Geographical Indication and Rural Sustainable Development: A Bibliometric Analysis

Sanjay Singh[1] [2] and Dr Nisha Bharti[3]

Abstract

Geographical Indications (GI's) mean a particular product belonging to a specific Geographical Environment, having a specific traditional knowledge which separates it from similar looking products. Certification is beneficial to both the producer as it can ensure him a premium price and the consumer as it generates the willingness to pay higher on quality assurance.GI also facilitates rural sustainable development as its uniqueness generates conservation of the resources in the concerned community. Bibliometric analysis is the scientific analysis of all the academic work done pertaining to a certain topic under study. It streamlines all the work done in a specific field and is also helpful in highlighting the areas where to focus for research. The main objective of this paper is to study the trend of development of the topic through the analysis of the entire academic work done.

Data for the period from 2001 to 2021 was collected from web of science database and analyzed by using R package and VOS viewer software. Overall, 194 research papers were shortlisted.

GI certification prevents commercial fraud, it ensures Bio-diversity conservation. Academic contribution has been maximum in the year 2019. Most relevant sources were sustainability, British food journal. Among the most relevant keywords, frequency of words like Geographical Indications, quality, terroir, food, governance, certification, etc were on the higher side. Europe and USA dominate in certifications and contributions to GI Tagging followed by some developing countries like India, Mexico, Brazil.

This study holds great relevance to people from all dimensions of life. There is a need to increase research in this area. The study will suggest several new dimensions to research which will be very much beneficial for the academicians, policy makers and particularly the rural community.

***JEL classification**:* O34, Q01, Q56, Q57.

Keywords: Geographical Indications, Bibliometric analysis, Premium price, Rural sustainable development.

[1] PhD Scholar at Symbiosis International Deemed University Pune.
[2] Assistant Professor in National Defence Academy Khadakwasla, Pune.
[3] Assistant Professor at Symbiosis Institute of International Business, Symbiosis International (Deemed University), Pune.

1. INTRODUCTION:

There are 34 (Thirty-Four) classes of GI products listed amongst the 34 (Thirty-Four) 29 to 32 is meant for foodstuffs and 33-34 for beverages. Geographical Indications (GI's) mean a particular product belonging to a specific Geographical Environment, which has specific qualities pertaining to that particular environment that distinguish it from the similar existing products found elsewhere (Tapkir 2020). A GI tag is a sign used on products that have a specific geographical origin and possess origin-based qualities and reputation in the region (Sharma 2019). The people living in the secluded forests, have their entire dependence on the available forest products which includes both the timber and non-timber products. The non-timber products form a significant supply chain for rural livelihood, which clearly indicates the intense dependence of the local rural population on the surroundings. This enables the locals to adopt various traditional measures to safeguard their environment along with maintaining the sustenance of the non-timber products (Sharma and Bharti 2018). The environmental degradation on account of overexploitation of a natural resource and ignoring the local participation thereby instigating the unrest, to check all this the locals were given equal share in the profit with the introduction of access sharing benefit (ASB), prior informed consent (PIC) which led to the development with local participation and conforming to the objectives of convention on Biological Diversity (CBD) like conservation of bio-diversity, sustainable use of indigenous biological resources (IBR) (Amusan 2017). The GI has been introduced in order to fulfill various interests which can be grouped as under:

The economic implications- mostly concerned with earnings, market policy. There are two parts in this on one hand is the producer and on the other the consumer. For the producer it is the premium price which counts a lot and contributes towards his earnings while for the consumer it is the information about the uniqueness of the product provided which instigates the willingness to pay a premium price. Branding, trust, marketing strategy etc overall have their impact in achieving the objectives and affecting the economic status.

The Social and Cultural Implications- the social and cultural changes as a result of ensured income. Preserving the local Traditional Knowledge. The use of traditional techniques from the ancient cultures like the vicus and the tallan, by the people of chulucanas in peru to develop the unique chulucanas pottery (WIPO 2017).

