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# Indigenous knowledge in India: A bibliometric analysis of funding sponsors' academic research themes

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The current study explores the transition, reach, and framework of financed scholarly research on Indigenous knowledge in India through bibliographic techniques. The study examines three field plots, keyword co-occurrence, thematic focus, journal-wise publication, leading institutions and affiliations, and institutional collaboration by using data from 1997 to 2025 gathered from the Scopus databases using the keywords "indigenous knowledge", "traditional knowledge", and "local knowledge". We used Biblioshiny (R package) for analytical and visualization purposes. The study observes an increasing interest in Indigenous knowledge when it comes to traditional knowledge of the environment, adapting to climate change, protecting biodiversity, ethnobotany, and medicinal plants. The study shows that the focus is expanding from ethnomedicinal and botanical documentation to applied transdisciplinary issues, sustainability, machine learning, and digital documentation. The study critically analyzed and interpreted the results with relevant context. It identifies research gaps in the existing literature and suggests future research directions that amalgamate Indigenous knowledge with technology and guide policy formulation.

**Keywords**: Bibliometric, Funding sponsor, India, Indigenous knowledge, Research theme, Scopus database

**IPC Code:** Int Cl.[26]: NA

Indigenous knowledge covers the distinctive understanding and practices transmitted to generations within indigenous communities. Indigenous peoples have in-depth knowledge of the environment, culture, and core values of sustainable life. The concept of indigenous knowledge has never been bounded by the walls of history. It is connected to everyday life and has an effect on relationships with other people, keeping culture, and taking care of the environment. It also teaches how to build futures that will last for generations[1]. These initiatives show the resilience and innovation of the communities that adapted to changing conditions[2]. In India, the technique is still helpful in the areas of food security (e.g., how millets are coming back into people's diets) and health care (*i.e.,* Ayurveda). The herbs and drinks taken on a regular basis are part of traditions that make people healthy. Safeguarding and recovering the traditional knowledge & technique are essential and appreciated by cultural expertise for social justice and promoting social inclusion[1].

The traditional knowledge improves the understanding of intricate issues in the field of health, environment, and climate crisis adaptation[3,4]. The technique transformed from generation to generation through different cultural settings. The knowledge presents new insights to deal with current issues. Additionally, the study of traditional knowledge and technique addresses the bias in the Western viewpoint and promotes more inclusive research[5,6].

Integration of indigenous knowledge into academic research may greatly assist individuals of indigenous heritage, producing outcomes that are both substantial and inspiring. To understand the local context, it is important to get to know people in the community well, especially when doing research on disabilities[5-7]. Researchers should recognize the risks linked to knowledge collection and maintain indigenous self-determination in their endeavors[8].

Furthermore, research findings must be accessible and beneficial to the indigenous populations that enhance the knowledge base[9]. Research grants positively impact the research performed under the grant and have broader benefits, particularly in advancing academic careers[10]. Grant recipients were about twice as likely as rejected applicants to obtain a full professorship, and the probability for research

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career advancement, recognition, networking, and other factors is approximately 9% higher for those who received grants[10].

There are potential challenges in engaging Indigenous knowledge holders, such as Elders, in research. Some of the difficulties involve identifying a suitable "fit", engaging with Elders in a manner that respects cultural norms, and dealing with bureaucratic systems that fail to recognize Indigenous methods[11].

While thinking about funded or sponsored studies, we are interested in the thematic structure of the funded or sponsored research on indigenous knowledge.

Several bibliometric and systematic reviews on indigenous knowledge have revealed important trends and themes. A comprehensive bibliometric analysis of indigenous knowledge research from 1990 to 2020 found that while indigenous knowledge is globally recognized, the African narrative is largely missing and not told by Africans. Most indigenous knowledge research in Africa focused on ethnobotany, customs, traditions, agroforestry, and agriculture, with Southern Africa being the most researched region[12]. In the context of climate change adaptation, a scoping review of peer-reviewed studies on indigenous knowledge shows that it is mainly found in rural areas of tropical, subtropical regions, and drylands, focusing on adapting through planning, practices, and behavior changes. Knowledge gaps were identified in regions such as Australia, northern Asia, northern and central Africa, and South America, as well as in metropolitan areas, as well as in adaptation methods involving capacity building, institutional adjustments, and psychological adjustments[4].

A comprehensive global systematic study of Indigenous society participation in climate field studies accessing Indigenous knowledge found that the vast majority of studies practice an extractive model with minimal participation or decision-making authority from Indigenous communities. Additionally, few studies have followed ethical research protocols or shown results that directly benefit Indigenous people[13].

Funding agencies are well situated to facilitate the promotion of evidence in health practice and policy[14]. They are essential in determining research priorities and facilitating knowledge translation. Literature indicates that funding agencies can help improve knowledge translation using five primary functional domains: advancing the science of knowledge translation, developing capacity for knowledge translation, overseeing knowledge translation projects, offering financial support for knowledge translation initiatives, and promoting the significance of knowledge translation[14].

Research that bridges disciplines also receives significant support from funding sources. They hold significant tacit knowledge about managing interdisciplinary research programs and projects, and their support is critical to achieving the potential value-added of interdisciplinarity[15]. Challenges exist in designing clear policies, monitoring compliance, implementing sanctions for non-compliance, providing incentives, and offering support for data sharing[16].

There is a growing emphasis on open science and reproducibility, which is changing how authors cite and acknowledge these research infrastructures[17]. Funding agencies are becoming more involved in supporting software development, recognizing its increasing importance in scientific research[18].

