A Topic Modeling-Based Bibliometric Exploration of Indigenous Knowledge Research

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Introduction

Indigenous Knowledge:

- Indigenous knowledge (IK) is sometimes referred to as traditional knowledge. It has been increasingly popular in recent years.
- Terms such as ‘Traditional Knowledge,’ ‘Indigenous Technical Knowledge,’ ‘Indigenous Knowledge,’ ‘Local Knowledge,’ ‘Ethnoecology,’ ‘Folk Knowledge,’ and ‘Traditional Environmental Knowledge or Ecological Knowledge’ are interchangeable and shared the same meaning.
- Indigenous knowledge is essential for survival and stability among indigenous communities, acting as an information base in local decision-making processes for agriculture, health care, food preparation, education, natural resource management, and other activities, especially in rural areas.
- It is the unique, traditional, local knowledge existing within and developed around the specific conditions of people indigenous to a particular geographic region.
- IK is about the ways of knowing, seeing, and thinking that are verbally transmitted from one generation to the next. It reflects thousands of years of experimentation and innovation in all aspects of life in a particular context.

Introduction

Topic Modeling:

- Topic modeling is used to identify the hidden theme or concept using an algorithm based on high word frequency among the documents.
- Latent Dirichlet Allocation (LDA) used to uncover the hidden topics in a documents.
- Topic modelling assigns a topic to each document, which can be used to link and index another documents in a website or database for improved search and retrieval.
- Topic modelling involves two activities. First it identifies the topics from a text corpus and then assigns the topics to each document, so that the thought content of each of the document can be identified.
- This study is carried out with the intention to find out the overall scenario of research in the indigenous knowledge domain by the Indian author and the topics explored in this research domain.

Objectives of the Study

The present study is an attempt to explore the topics of the Indigenous knowledge research domain in India as well as to map the collaboration and pattern of publication by the Indian authors on Indigenous knowledge. Based on that the following objectives are drawn for the study-

1) To study the research output contributed by Indian authors on Indigenous knowledge research domain.
2) To identify the top cited articles by Indian authors.
3) To study the inter-country collaboration pattern and top contributed institutions among the Indian authors.
4) To identify the topic used in the Indigenous knowledge research domain through topic modeling.
5) To study the relationship between the documents and the assigned topics of LDA modeling.

Methodology Adopted

The sample data for this study is gathered from WoS (Web of Science) database using the search string –
(Indigenous) AND (Knowledge) (Topic) AND INDIA (Countries/Regions) AND Article (Document Types) AND 2024 (Exclude – Publication Years).

A total of 821 articles were retrieved in .txt and excel format on April 15, 2024, and VOSviewer software has been used for bibliometric analysis and visualization. KNIME software has been used for the topic modeling on collected articles. The topic modeling is performed on title and abstract of considered articles using LDA technique. Generally, LDA technique is a modeling technique that discovers the latent topics and themes from the text corpus based on the selected domain for unstructured data.

Analysis of the Retrieved Data

Research Output

Total Article	Total Citations	Articles with minimum one citation	Articles without any citation	Cited to non-cited ratio
821	15,158	716	105	6.82:1

