80	2009	3	1997	1
2017	56	2008	1	1994	1



3.1. Analysis of countries

Bibliographic coupling by Countries



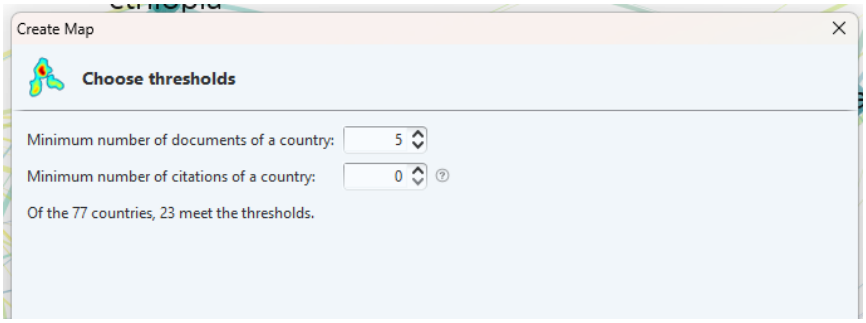
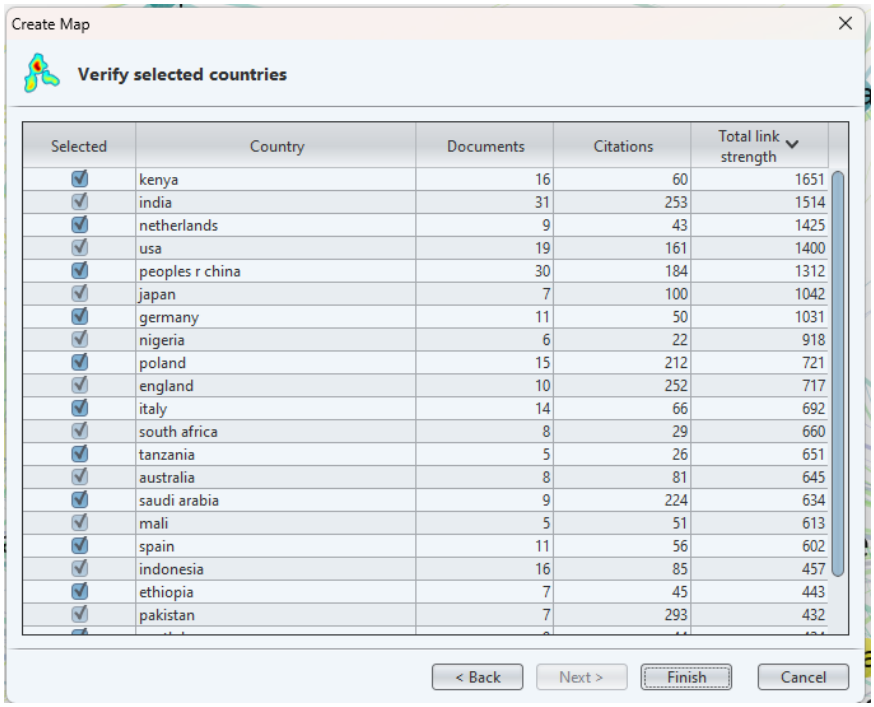
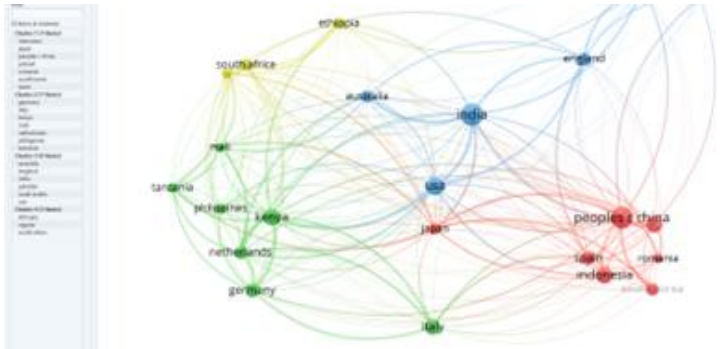


Table 1. The top 10 bibliographic coupling links with other countries on Smart village thematic (2021-2025)



Selected	Country	Documents	Citations	Total link strength
☑	kenya	16	60	1651
☑	india	31	253	1514
☑	netherlands	9	43	1425
☑	usa	19	161	1400
☑	peoples r china	30	184	1312
☑	japan	7	100	1042
☑	germany	11	50	1031
☑	nigeria	6	22	918
☑	poland	15	212	721
☑	england	10	252	717
☑	italy	14	66	692
☑	south africa	8	29	660
☑	tanzania	5	26	651
☑	australia	8	81	645
☑	saudi arabia	9	224	634
☑	mali	5	51	613
☑	spain	11	56	602
☑	indonesia	16	85	457
☑	ethiopia	7	45	443
☑	pakistan	7	293	432



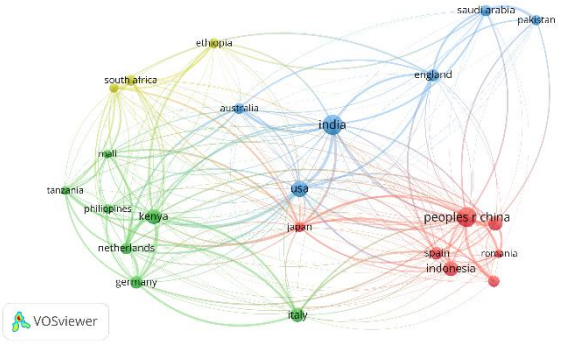
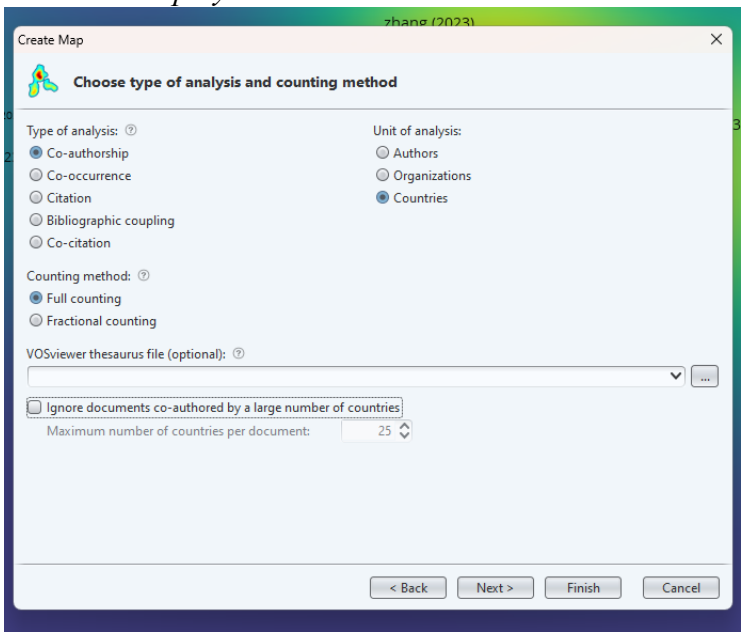
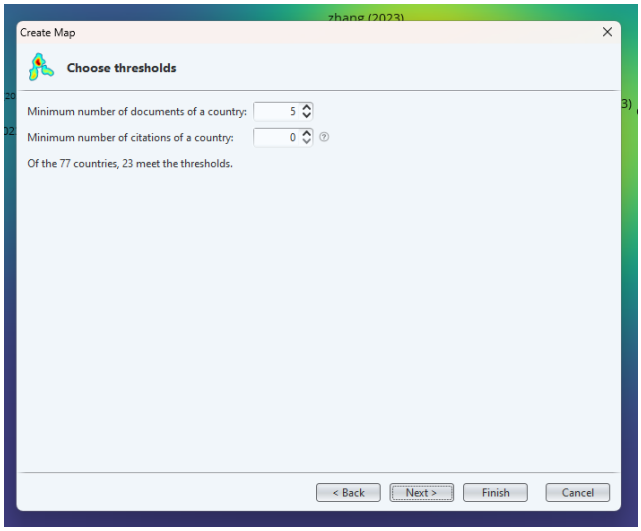


Figure 3. Bibliographic coupling link by country on Smart village thematic (2021-2025). Network view

Cluster 1 (red) "People's Republic of China "; Cluster 2 (green) "The vision of Kenya"; Cluster 3 (blue) "India's vision"; Cluster 4 (yellow) "South Africa's vision"