Funding and sponsorship are essential for research, but different fields receive support for different reasons. The same is true for research on indigenous knowledge, traditional knowledge, and local knowledge: some studies get financial or institutional support because they align with policy goals, community priorities, environmental management, health, education, or data governance[19-23].

Current scholarly debates question whether funding truly empowers Indigenous communities or merely incorporates Indigenous content into colonial frameworks[19,22]. Another discussion is that researchers frequently encounter a mismatch between the funding timelines typical in academia and trust-based relationships for meaningful, community-led research initiatives[22-24]. Concern also arises in the case of drug development and their commercial use, prior informed consent, and fair benefit-sharing[25], similar to the case of cultural privacy, date sovereignty, and community rights over knowledge conflict with open data science and digital systems[21,26].

There is insufficient information to address the limitations in the current understanding of funded research in the indigenous knowledge domain. We summarized relevant insights from the existing study that broadly relate to the research understanding and knowledge domains.

Funding shapes who controls the knowledge and whose priorities are supported and also influences whether Indigenous communities gain from research or are merely utilized as a source of information. Indigenous-led funding can support community

leadership, capacity-building, and more respectful research partnerships[19,27,28]. Prior studies show growing support for Indigenous knowledge, but whether that support creates genuine power-sharing and sovereignty or only a symbolic inclusion is still unclear.

Research on innovation indicators and knowledge domains indicates gaps in understanding how various types of knowledge affect comprehension and performance[29,30]. Studies have shown that familiarity with application domains significantly affects how programmers comprehend and solve problems[30,31]. This shows how important it is to look at both domain-specific knowledge and general skills when judging performance and expertise. When it comes to protecting cultural heritage, studies have shown that younger people don't always understand or communicate the value of heritage[32]. This suggests potential limitations in how knowledge is transferred across different groups, which could also be relevant to indigenous knowledge domains.

Publications in the form of articles are most often included in bibliometric studies because of their original research output, comparability, and data consistency[33,34]. A review study can be considered a bibliometric study, especially for field mapping and thematic overview[35-37]. In conferences, trending or crucial topics are presented, which are published as conference proceedings or conference papers and are generally considered fast-evolving fields or fast-moving topics[38-40]. Nowadays, climate adaptation, education, food systems, agroforestry, ethnomedicine, biodiversity, and wildlife conservation research are linked to indigenous knowledge and traditional knowledge[41-45].

## Research Gap

Current research does not specifically tackle the shortcomings in funded studies regarding indigenous knowledge; it emphasizes the need to take into account knowledge that is specific to certain domains, the difficulties in communication among various groups, and the relationship between general and specialized knowledge in comprehending research. The availability of limited studies of funded or sponsored research on indigenous knowledge excites us and makes us want to know more about its structure.

## Research Objective

The study objective is to know the indigenous knowledge thematic structure of the funded or sponsored study in India. That means the research is an attempt to explore the thematic structure of the funded or sponsored studies related to Indigenous knowledge in India. Funding sponsored research has its own significance. In connection to funding sponsors, the study focused on exploring its thematic structure, major publisher, and connection and contributions of authors' affiliated institutions.

## Research Methodology

### Keywords identification

We identified near-synonym keywords from different published studies that are used for “Indigenous knowledge” in prior studies (Supplementary Appendix S1) for different contexts where the terminology is inconsistent and often interchangeable. We found that “indigenous knowledge”, “local knowledge”, and “traditional knowledge” are more commonly used keywords in the prior study.

### Search query

Initially, we conducted a search using the Boolean operator “OR” between "indigenous knowledge", “traditional knowledge”, and “local knowledge” within the article title, abstract, and keywords. Secondly, we limited the publication year to 2025. In the third step, we selected document types as “Article”, “Review”, and “Conference Paper” and country or territory as “India”. Finally selected each name in the funding sponsor filter, a total of 564 Indian-affiliated research documents with funding sponsored were found.

The initial search query used is as follows: TITLE-ABS-KEY ("indigenous knowledge" OR "traditional knowledge" OR "local knowledge") AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp") OR LIMIT-TO (DOCTYPE, "re")) AND (LIMIT-TO (AFFILCOUNTRY, "India")) AND PUBYEAR > 1888 AND PUBYEAR < 2026. The query output was 3027 documents, and then we selected all available funding sponsors. Our study's main idea and objectives are based on the funding sponsor. Research on traditional knowledge can be done in any domain like engineering, business, management, and accounting. Therefore, further filtering in the data mining process may exclude potential data and can change the original concept of the study. The final search string is given in (Supplementary Appendix S2). We preferred the CSV file format to download the final dataset of 564 documents.

We used bibliometric analysis to study funded academic research on indigenous knowledge in India. Data of existing studies was extracted from the Scopus database, covering the years 1997 to July

2025. The methodology is designed to ensure a focused, transparent, and replicable analysis. The primary data source for this study is the Scopus database, a comprehensive and multidisciplinary repository of peer-reviewed academic literature. The data was systematically collected in four steps to help refine the research and uncover the most appropriate articles for the research goals. Figure 1 shows the overview of research methodology that we used in this study.

**Data analysis**

Primarily, the Sankey Diagram Analysis, Keyword Co-occurrence Analysis, and thematic map analysis of bibliometric techniques have been applied to identify research themes and to reveal key insights. Further, journal-wise publication, leading institutions and affiliations, and institutional collaboration networks are studied to know the institutional leadership within the field, social structure, and their contributions over time. The Biblioshiny interface of the Bibliometrix R package is utilized for advanced bibliometric statistics, network visualization, and thematic map generation.