Table 1: Research Output on Indigenous Knowledge

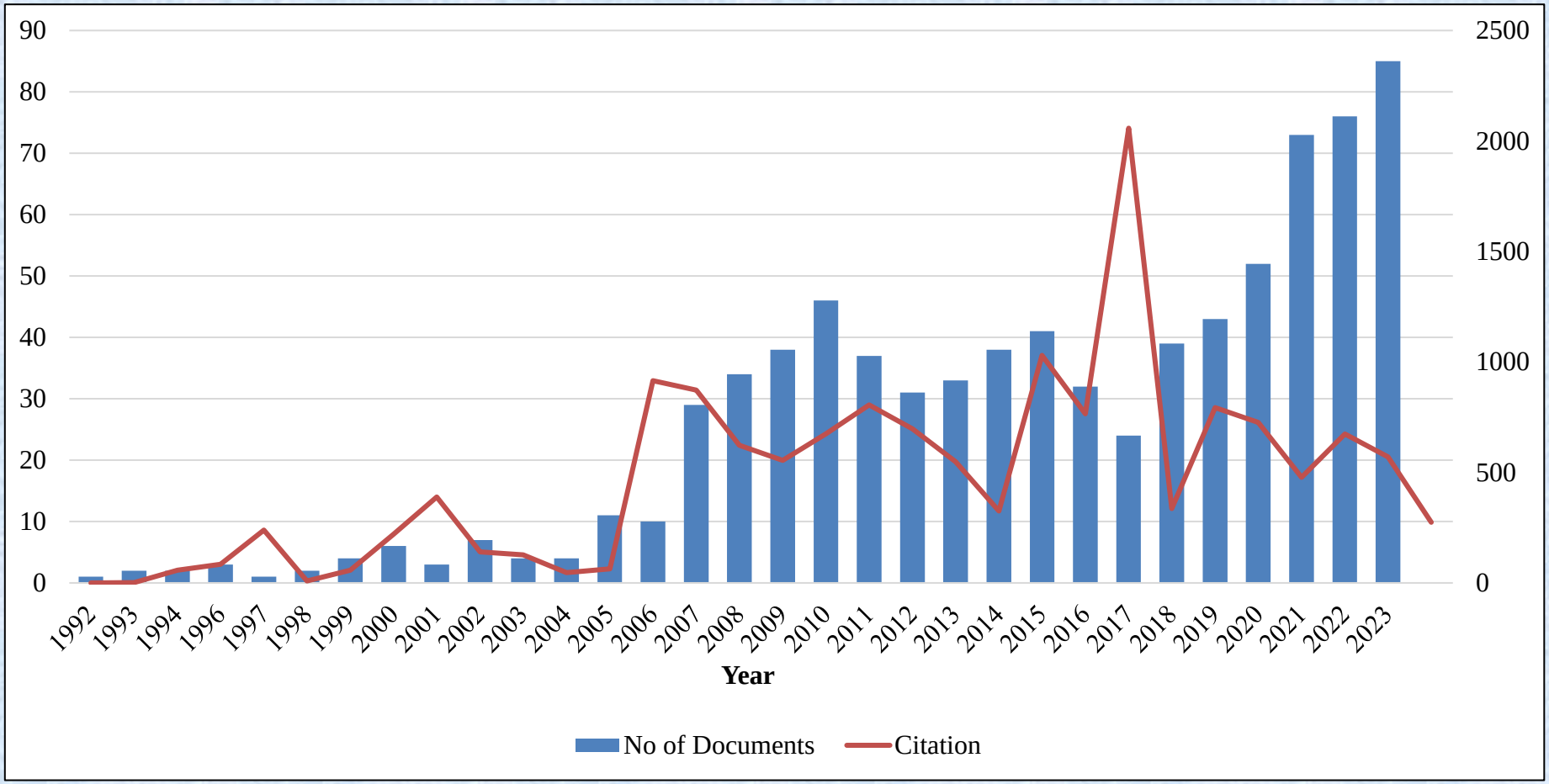


Fig 2: Year wise Documents and Citation

Top Cited Articles on Indigenous Knowledge Research Domain

Article Title	Source Title	Publication Year	Times Cited
The IPBES Conceptual Framework - Connecting Nature and People	Current Opinion in Environmental Sustainability	2015	1425
Indigenous Knowledge for Biodiversity Conservation	Ambio	1993	723
Medicinal Plants Used by Traditional Healers in Kancheepuram District Of Tamil Nadu, India	Journal Of Ethnobiology and Ethnomedicine	2006	347
Green Purchasing Behaviour: A Conceptual Framework and Empirical Investigation of Indian Consumers	Journal Of Retailing and Consumer Services	2018	349
Psychological Science in Cultural Context	American Psychologist	1996	202
Developing The Medicinal Plants Sector in Northern India: Challenges and Opportunities	Journal Of Ethnobiology and Ethnomedicine	2006	192
A Comparison of Selected Classification Algorithms for Mapping Bamboo Patches in Lower Gangetic Plains Using Very High-Resolution Worldview 2 Imagery	International Journal of Applied Earth Observation and Geoinformation	2014	173
Ethnobotanical Survey of Medicinal Plants Commonly Used by Kani Tribals in Tirunelveli Hills of Western Ghats, India	Journal of Ethnopharmacology	2011	156
Soil Fertility and Indigenous Nutrient Supply in Irrigated Rice Domains of Asia	Agronomy Journal	2003	124
Prioritization of Medicinal Plants on The Basis of Available Knowledge, Existing Practices and Use Value Status In Uttaranchal, India	Biodiversity And Conservation	2004	112