Co-authorship by Countries





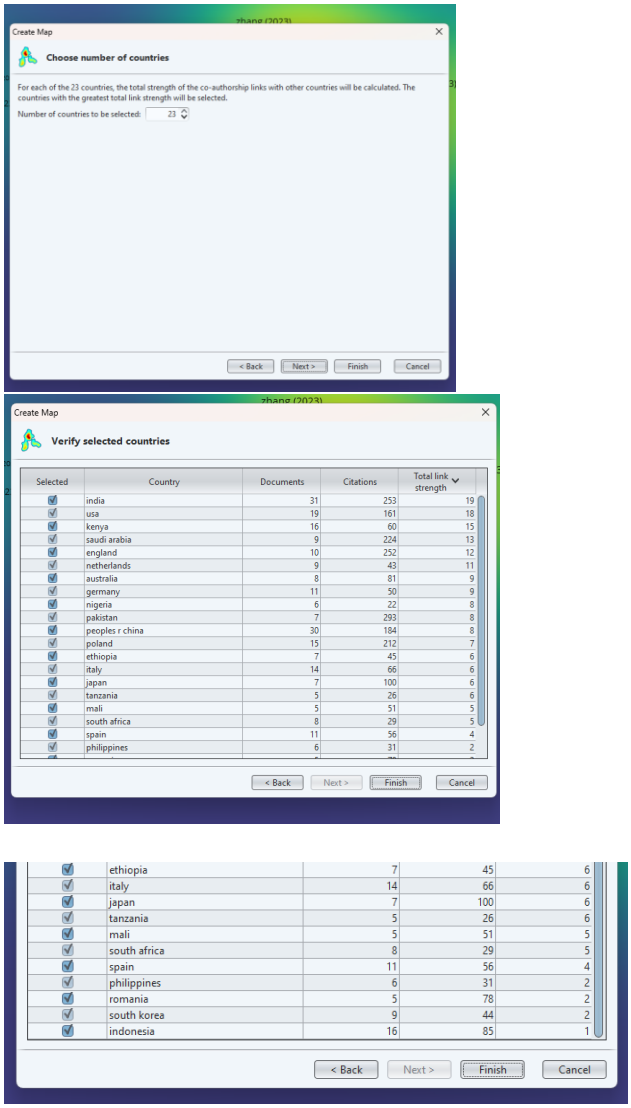
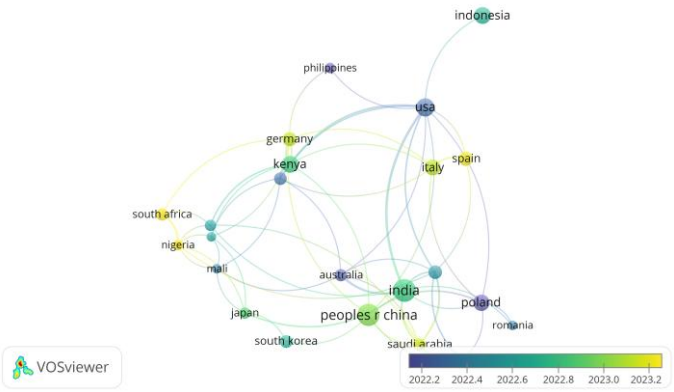


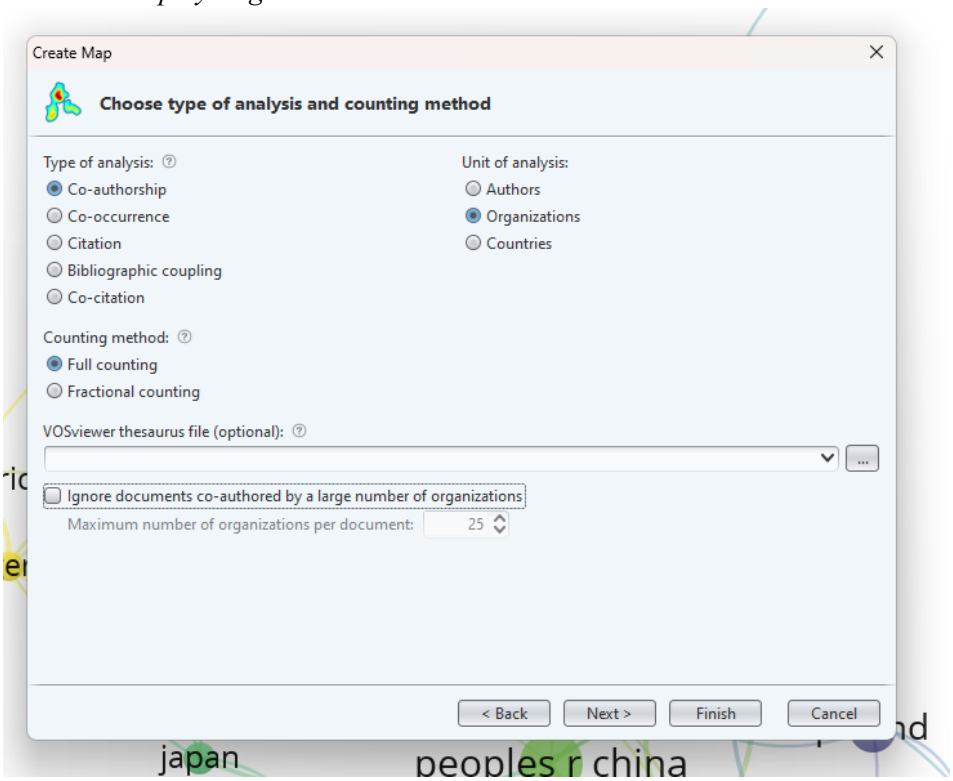
Figure 4. Bibliographic coupling link by country on Smart village thematics (2021-2025). Overlay view.

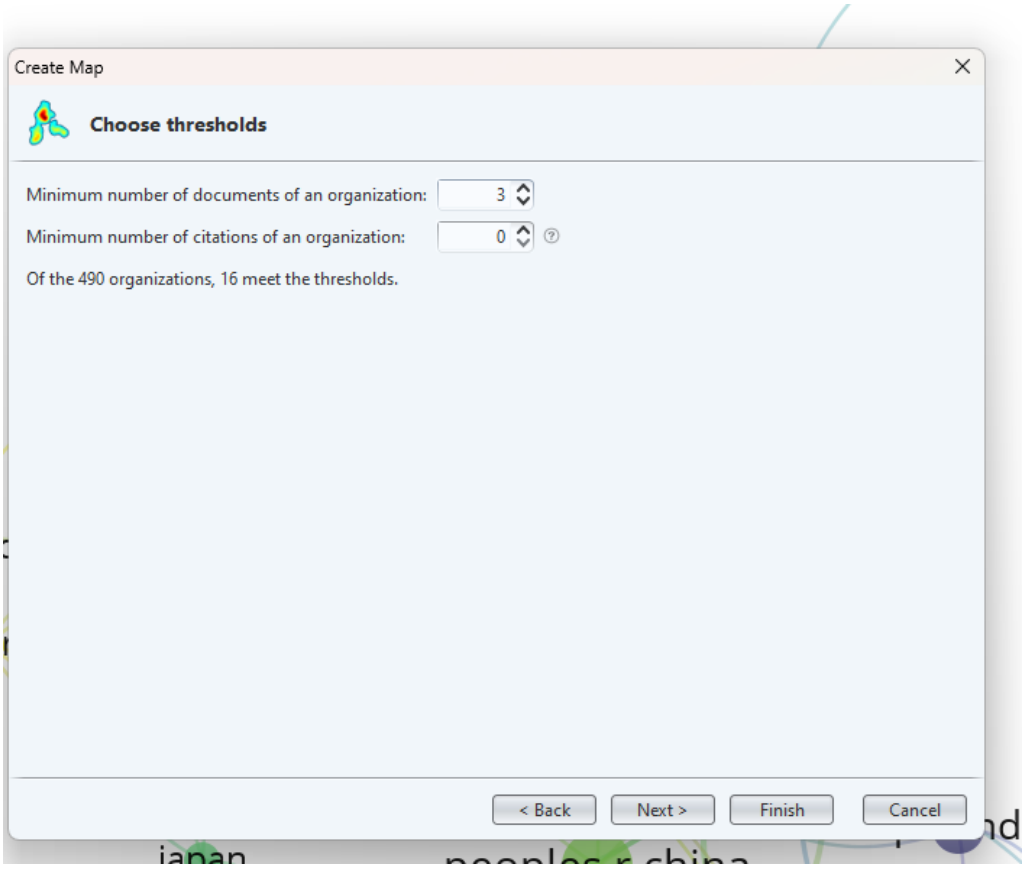


Node size represents the number of documents; link strength indicates bibliographic connections among countries. Colors correspond to the average publication year (2021–2025).