## Result

**Data summary**

Table 1 presents a summary of sponsored research documents on indigenous knowledge for the study. A total of 316 sources have published 564 documents, with a yearly publication growth rate of 18.65%, indicating increasing interest in the field. The average age of documents is 5.13 years, reflecting the recent and active field of study, and an average of 26.56 citations each, reflecting a moderate to significant academic impact. The collective works contain 93817 cited references, illustrating a rich and interconnected literature landscape. The study includes 4648 Keywords Plus and 2019 Author Keywords, which indicates that authors use certain words that are very similar to indexed keywords. On the other hand, database-generated keywords show a wider range of topics. Out of 2342 authors, only 20 authors published study work individually or entirely on their own, showing more collaborative work, which is also evidenced by the fact that each document has an average of 5.25 co-authors and that 27.48% of the documents have international co-authorship. This means that people from all over the world are working together with funding support to study indigenous knowledge. The vast majority of the documents are journal articles and review documents that cover most areas of empirical and theoretical research. There are only 14 documents in the form of conference paper.

Table 1 — Data summary

| Description | Results |
|---|---|
| Main Information About Data | |
| Timespan | 1997:2025 |
| Sources (Journals, Books, etc.) | 316 |
| Documents | 564 |
| Annual Growth Rate % | 18.65 |
| Document Average Age | 5.13 |
| Average citations per doc | 26.56 |
| References | 93817 |
| Document Contents | |
| Keywords Plus (ID) | 4648 |
| Author's Keywords (DE) | 2019 |
| Authors | |
| Authors | 2342 |
| Authors of single-authored docs | 20 |
| Authors Collaboration | |
| Single-authored docs | 21 |
| Co-Authors per Doc | 5.25 |
| International co-authorships % | 27.48 |
| Document Types | |
| Article | 473 |
| Conference paper | 14 |
| Review | 77 |

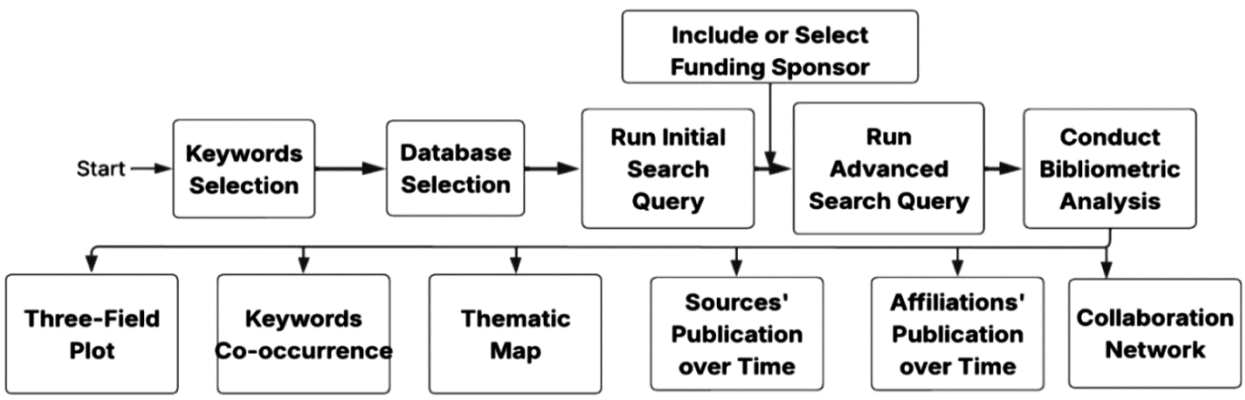



Fig. 1 — Methodology overview

**Three-field plot**

In a three-field plot, the flow signifies the relation between the elements, and flow thickness is co-occurrence. Niche or emerging topics are identified by isolated and thin flows. Elements with multiple flows are considered central nodes of the network. The three-field plot in (Fig. 2) illustrates the relationship between sources (SO), authors' keywords (DE), and authors' affiliated institutions (AU_UN) in funded research on indigenous knowledge in India. The “Journal of Ethnopharmacology”, “Indian Journal of Traditional Knowledge”, and “Ethnobotany Research and Application” sources are leading outlets, publishing studies mainly based on traditional knowledge, medicinal plants, and traditional medicine. Climate change and food security research are the emerging themes. Authors affiliated with Jawaharlal Nehru University, University of Delhi, and Academy of Scientific and Innovative Research (ACSIR) are publishing in every field. CSIR-Indian Institute of Integrative Medicine and Tamil Nadu Agricultural University are strongly connected with research related to India, showing significant contributions towards geographical location. Indira Gandhi National Tribal University's contributions in the field of conservation, and research in the field of food security are majorly contributed by authors affiliated with Banaras Hindu University and Tamil Nadu Agricultural University.

**Keywords co-occurrence**

In (Fig. 3), the co-occurrence of the authors' keywords reveals the historical progression of the study theme. To understand the conceptual structure, we preferred the diachronic network as co-occurrence network analysis and to track down the traditional knowledge forms as the core of the research network in four temporal snapshots, like in the years 1997, 2009, 2018, and 2025.