The Environmental implications- progress in profit making and the impacts on the biodiversity and environmental pollution of the territory in focus. Like the Coorg Coffee versus Coorg Oranges (Garcia et al 2007). GI's can enhance biodiversity, in order to achieve this one should not only be confined to the biological characteristics but also should be well aware of the local knowledge and the practices involved (Berard and Marchenay 2006).

Development is not possible without the exploitation of resources. The resources are also of different types exhaustible and non-exhaustible. The resources are under a tremendous amount of pressure due to the greed of exploitation, this has led to the attention of the entire world to think in different terms in order to conserve the environment and keep it liveable. As a result, in 1983 Brundtland commission was instituted in order to look for the alternatives to preserve the human environment the depleting natural resources and the deterioration of social and economic development. It tabled it's report in the year 1987. It was from this report the word **Sustainable Development** was taken. Sustainable development means to continue with the development process keeping in mind the sustainability and development of the future generations to come, they also have the equal right like us on everything that is present on the Earth. Therefore, it becomes our responsibility to preserve the resources for the generations to come. Social, economic and Environment factors form the three pillars of Sustainable development. Geographic Indications and sustainable development go hand in hand. In fact, the GI has been introduced to expedite social-cultural and economic development but not at the cost of environmental degradation.

2. REVIEW OF LITERATURE:

The term Bibliometrics was first used in the Journal of Documentation in the year 1969 (Broadus 1987). Bibliometric analysis deals with all the work done in the academia world on the related topic under study. It shows the gaps in the world of research, it apprises a scholar regarding the developments which have occurred and guides an individual to choose the undeveloped or underdeveloped area for his research (Oliveira et al 2019).

The concept of Geographical Indications (GIs) was conceived centuries ago, in a world where different peoples have found the need to tie certain products to certain places, so they could label their reputational quality, traditions and know-how (Medeiros et al., 2016). The term Geographical Indication, was coined in the Uruguay Round, a multilateral trade negotiation called Trade related Aspects of Intellectual Rights (TRIPS 1994), which had 123 participating countries, and lasted for 07 years (1986-1993). Article 22 Section 3 of TRIPS states "indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin." (WTO, 2020, p. 328). The three important aspects of the GI certification, protected designation of origin (PDO), protected geographical indication (PGI) and traditional speciality guaranteed (TSG) have a legal binding with them. The three in combination or individually benefit the community and saves them from commercial fraud by checking duplicity from cheap looking similar products (Dias and Mendes 2017).

GI's have economic aspect attached to them. They can be understood as strategies that help goods to establish their uniqueness and acceptance in terms of quality and hence invite a higher price with increase in sales (Pellin and Vieira 2015, Cerdan et al 2010). They have a value added to them and are a main source of livelihood of the locals therefore their conservation along with the conservation of environment becomes very important (Laybbert et al 2002). The intensity of demand and the high persisting price leads to enhanced exploitation which further leads to environmental degradation, the local players get replaced by outsiders which gets the traditional knowledge compromised (Bowen and Zapata, 2009). Sustainable development and the socio-economic reliability amongst the local users can only be possible with the sustainability in use of the particular resource (Sharma and Bharti 2020).). GI's enable a premium price for origin-based products which leads to an equal distribution of value amongst the local producers and communities (Zografos 2008), the certification helps in disseminating the correct information on quality and traceability to consumers which indirectly helps in retaining the local population in the rural areas and preserve traditions (Lamarque & Lambin 2015 and Tregear et al 1998). The clarity in terms of PDO, PGI and Traditional Knowledge for collective objectives and consensus among all involved can ensure the development of GI as a tool for Sustainable development and Biodiversity management (Bienabe, 2009; Bowmen and Zapata, 2009; Emperaire et al, 2012).

The information that GI's add value to the unique products impacts development in all the three aspects economically, socio- culturally and environmentally. Economically by expanding the market threshold to National and International markets. Socially and culturally by penetrating to the backward region and uplifting it. Finally, environmentally by preserving the biodiversity along with the genetic resources (Artencio et.al.,2019; Garcia et.al.,2019; Brasil,2014).

Table 1. The authors mentioned in the gist are the pioneers in the field.