Table 2: Top 10 Most Cited Articles on Indigenous Knowledge

Trends in Inter-Country Collaboration

Country	Documents	Citations
India	821	15158
USA	47	624
England	28	542
Canada	21	1070
Saudi Arabia	20	220
Australia	19	196
Italy	13	286
Germany	12	97
Pakistan	12	132
Peoples R China	12	256
Ethiopia	10	480
Japan	10	114
South Africa	8	106
Spain	8	154
Georgia	7	43
Switzerland	7	95
Brazil	5	99
Philippines	5	237
Scotland	5	83

Table 3: Country wise Collaboration with Indian Author

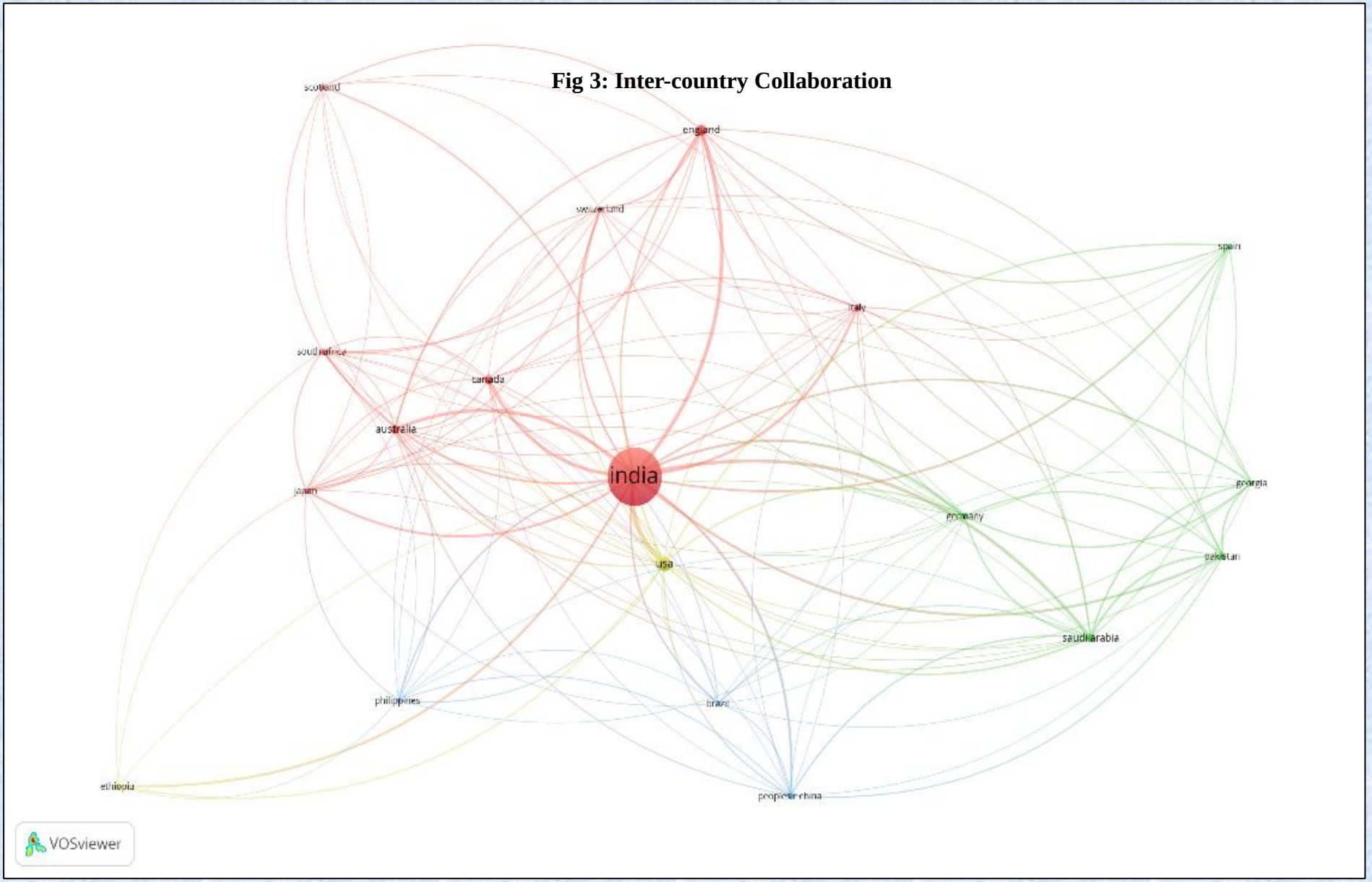


Fig 3: Inter-Country Collaboration

Top Contributing Institution

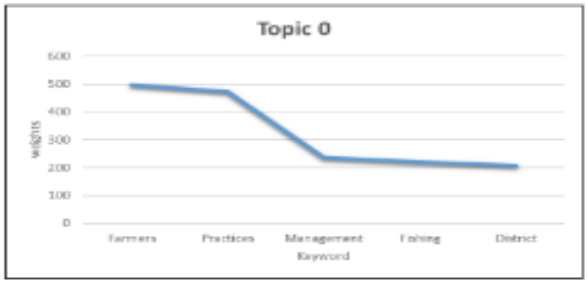
Sl. No	Organization/Institution	Documents	Citations
1	Central Agricultural University	35	325
2	GB Pant National Institute of Himalayan Environment	24	689
3	Delhi University	23	592
4	Banaras Hindu University	17	192
5	HNB Garhwal University	17	353
6	Gauhati University	16	209
7	Indian Institute of Technology System	14	200
8	Assam University	13	138
9	CSIR National Dairy Research Institution	13	82
10	Jawaharlal Nehru University	12	165

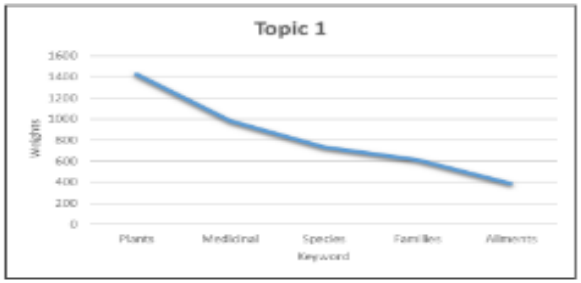
Table 4: Top 10 Contributing Institution