In the early stage, funded research on indigenous knowledge was geographically concentrated around the Himalayas, while a snapshot in the year 2009 network shows traditional knowledge evolved as a central theme heavily associated with medicinal plants, ethnobotany, ethnomedicine, and conservation. During the period, sustainable development-related studies also appeared in the funded research. From 2009 to 2018, the conceptual structure of funded traditional knowledge research moved beyond medicinal plants by connecting with conservation, indigenous knowledge, livelihood, agriculture, climate change, food security, and sustainable development. Concepts related to herbal medicine, biodiversity, folk medicine, biodiversity conservation, traditional ecological knowledge, and suitability are getting recognition in sponsored research. By 2025 the network becomes interdisciplinary. Where all the concepts are almost equally studied and connected with traditional knowledge, indigenous knowledge,

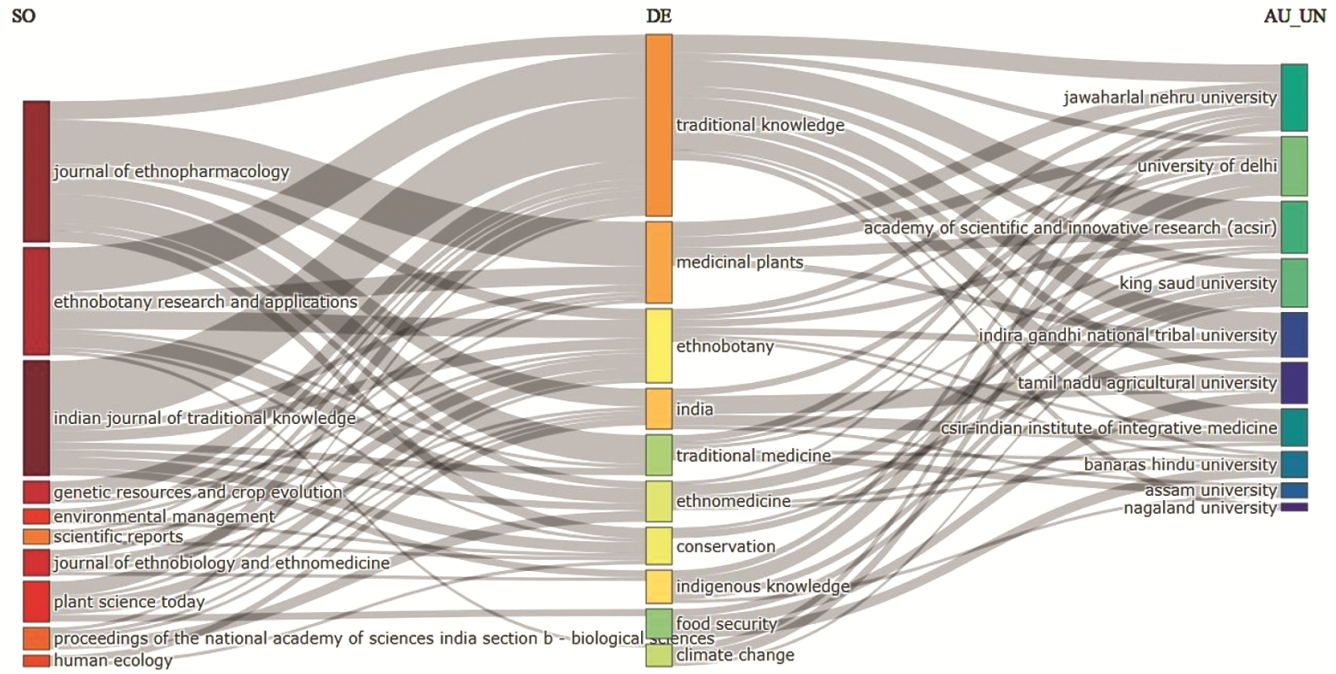



Fig. 2 — Three-Field plot

and local knowledge in different contexts. From the very beginning, traditional knowledge, medicinal plants, ethnobotany, and conservation formed a strong connection and, in recent years, reached environment and agriculture-related ideas through indigenous knowledge. Interestingly, we can observe that funding sponsored research in the initial stage bridged the concept from a place to the practice of medicinal plants and ethnobotany. We can call this the emerging stage. In the expansion stage, it connected with people and livelihoods like indigenous knowledge, agriculture, and food security. Subsequently, developed networks with systems and sustainability-related research themes like biodiversity, climate change, adaptation, traditional ecological knowledge, disaster risk reduction, and sustainable development.

**Thematic map**

Figure 4 is the thematic map of the structure, development, and strategic position of the significant study area. The keywords are categorized into four themes: motor (upper-right), basic (lower-right), emerging or declining (lower-left), and niche (upper-left), based on their relevancy (centrality) and development (density). The thematic map reveals that the motor themes is significantly developed and highly influential, with more efforts on conservation, climate change, ethnomedicinal plants, food security, and biodiversity conservation, showing the increasing integration of traditional and indigenous knowledge with environmental resource management. A number of medium-developed studies also examined the secondary metabolites and intellectual property. Motor