Summary of the scientific review of literature:

Title	Author	Year	Research Focus
Toward A Definition of Bibliometrics.	Broadus, R.N.	1987	Developing the concept of Bibliometrics. Focussing on whether Zipf's law of word occurrence be considered as a part of sub-discipline studies.
The Bibliometric Analysis of Scholarly Production: How deep is the impact?	Ellegaard, O. and Wallin, J.A.	2015	What is bibliometric Analysis and its impact based on the topic under study.
Implications of geographical indications: a comprehensive review of papers listed in CAPES' journal databse.	Medeiros, M.de.L. Passador, C.L. Passador, J.L.	2016	How the GI protection can be utilised for Rural Sustainable Development by creating livelihood, jobs, protecting the interests of producers and consumers and last but not the least protecting the culture.
Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG): A Bibliometric Analysis.	Dias, C. and Mendes, L.	2017	The difference and importance of PDO, PGI and TSG in GI protection. How the community can be benefitted with a protection combination of all the three or individually. How the certification can prevent commercial fraud.
Bibliometric Analysis on Protection of Geographical Indications	Dias, C.T. Silva, W.de. V. R. da. Russo, S.L	2018	Protection difference in terms of GI in EU and USA. Contribution of GI products in Rural development.
The Connections between Ecological Values and Organic Food: Bibliometric Analysis and Systematic Review at the Start of 21st Century.	Sanchez, V-M.M. and Flores, A-M.P.	2021	Stressing upon ecological and logical values that influence the consumption of organic food for having a healthy lifestyle, the development of Postmaterialist values and environmentalism.

2.1 Methodological Background:

Bibliometric analysis is good to study the scientific impact, influence, relationship of published academic work on a certain topic (Raan 2003). As the literature present is large and therefore it is very difficult to manage such a large data manually. Hence, Bibliometrics tool is considered a very good tool to manage such a large existing data scientifically (Aria et al 2017).

In Bibliometric studies two aspects exist i) Performance Analysis which is concerned with describing of the current topic under study in terms of annual scientific production, most relevant sources, most relevant authors, most cited publications, the keywords etc. it helps us to understand the development which has taken place at the university/institution level, country level and the overall impact of such academic activities. ii) The scientific Mapping is concerned with the structural and dynamic aspects of the research. It is more related with the collaboration aspects between countries, between authors etc and the development of various themes over a period of time. It is through scientific mapping that the work done on various themes gets highlighted and one gets a clear idea about the study area to be chosen.

3. METHODOLOGY

3.1. Data Collection

Data from 2001 to 2021 was collected through Web of Science. For collection of data first of all the main keyword Geographical Indication was typed then in the subfields the keywords Sustainable development and impact on environment were added. The title and the abstract preferably in English language were the main inclusion criteria and the papers of pure sciences, the three keywords only appearing as words in different paragraphs formed the exclusion criteria. And so, on the basis of this criteria One Hundred and Ninety-Four (194) articles were shortlisted for analysis.