3.2. Analysis of organizations

Co-authorship by Organizations





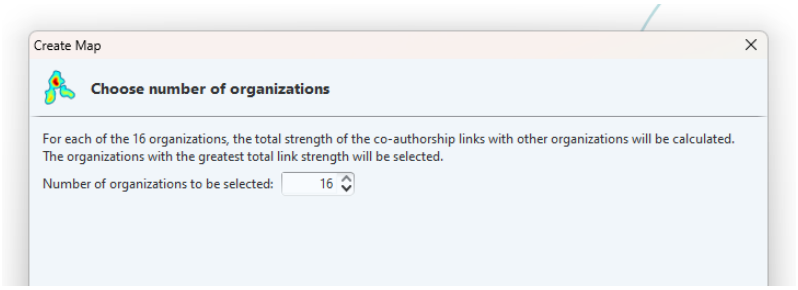
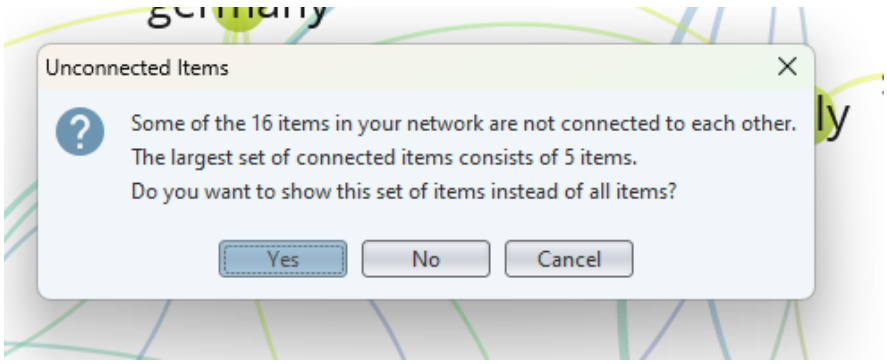


Table 2. The top 10 co-authorship links with other organizations on Smart village thematic (2021-2025)



3.3. Analysis of authors

Co-authorship by authors

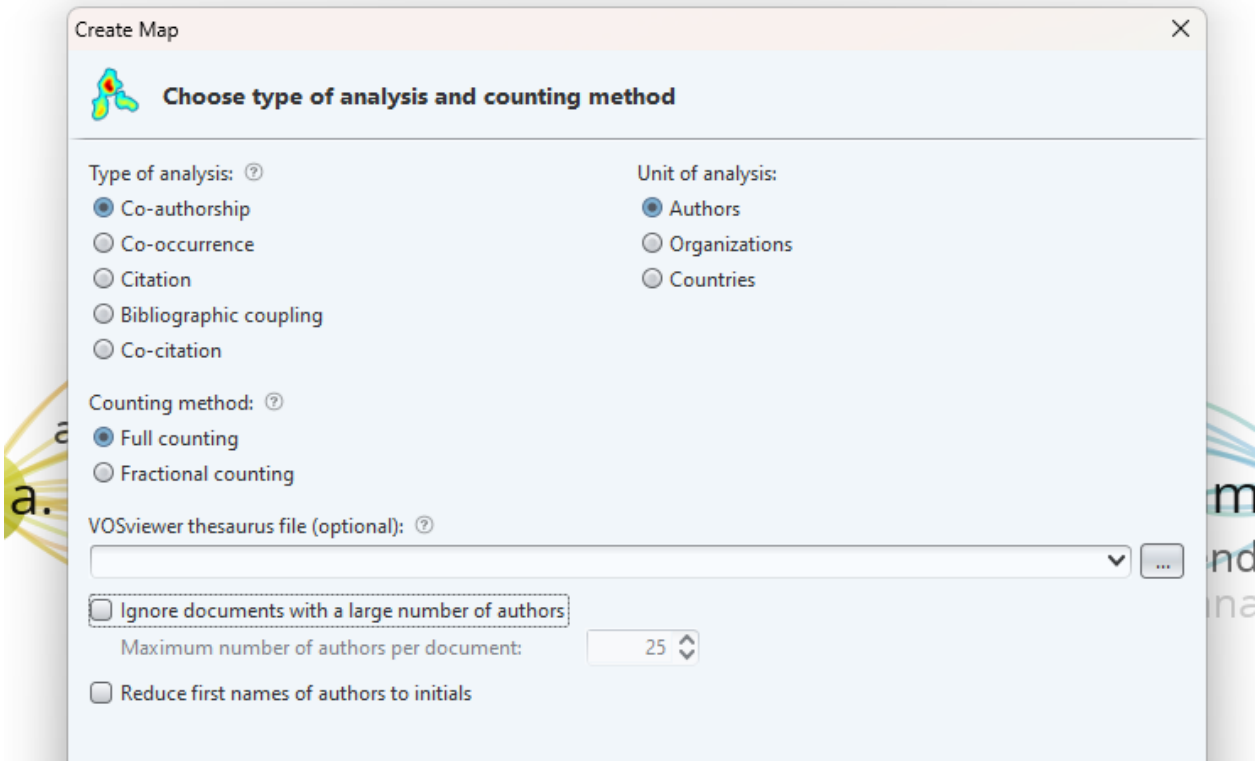
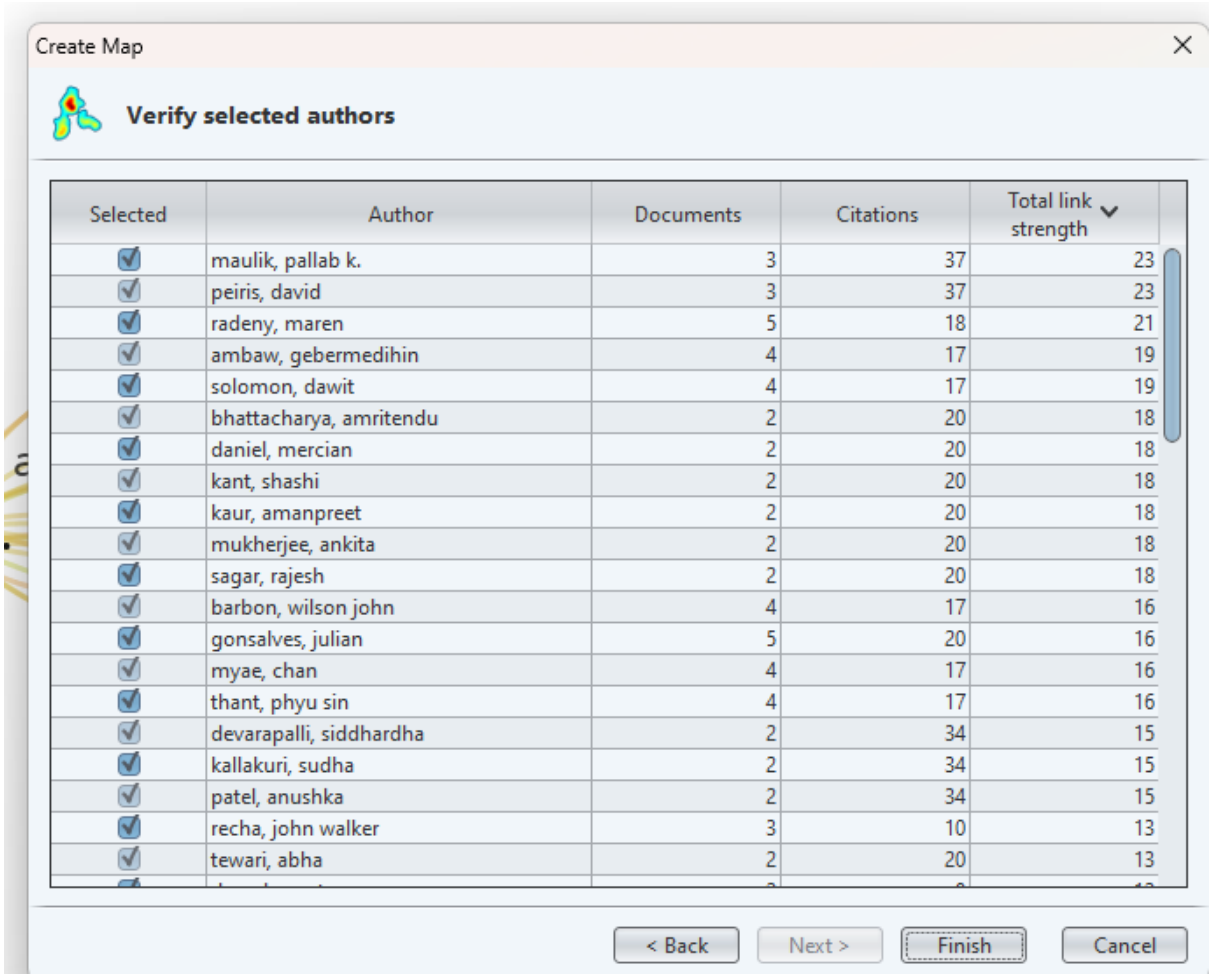
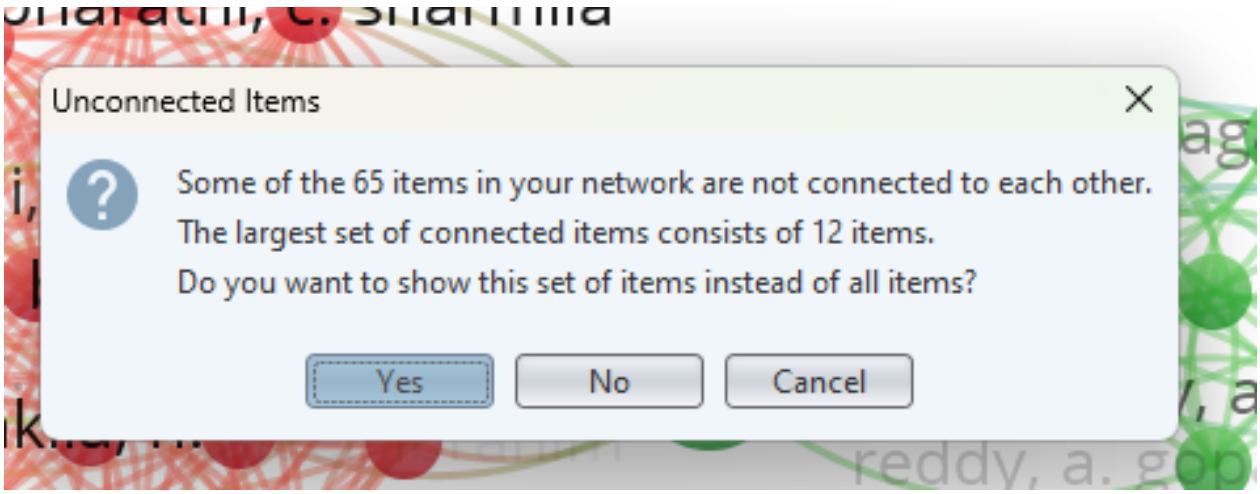