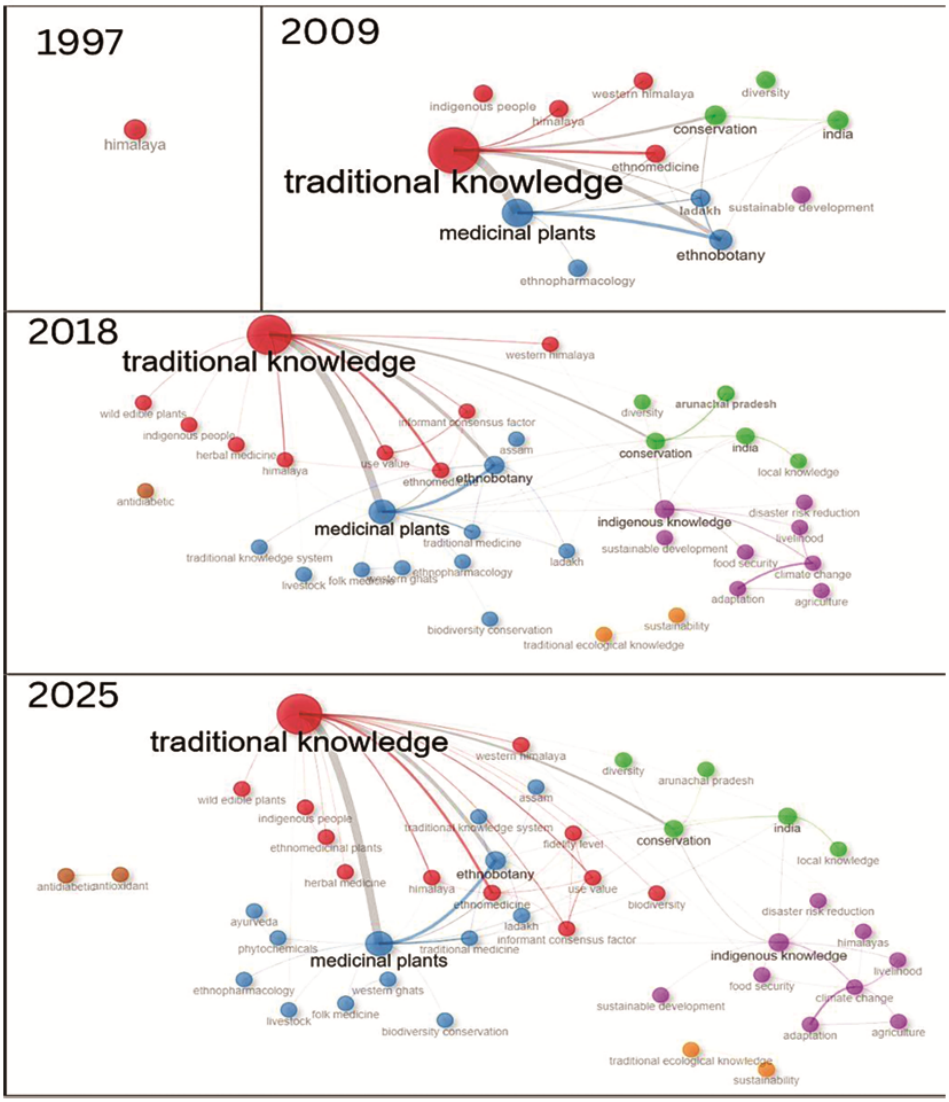



Fig. 3 — Keywords Co-occurrence

themes representing high centrality and high density.Within the basic theme, traditional knowledge, ethnobotany, sustainability, resilience, local knowledge, and antioxidants are the key concepts that considerably developed. Ethnomedicinal and disaster risk reduction are relevant topics in the basic themes and, at the same time, connected with motor themes. Niche themes are made up of specialized and mature topics, albeit with limited integration into the main field. The themes are focused and specific, which have the potential to highlight emerging trends and create a framework for subsequent research initiatives. Herbs and neurodegenerative diseases are at a medium degree of development and near motor themes. *Helicobacter pylori*, fermented foods, and blockchain-related works are highly relevant, but the degree of development is low.Interest in emerging themes is growing. Human-wildlife conflict, machine learning, and germination related works are highly relevant but fully not developed under merging or declining themes. Additional analysis required to distinguish different concepts in the emerging and declining themes.

**Sources' publication over time**

A longitudinal analysis of journal-wise publication output provides crucial insights into the disciplinary positioning of Indigenous knowledge. The top ten sources with their cumulative publications during the time is shown in (Table 2), and (Fig. 5) shows their year-wise publications trend.

The Journal of Ethnopharmacology was the earliest and most consistent outlet for publishing funding-sponsored research rooted in traditional knowledge. This trajectory underscores the journal's longstanding role as a global anchor for research that bridges traditional medicinal systems with contemporary pharmacological investigation. With the highest cumulative output, the Indian Journal of Traditional Knowledge emerged as a significant publisher in this field, and the Ethnobotany Research and