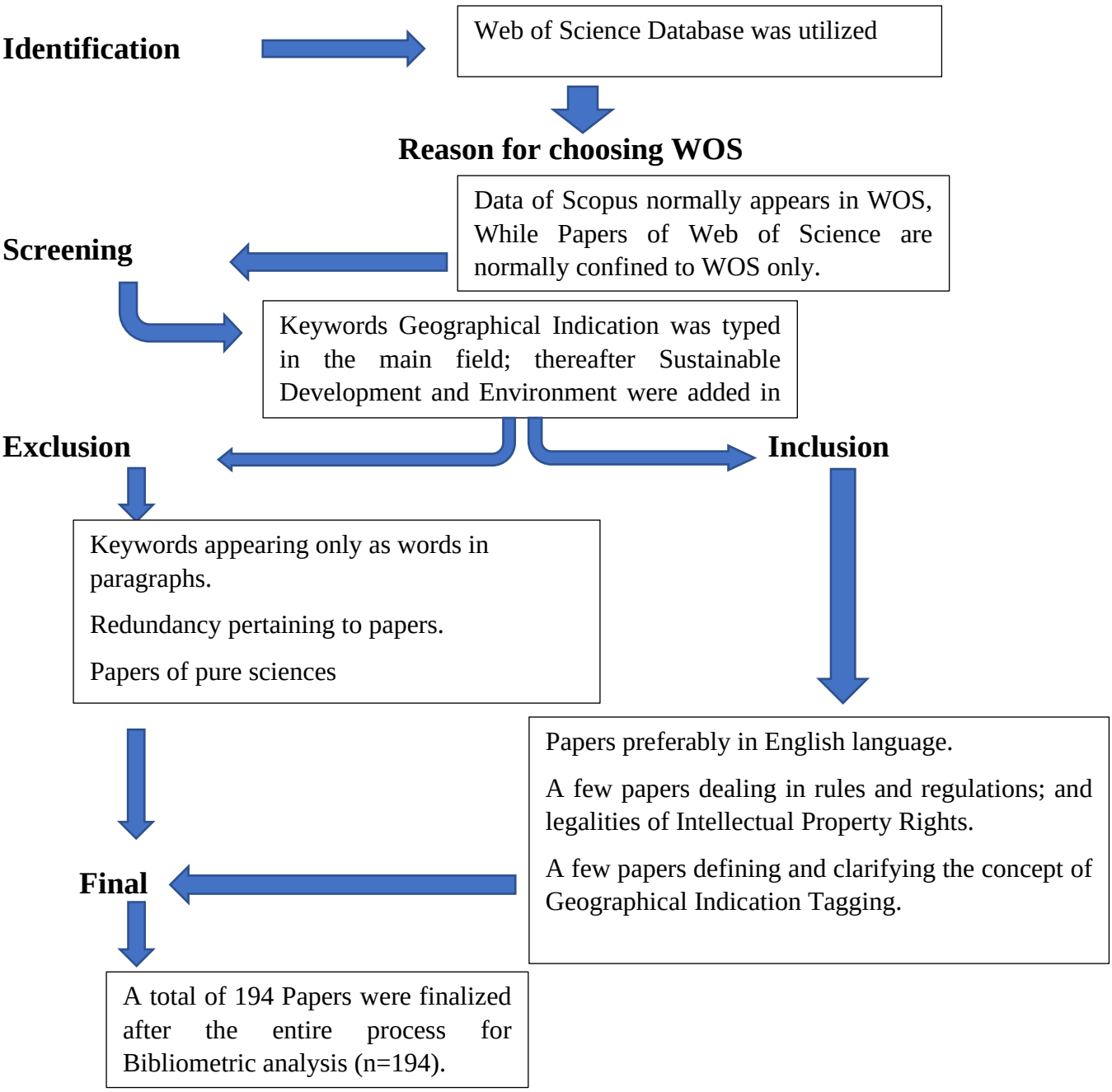

Figure:1 Flow Chart

Source: Prepared by the authors.

3.2. Bibliometric Analysis Procedure:

As two types of analysis were involved in the study i.e., performance analysis and scientific mapping. The R package with "Biblioshiny" was utilised to process the data and extract out the information pertaining to performance analysis and thematic evolution of scientific mapping whereas in order to analyse collaboration network the VOS viewer software was utilised.

4. ANALYSIS AND DISCUSSION OF RESULTS:

4.1. Performance Analysis:

Time span from 2001-2021 was selected for the review with the topic Geographical Indication and Sustainable Development, furthermore the impact on Environment was also considered. A total of 194 documents were collected from 126 sources (journals, books etc) having 489 authors. Average citation per document was 10.89, average citation per year per document was 1.12 with average years from publication at 6.28. Regarding Authors contribution, out of the 489 Authors 45 documents are single authored and 444 are multi authored documents. Hence documents per Author were 0.397, Authors per document were 2.52 and Co-authors per document were 2.87 with the collaboration index at 2.98. A total of 621 authors keywords (DE) (originally put forward by the Authors) and 390 Keyword plus (extracted from the Title and Abstracts) were collected.