Table 3. The top 5 co-autorship links with other authors on Smart village thematic (2021-2025)





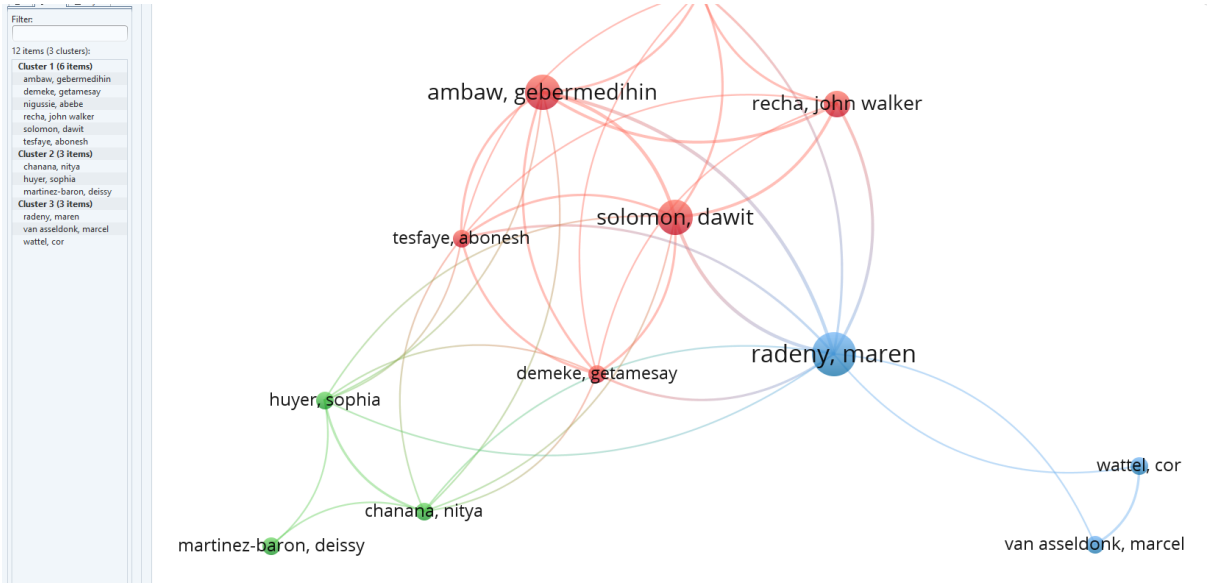
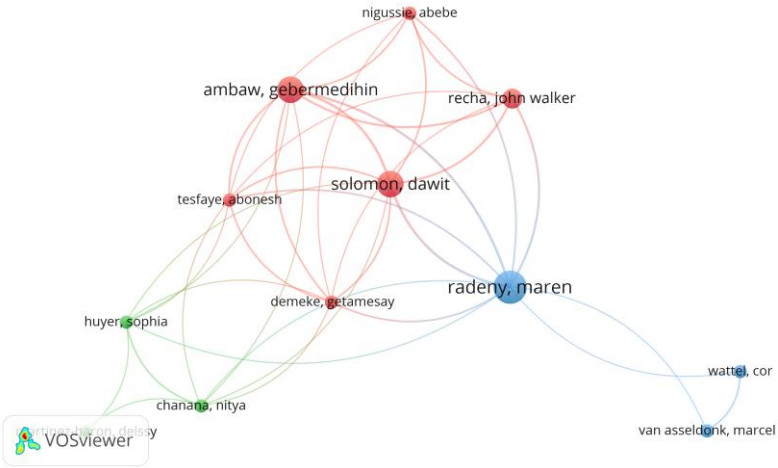
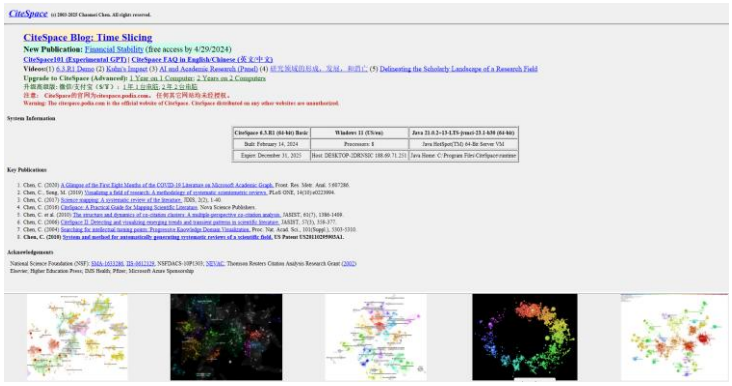


Figure 6. Co-authorship by authors on Smart village thematic (2021-2025). Network view



Contractual designations: Cluster 1 (red) “Gebermedihin Ambaw”; Cluster 2 (green) “Sophia Huyer”; Cluster 3 (blue) “Maren Radeny”