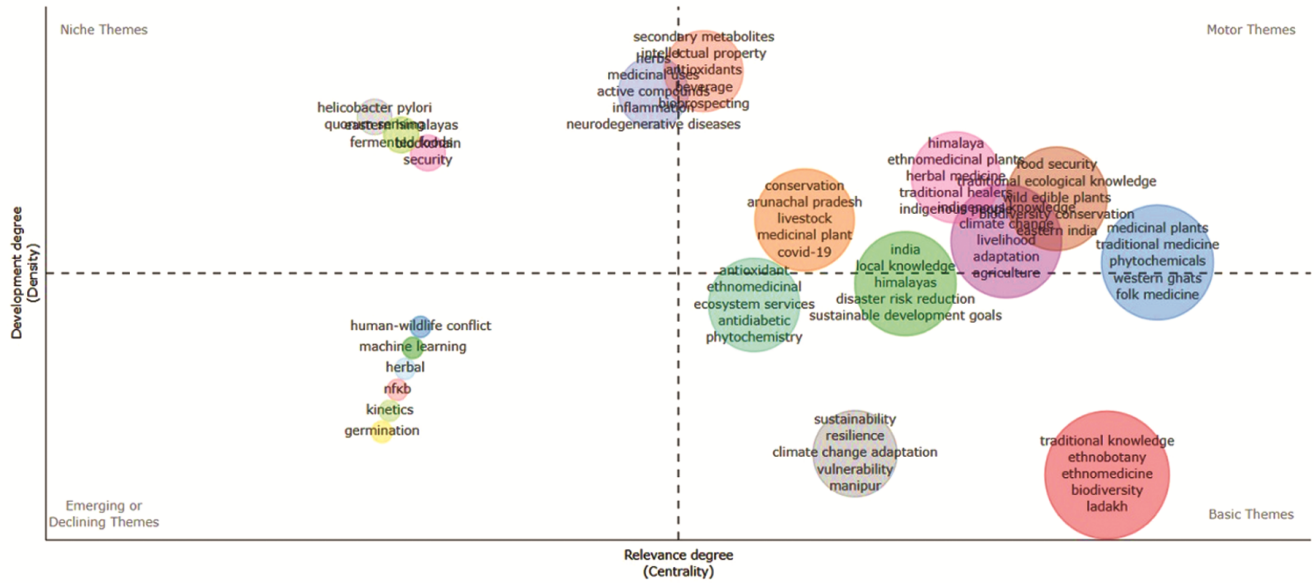



Fig. 4 — Thematic map

Table 2 — Top Ten Journal Publications 2025

| Journal Name | Cumulative Article | Earliest Publication Year |
|---|---|---|
| Indian Journal of Traditional Knowledge | 39 | 2017 |
| Journal of Ethnopharmacology | 34 | 2001 |
| Ethnobotany Research and Applications | 25 | 2019 |
| Genetic Resources and Crop Evolution | 11 | 2006 |
| Journal of Ethnobiology and Ethnomedicine | 10 | 2011 |
| Plant Science Today | 8 | 2019 |
| Environmental Management | 6 | 2016 |
| Human Ecology | 6 | 2008 |
| Proceedings of the National Academy of Sciences India Section B - Biological Sciences | 6 | 2013 |
| Scientific Reports | 6 | 2022 |

Applications journal accelerated interest in plant-based traditional knowledge. Up to 2010, research output was dominated by two journals, and gradual expansion into journals was noticed from 2011 to 2018. Thereafter, the Ethnobotany Research and Applications, Plant Science Today, and Scientific Reports significantly contributed to the field with accelerated cumulative publication.

**Affiliations' publication over time**

The institutional distribution of authorship is a crucial indicator in bibliometric analysis. It reveals the organizational loci of knowledge production, identifies research leadership, and exposes structural patterns of academic investment in a field. The top 22 leading authors' affiliated institutions (Supplementary Appendix S3) were identified based on their cumulative research contribution. Figure 6 shows the cumulative contribution trends of the institutions in different years between 2006 and 2025.

The affiliation production over time shows a clear increase in the recent decade. But during 2006-2011, limited institutional contributions were observed, with 1 to 2 publications per year across the affiliated institutions. From 2012 onwards, overall yearly contributions increased to 16 in the year 2020. Thereafter, noticeable expansion occurred when institutional contributions increased substantially, with 35 publications in 2021 and 48 contributions in 2024, the highest annual output up to the year 2025. The yearly data shows a strong expansion in recent years and growing institutional involvement in the sponsored research linked with indigenous or traditional knowledge.

At the institutional level, the University of Delhi is the leading contributor in the field with 27