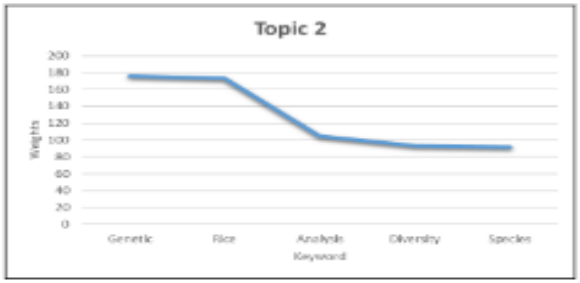
Topic wise Term

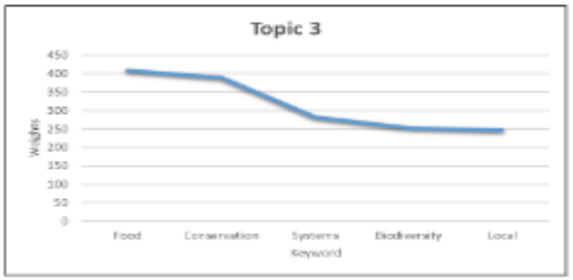
Topic 0	Farmers, Practices, Management, Fishing, District
Topic 1	Plants, Medicinal, Species, Families, Ailments
Topic 2	Genetic, Rice, Analysis, Diversity, Species
Topic 3	Food, Conservation, Systems, Biodiversity, Local
Topic 4	Climate, Change, Adaptation, Local, Farmers
Topic 5	Research, Development, Health, Paper, Systems
Topic 6	Activity, Soil, Potential, Treatment, Extract
Topic 7	Paper, Products, People, Ethnic, Cultural
Topic 8	Reproductive, Patients, Cattle, Animals, Milk
Topic 9	Species, Plants, Wild, Genetic, Edible