3.4. Analysis of journals



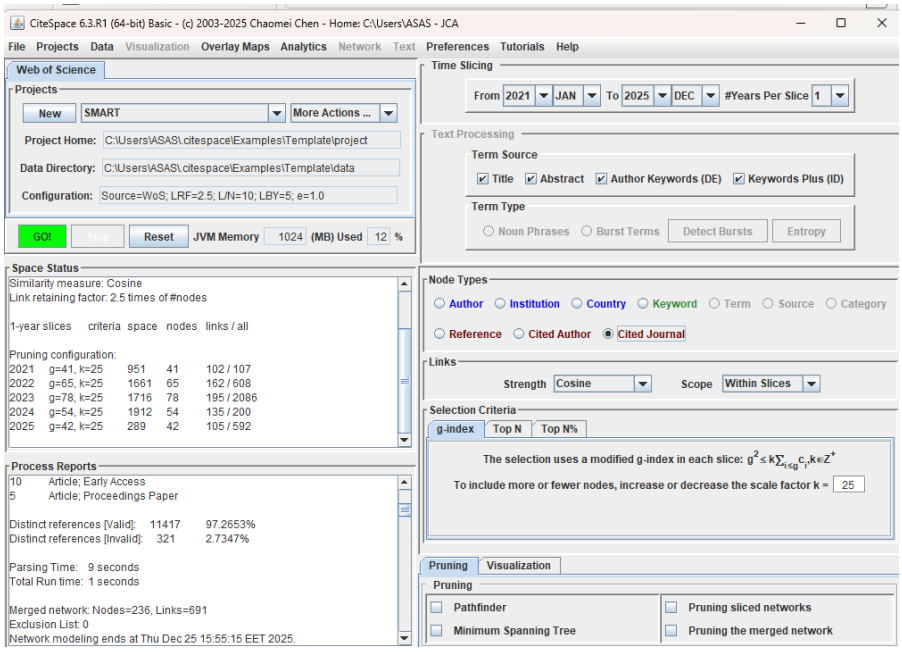
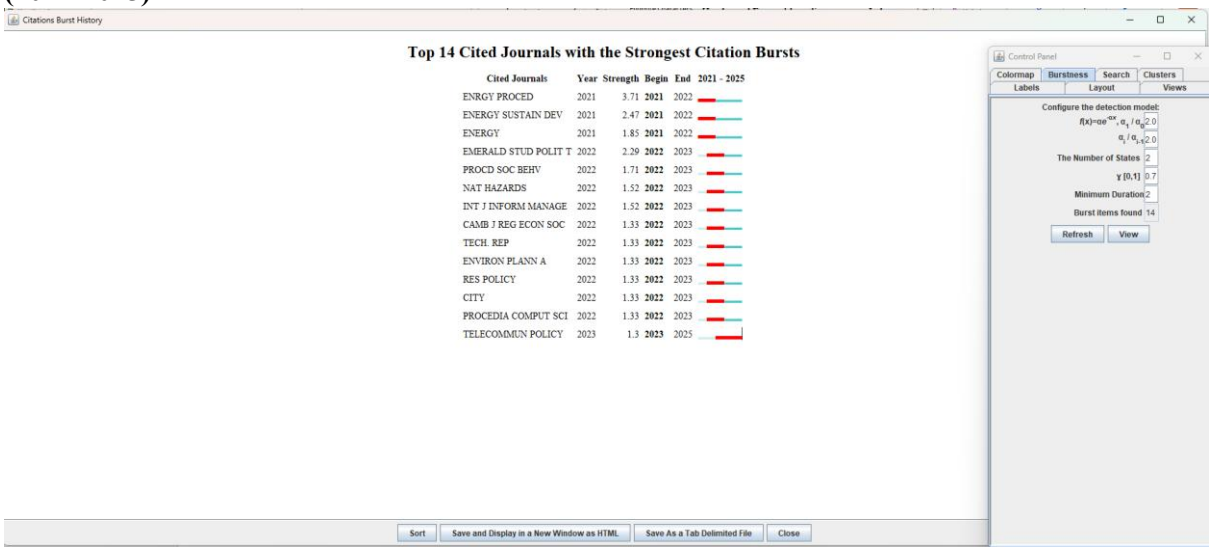
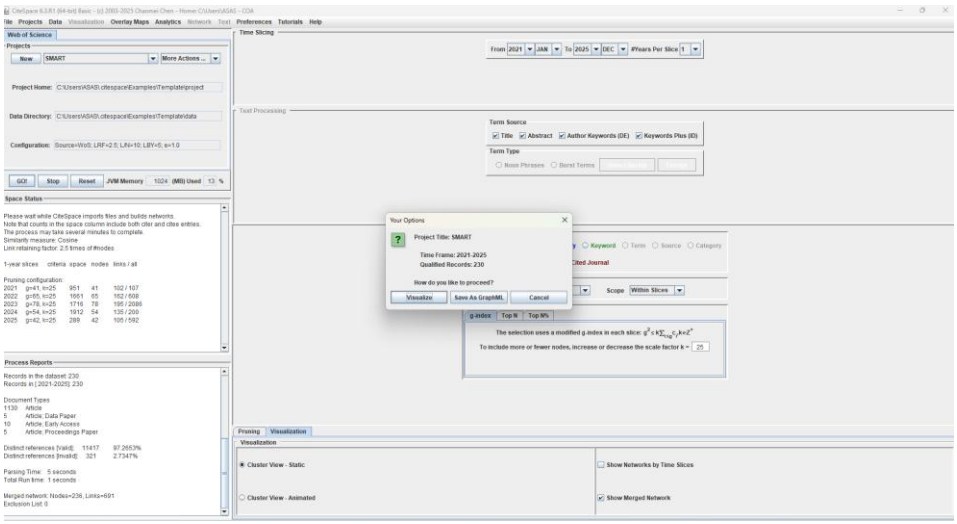
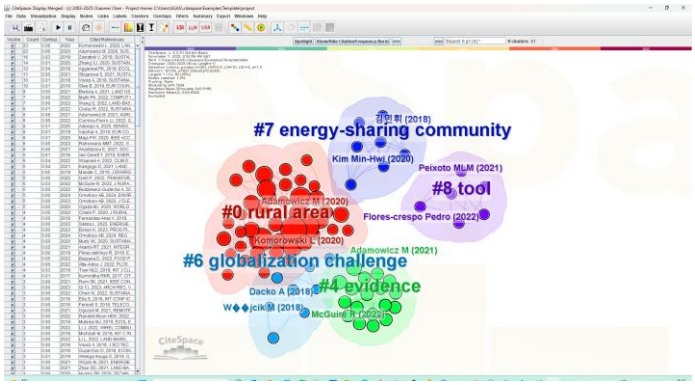


Figure 7. Top 14 Cited Journals with the Strongest Citation Bursts on Smart village thematic (2021-2025)



3.5. Analysis of references





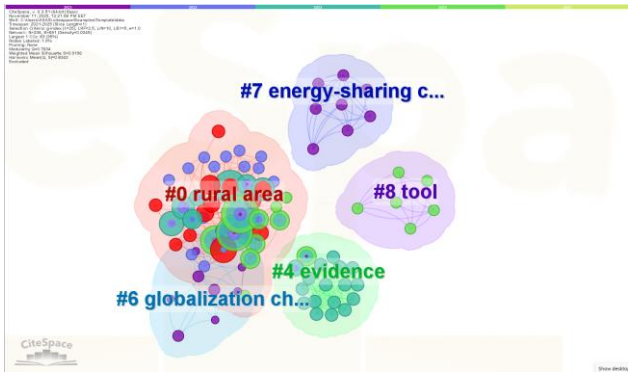


Figure 8. Analysis of cluster links on Smart village thematic (2021-2025)

Table 4. Summary of the 5 largest clusters by references on Smart village thematic (2021-2025)

Table 1. Summary of the largest 5 clusters.

ClusterID	Size	Silhouette	Label (LSI)	Label (LLR)	Label (MI)	Average Year
0	43	0.859	rural area	rural area (5.41, 0.05)	globalization challenge (4.66)	2019
4	18	0.988	influencing digital village	evidence (6.68, 0.01)	globalization challenge (0.09)	2021
6	8	0.955	agricultural development processes in the context of globalization challenges and new approaches to the concept of sustainable development	globalization challenge (7.74, 0.01)	rural area (0.04)	2018
7	8	1	self-sufficiency and energy savings of renewable thermal energy systems for an energy-sharing community	energy-sharing community (8.65, 0.005)	rural area (0.05)	2018
8	6	0.992	routerecoverer: a tool to create routes and recover noisy license plate number data	tool (8.65, 0.005)	rural area (0.05)	2020

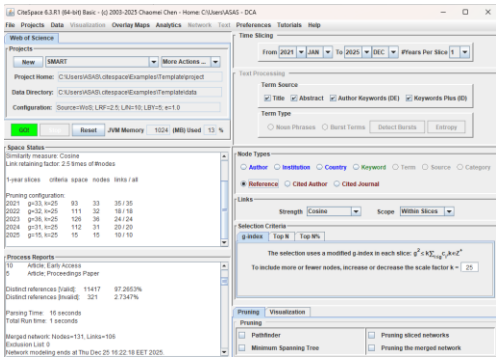
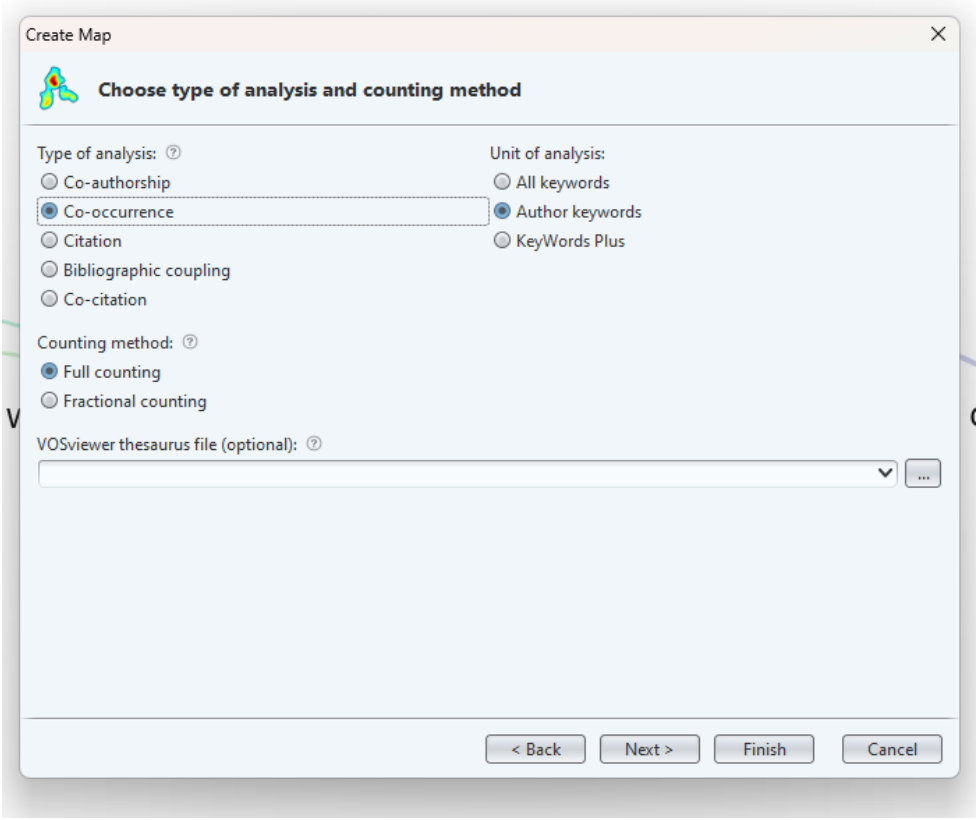


Figure 9. Top 25 References with the Strongest Citation Bursts on Smart village thematics (2021-2025)