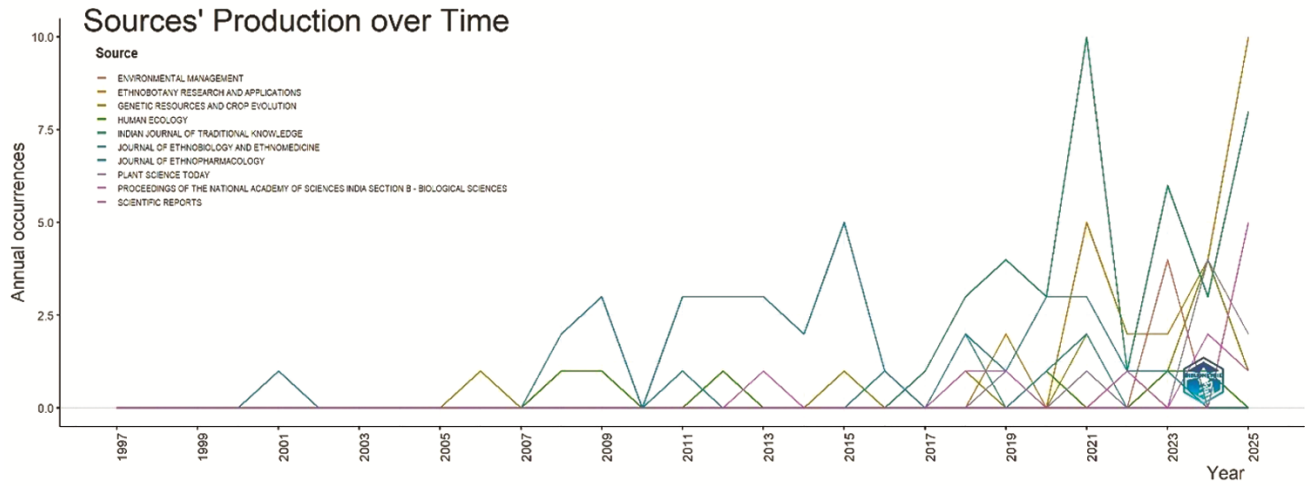



Fig. 5 — Top ten sources' production over time

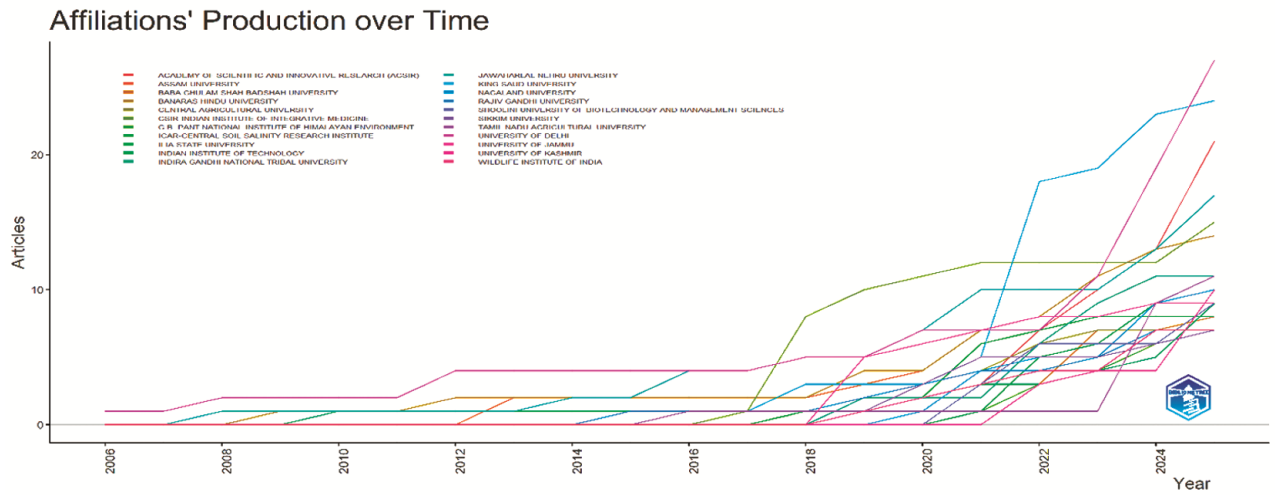



Fig. 6 — Top 22 affiliations' production over time

publications. CSIR–Indian Institute of Integrative Medicine added 15 funded sponsored studies, indicating a specialized research link with traditional knowledge. Involvement of authors from Tamil Nadu Agricultural University, Shoolini University of Biotechnology and Management Sciences, ICAR-Central Soil Salinity Research Institute, Wildlife Institute of India, and Central Agricultural University indicates a significant contribution in connecting specialized knowledge and traditional knowledge in funding sponsored studies. The participation of regional and tribal-focused institutions, particularly from the Himalayan and northeastern regions like Assam University, Nagaland University, the University of Kashmir, the University of Jammu, Rajiv Gandhi University, Sikkim University, and the G.B. Pant National Institute of Himalayan Environment, highlights the geographical and cultural relevance of indigenous knowledge research. Similarly, involvement of scientific and specialized institutions like ACSIR and the Indian Institute of Technology reflects the growing interdisciplinary orientation of the field. In recent years, foreign institutions have also been highly contributing to the domain.

#### Institutional collaboration network

Bibliometric mapping of institutional collaboration networks provides a structural lens through which the sociology of scientific knowledge production can be examined. Collaboration analysis moves beyond counting individual outputs to reveal how research communities are organized, which institutions serve as brokers or bridges, and where disciplinary or geographic communities cluster. Figure 7 shows the social structure of the institutional collaboration network for sponsored indigenous knowledge research. In the institutional collaboration network, there are seven clusters with different levels of centrality, connectivity, and influence. The studies' knowledge is connected through several interconnected institutions rather than a single lead collaboration network.

Institutional collaboration network data (Supplementary Appendix S4) is also used for further analysis. Betweenness is an indicator used to know the ability to act as a bridge; closeness value is useful to know how efficiently an institution can reach others in the network, and PageRank is the indicator of the overall influence of an institution. Cluster 1 (red-colored network) is composed of Indian universities. The University of Delhi has a high PageRank (0.045) and substantial betweenness (110.477), while Banaras Hindu University records even higher betweenness (130.443). This suggests that these institutions occupy important bridging positions and connect different parts of the collaboration network. JNU also shows considerable network importance, although its betweenness (47.703) is lower than that of DU and BHU. In cluster 2 (blue-colored network), King Saud University also has the highest PageRank in the entire network (0.058), indicating considerable overall network influence. The cluster also represents an important internationally connected collaboration pathway. Cluster 3 (green-colored network) presents a strong