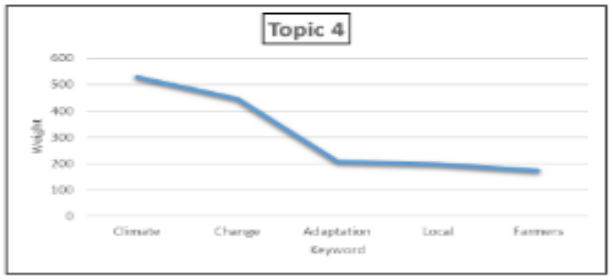
Table 5: Topic wise Terms

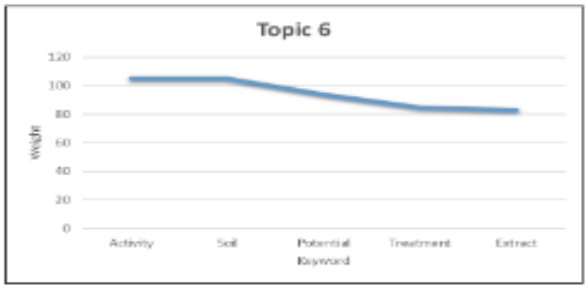


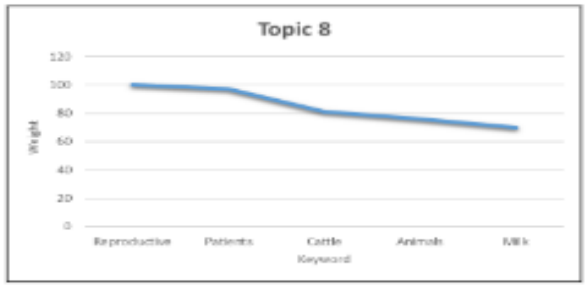












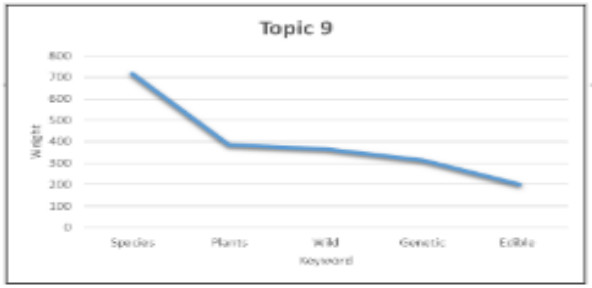


Fig 4: Weight wise Topic

Fig 5: Term Map

Relationship Between Documents and Assigned Topics

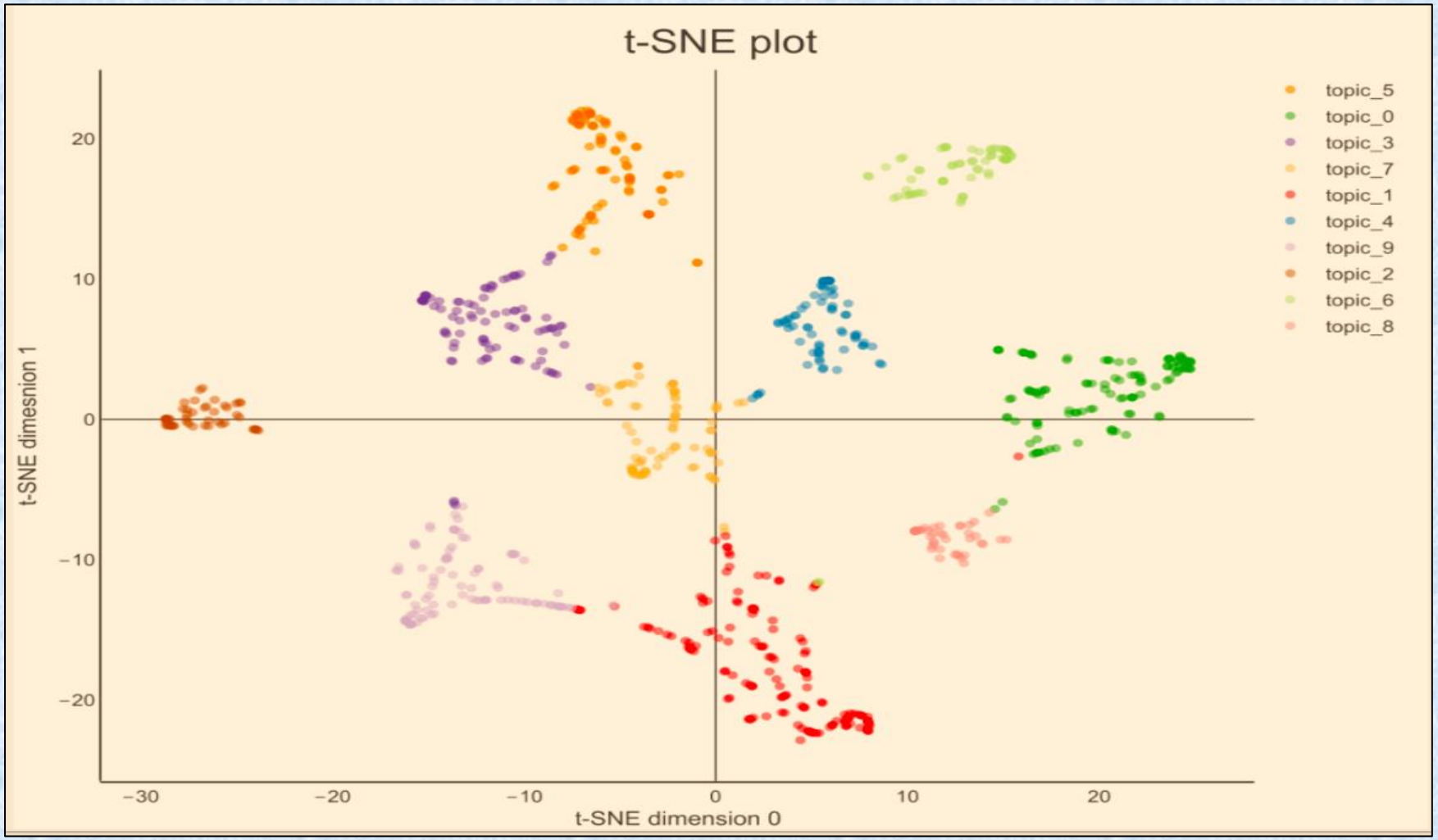


Fig 6: Document wise Assigned Topic

Conclusion

- Topic modelling can help to understand the hidden relationship in large text corpus by assigning topics to documents.
- From 2020 onwards, there is an growth of indigenous knowledge research in Indian context. One of the reason for this growth may be the attention to IK in National Education Policy (NEP, 2020).
- USA collaborated 47 documents with Indian researcher which makes them the highest collaborated country in this context.
- Most of the topics used in this research domain is- medicine, plants, climate, farmers, biodiversity, conservation, soil, species etc.
- This type of study is very helpful to understand the nature of data depicted in documents of different database. It is effective to organize, understand and summarize the data.
- Further studies can be done to assess the trend in indigenous knowledge publication pattern globally by including different indexing and abstracting database.

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