3.6. Analysis of keywords

Co-occurrence by author keywords



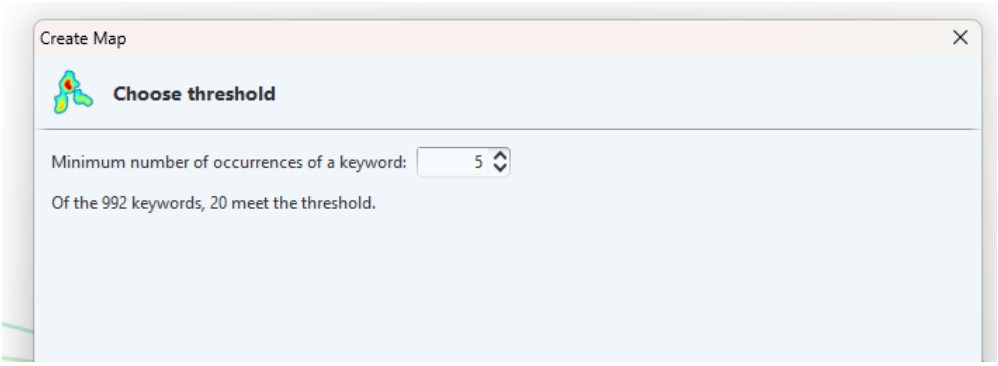


Table 5. The top 20 co-occurrence by author keywords on Smart village thematic (2021-2025)

Create Map

Verify selected keywords

Selected	Keyword	Occurrences	Total link strength
☑	climate change	16	22
☑	climate-smart agriculture	18	19
☑	food security	11	13
☑	smart village	23	11
☑	adaptation	7	10
☑	innovation	6	9
☑	resilience	6	9
☑	smart villages	19	9
☑	agriculture	8	8
☑	climate-smart villages	5	8
☑	rural development	14	8
☑	rural areas	7	7
☑	adoption	7	6
☑	climate smart agriculture	6	5
☑	china	5	4
☑	internet of things	5	4
☑	covid-19	5	3
☑	india	5	3
☑	smart agriculture	5	2
☑	smart city	6	2

< Back | Next > | Finish | Cancel

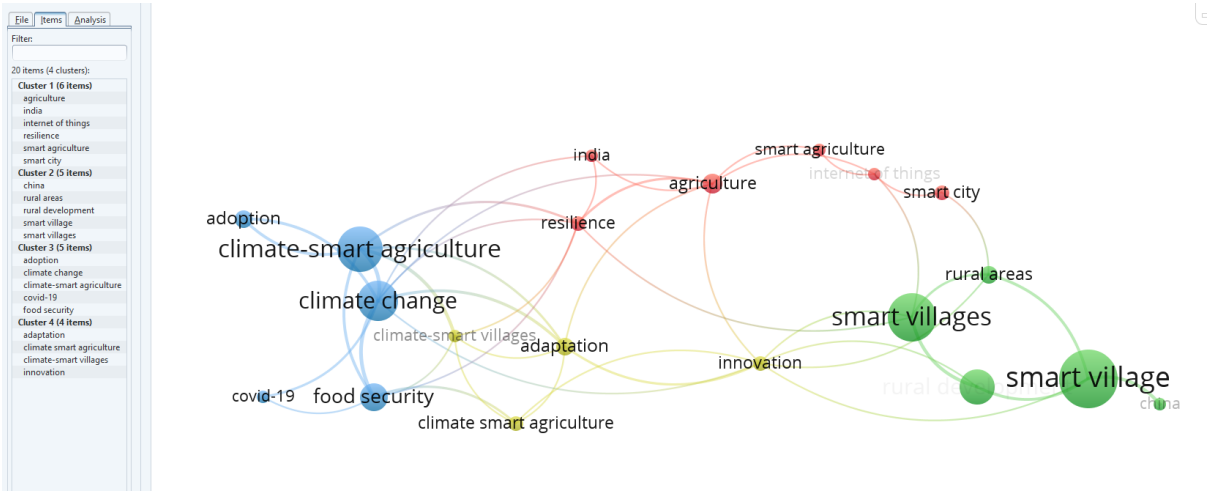
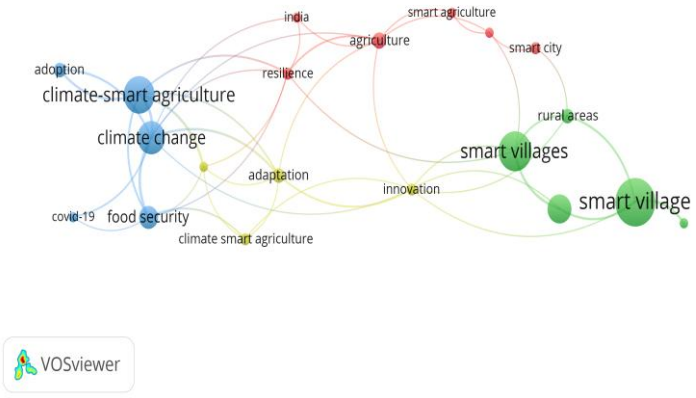


Figure 10. Co-occurrence by author keywords. Network view



Contractual notation: thematic center/(network node) - Cluster 1 (red) “Agriculture”; Cluster 2 (green) “Smart village”; Cluster 3 (blue) “Climate-smart agriculture ”; Cluster 4 (yellow) “Adaptation”

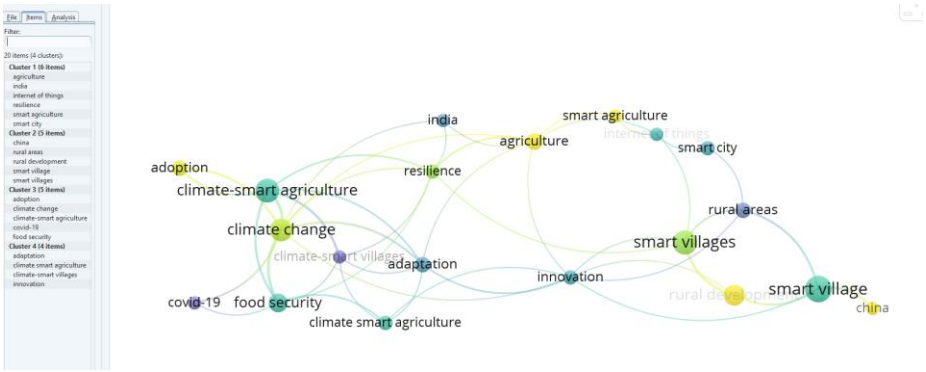
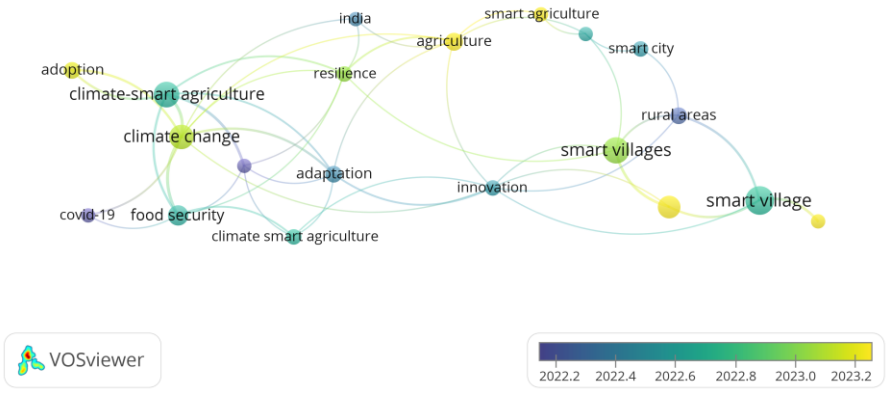
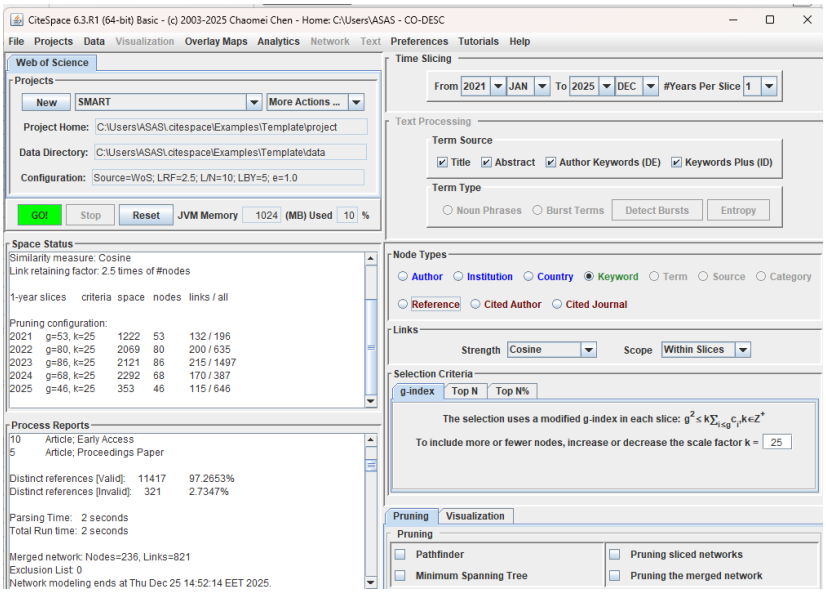
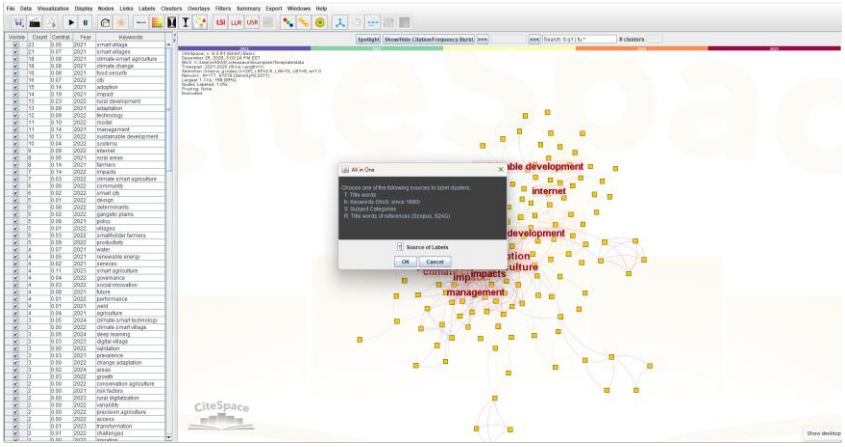
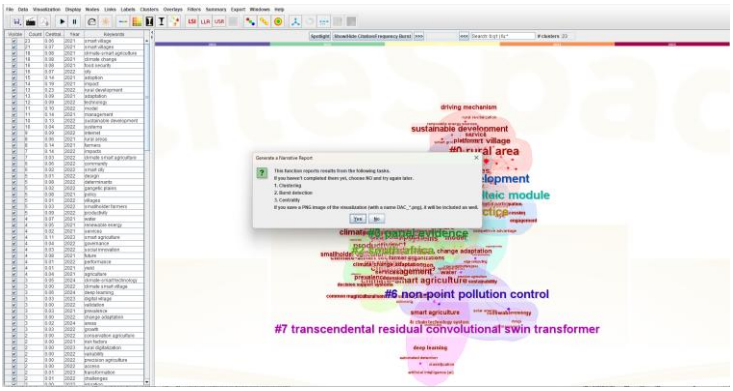