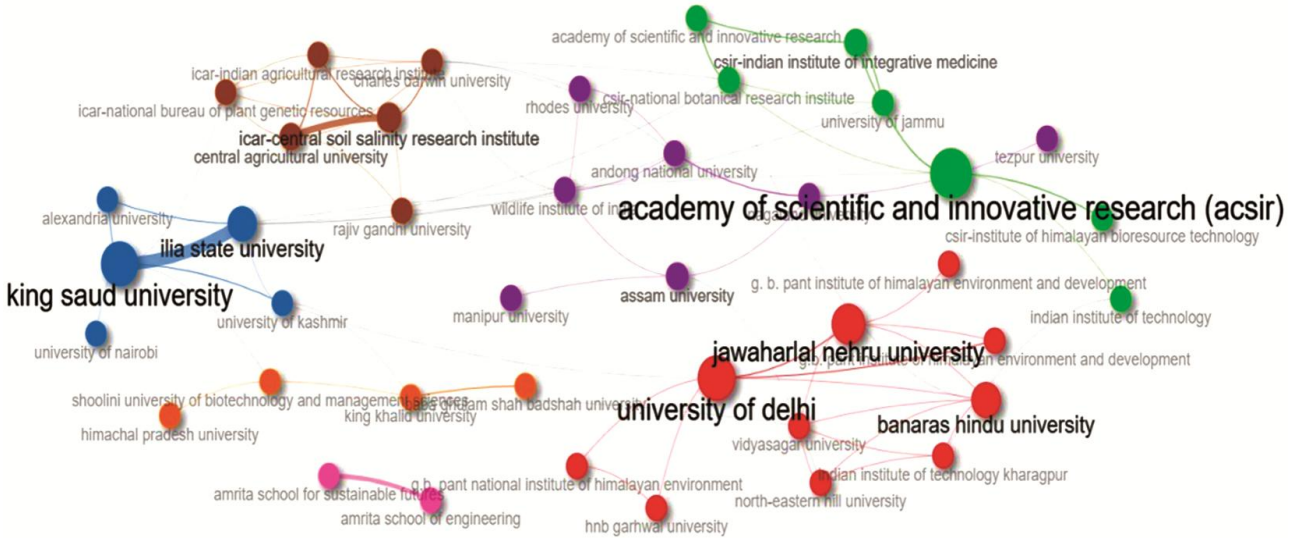



Fig. 7 — Institutional collaboration network

indication of scientific and research institutions. CSIR-National Botanical Research Institute is particularly important, with the highest betweenness in the complete network (158.168) and a closeness score of 0.011. ACSIR also has considerable betweenness (72.203) and PageRank (0.038). This indicates that scientific research institutions play an important bridging role between university-based research and specialized botanical, biomedical, and Himalayan research. In cluster 4 (violet-colored network), the presence of several northeastern Indian universities suggests a strong regional component. The Wildlife Institute of India has substantial betweenness (93.240), while Assam University records 84.297. Andong National University also shows relatively high betweenness (47.586), suggesting an international connection within this regional cluster. In cluster 5 (orange-colored cluster), King Khalid University has the highest betweenness. The cluster is connected with the Himalayan region institution, the University of Kashmir, and also connected internationally. In cluster 6 (brown-colored cluster), Charles Darwin University is the most structurally prominent institution and provides an international bridge. The presence of ICAR institutions indicates a strong agricultural and plant-resource research orientation. Cluster 7 (pink-colored cluster) contains two institutions only, which are closely related with limited bridging influence within the collaboration network.

The University of Delhi is the highest-producing institution (Supplementary Appendix S3), but King Saud University (non-primary authors' affiliation) has the highest PageRank, while CSIR-NBRI has the highest betweenness. Similarly, Ilia State University has relatively modest production but exceptionally high betweenness (157.135). This means that some institutions contribute not simply through the number of publications but through their strategic position in connecting otherwise separated research groups.

## Conclusion

The study shows a significant change in academic research and thematic development of indigenous knowledge. Various institutions and researchers have contributed to the field of indigenous knowledge. The study shows how indigenous knowledge research is institutionalized in India, while simultaneously branching into global sustainability and conservation debates. Traditional knowledge has evolved from a predominantly geographically embedded and medicinally oriented research theme into a multidimensional framework linking health, biodiversity, livelihoods, conservation, and contemporary sustainability challenges. Indigenous technical knowledge and climate change adaptation created strategic development for interdisciplinary research. Research themes have moved from ethnomedicinal and botanical documentation to applied and interdisciplinary concerns in the fields of conservation, climate change, ethnopharmacology, biodiversity conservation, and sustainable development of indigenous knowledge systems. The dynamic nature of indigenous knowledge is significant to the global environment and socio-political challenges. Niche and emerging themes reflecting potential for future exploration in the field of machine learning and NF-KB. Conceptual change over time should not be understood as one theme causing another to emerge. Various developed and influential research directions within the conceptual structure are noticed in the thematic map. In the case of affiliated institutions, publication productivity and collaboration network importance are not necessarily the same.Future research on theoretical engagement and cross-sectoral application of indigenous knowledge can benefit academic, cultural, and environmental issues.

## Suggestions

Scientific models, critical assessments, and policymaking in sustainable agriculture, climate resilience, and biodiversity governance should incorporate ecological and traditional knowledge. Researchers should combine Indigenous knowledge with scientific knowledge and environmental policy to adapt to climate change, machine learning, and sustainable development. The knowledge system must be digitally preserved and AI-validated.

## Supplementary Data

Supplementary data associated with this article is available in the electronic form at https://nopr.niscpr.res.in/jinfo/ijtk/IJTK_25(10)(2026)1031-1042_SupplData.pdf

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## Author Contributions

AKB – Conceptualization; Data Collection; Formal Analysis; Writing - original draft; Writing - review and editing; Finalization of manuscript. SS – Conceptualization, Manuscript revision; Finalization of manuscript; Supervision.

## Conflict of Interest

The authors declare no conflict of interest.

## Use of Artificial Intelligence (AI)

During the preparation of this manuscript, Quillbot was used solely to improve grammar, spelling, and readability.

## Data Availability

The supporting data are provided in the appendices.

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