Figure 11. Co-occurrence by author keywords on Smart village thematic (2021-2025). Overlay view




CiteSpace 6.3.R1 (64-bit) Basic - (c) 2003-2025 Chaomei Chen - Home: C:\Users\ASAS - CO-DESC
File Projects Data Visualization Overlay Maps Analytics Network Text Preferences Tutorials Help
Web of Science
Projects
New
SMART
More Actions ...
Project Home: C:\Users\ASAS\citespace\Examples\Template\project
Data Directory: C:\Users\ASAS\citespace\Examples\Template\data
Configuration: Source=WoS; LRF=2.5; L/N=10; LBY=5; e=1.0
GO!
Stop
Reset
JVM Memory 1024 (MB) Used 10 %
Space Status
Similarity measure: Cosine
Link retaining factor: 2.5 times of #nodes
1-year slices criteria space nodes links / all
Pruning configuration:
2021 g=53, k=25 1222 53 132 / 196
2022 g=80, k=25 2069 80 200 / 635
2023 g=86, k=25 2121 86 215 / 1497
2024 g=68, k=25 2292 68 170 / 387
2025 g=46, k=25 353 46 115 / 646
Process Reports
10 Article; Early Access
5 Article; Proceedings Paper
Distinct references [Valid]: 11417 97.2653%
Distinct references [Invalid]: 321 2.7347%
Parsing Time: 2 seconds
Total Run time: 2 seconds
Merged network: Nodes=236, Links=821
Exclusion List: 0
Network modeling ends at Thu Dec 25 14:52:14 EET 2025.
Time Slicing
From 2021 JAN To 2025 DEC #Years Per Slice 1
Text Processing
Term Source
Title Abstract Author Keywords (DE) Keywords Plus (ID)
Term Type
Noun Phrases Burst Terms Detect Bursts Entropy
Node Types
Author Institution Country Keyword Term Source Category
Reference Cited Author Cited Journal
Links
Strength Cosine Scope Within Slices
Selection Criteria
g-index Top N Top N%
The selection uses a modified g-index in each slice:
To include more or fewer nodes, increase or decrease the scale factor k = 25
Pruning Visualization
Pruning
Pathfinder
Minimum Spanning Tree
Pruning sliced networks
Pruning the merged network


CiteSpace


#6 non-point pollution control
#7 transcendental residual convolutional swin transformer

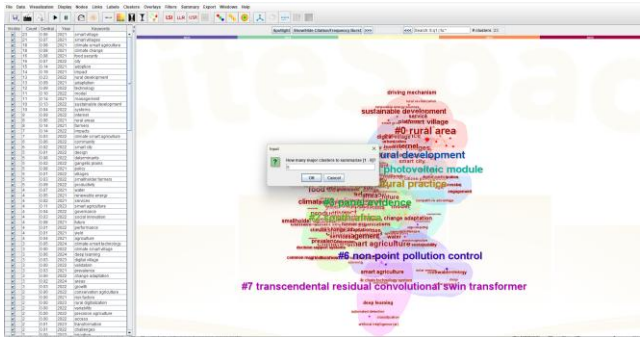


Figure 12. Keyword cluster analysis on Smart village thematic (2021-2025)

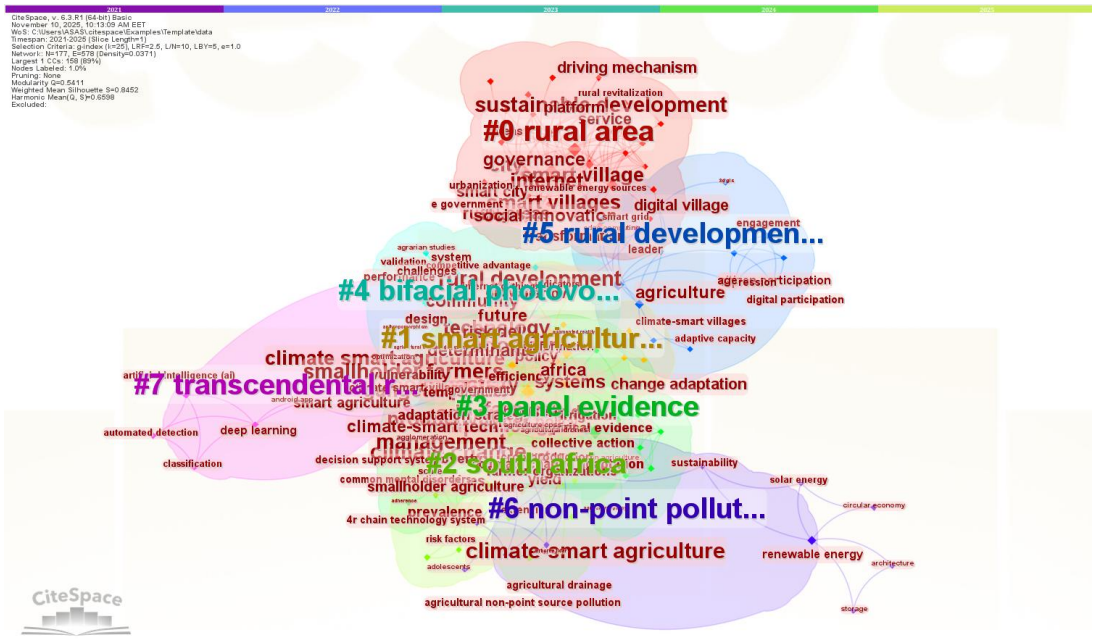


Table 6. Summary of the 8 largest clusters on Smart village thematic (2021-2025)

Table 1. Summary of the largest 8 clusters.

ClusterID	Size	Silhouette	Label (LSI)	Label (LLR)	Label (MI)	Average Year
0	36	0.807	rural area	rural area (55.87, 1.0E-4)	rural digital business ecosystem (2.22)	2022
1	29	0.766	smart agricultural practice	smart agricultural practice (53.46, 1.0E-4)	adaptation practice (1.47)	2022
2	25	0.809	south africa	south africa (43.83, 1.0E-4)	smart mental health project (0.61)	2022
3	18	0.912	panel evidence	panel evidence (43.01, 1.0E-4)	gender agriculture policies (0.19)	2023
4	16	0.9	smart village	bifacial photovoltaic module (42.85, 1.0E-4)	rural tourism development (0.16)	2022
5	14	0.9	rural development	rural development (53.05, 1.0E-4)	mountainous village relocation planning (0.12)	2023
6	12	0.922	non-point pollution control	non-point pollution control (37.79, 1.0E-4)	multiple health risk (0.07)	2021
7	8	0.947	transcendental residual convolutional swin transformer	transcendental residual convolutional swin transformer (21.14, 1.0E-4)	smart village (0.01)	2024

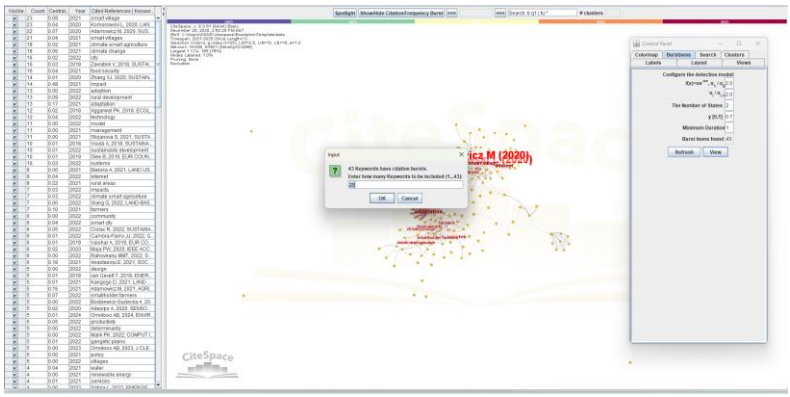
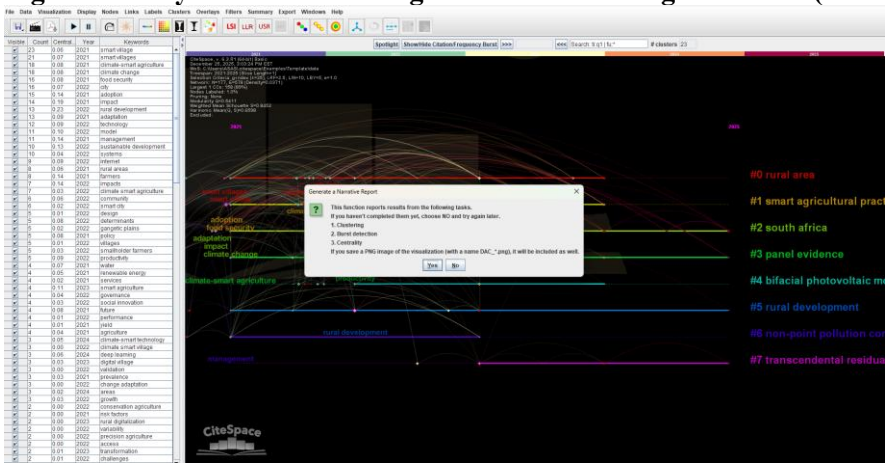
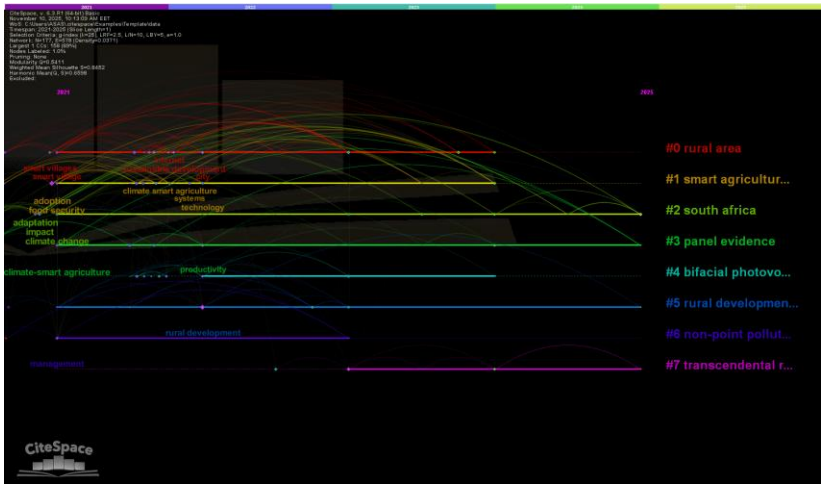
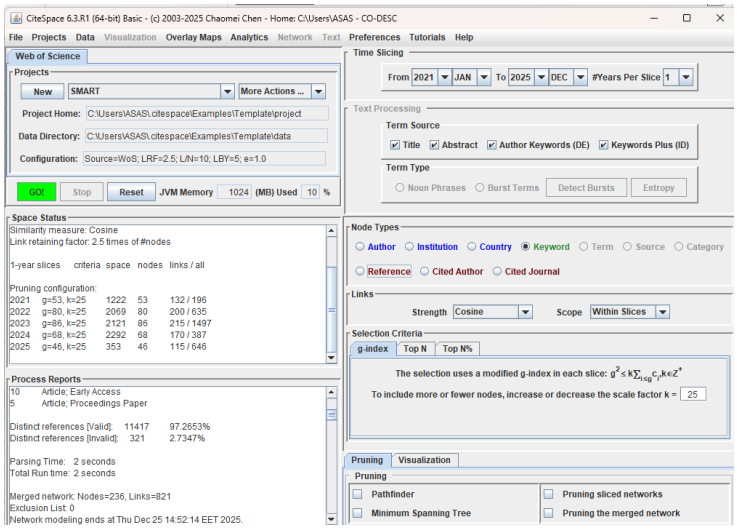


Figure 13. Keyword timeline diagram on Smart village thematic (2021-2025)







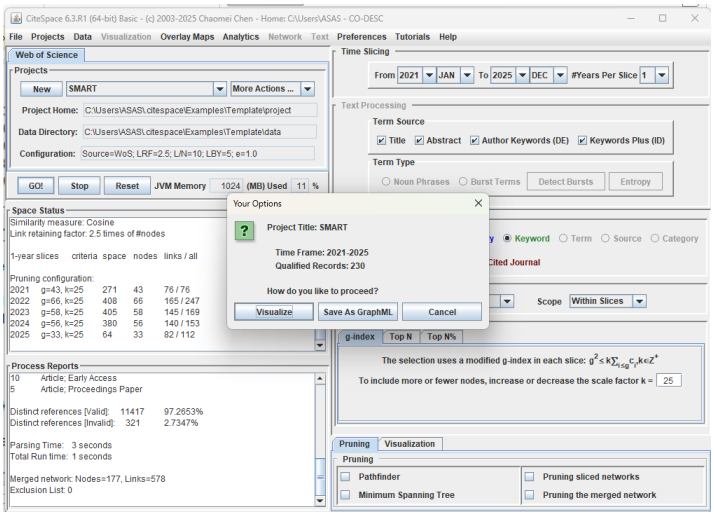
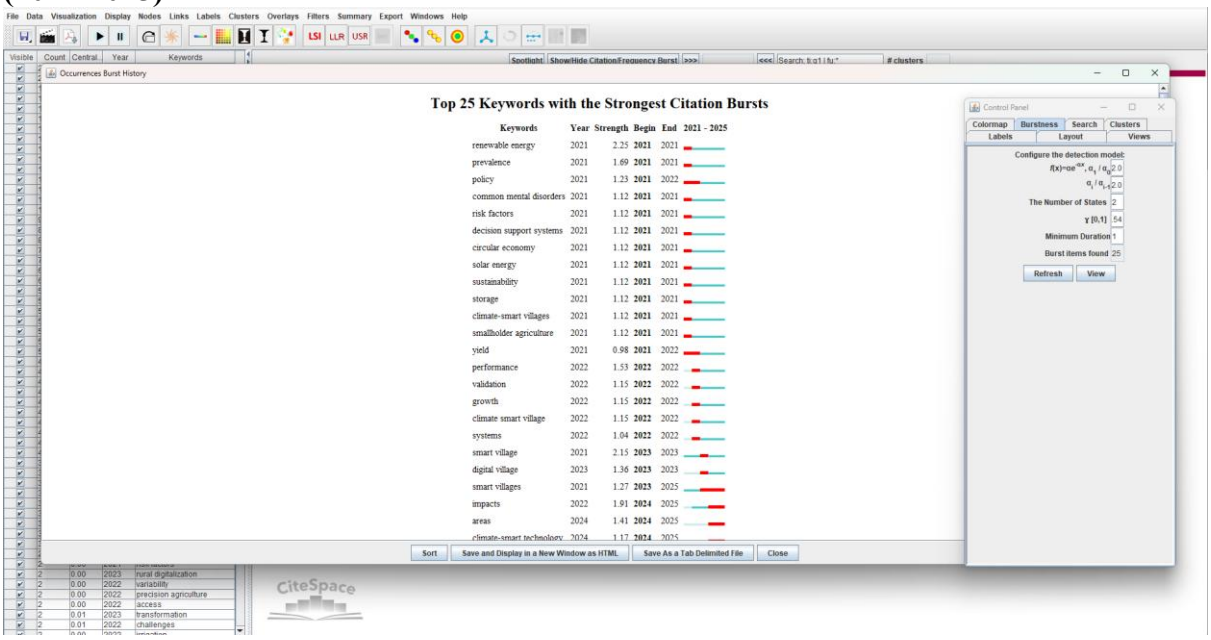



Figure 14. Top 25 keywords with the strongest citation bursts on Smart village thematic (2021-2025)