The performance analysis depends upon the following parameters namely: i) The Annual Scientific Production; which means the amount of the work done on the concerned topic through the time frame selected. ii) Most Relevant Sources; they are the published journals/ documents which publish the articles or research papers on the work done, each document/journal has its own weightage in the academic world, which further decides the relevance of the work done on the topic and its acceptability. iii) Authors Performance and Most Cited Publications; it states the amount of the research work done by an individual and the number of citations which the author gets denotes the quality parameter of his work done. More the citations highly qualitative and useful is the work done. iv) Most Relevant Keywords; they are the words which are frequently used and they denote the area /field of the work done, they are either the authors keywords or the keyword plus and are helpful in the development of thematic mapping, which further is helpful in choosing the future area of work.

4.1.1. *Annual Scientific Production:*

In general, the academic research in the field of Geographical Indication and its impact on sustainable development has been fluctuative in nature. Although the growth rate has been 11.57% but still many fluctuations are noted.

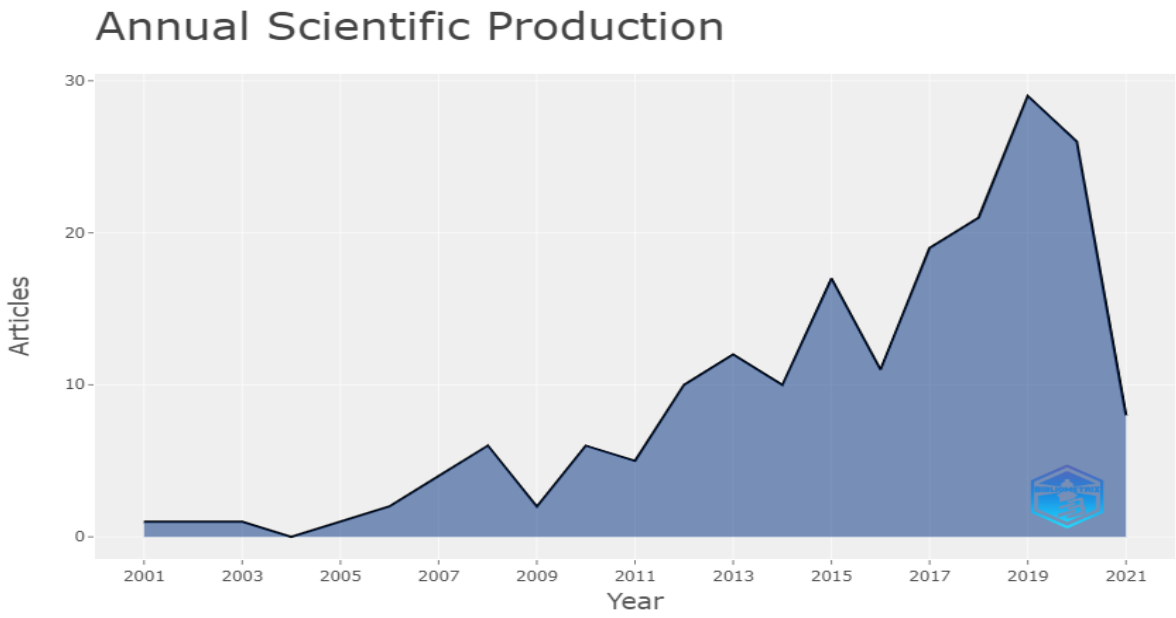

Figure 2. Annual Scientific Production

Source: Data imported and Bibliometric Analysis through Biblioshiny from R Package.

By going through the graph plot, it can be concluded that maximum work in the field of GI and sustainable development has been done in the year 2019 when twenty-nine (29) articles got published. The Articles are in the lines of the Sustainable Development Goals 2015 as declared by the United Nations. In terms of Climate change, Poverty and Biodiversity conservation. How sustainability will be achieved in all the three aspects with the changing times.

4.1.2. *Most Relevant Sources:*

The most relevant sources indicate the literary contribution by authors through different journals. These are the journals publishing the scholarly articles related to the topic.

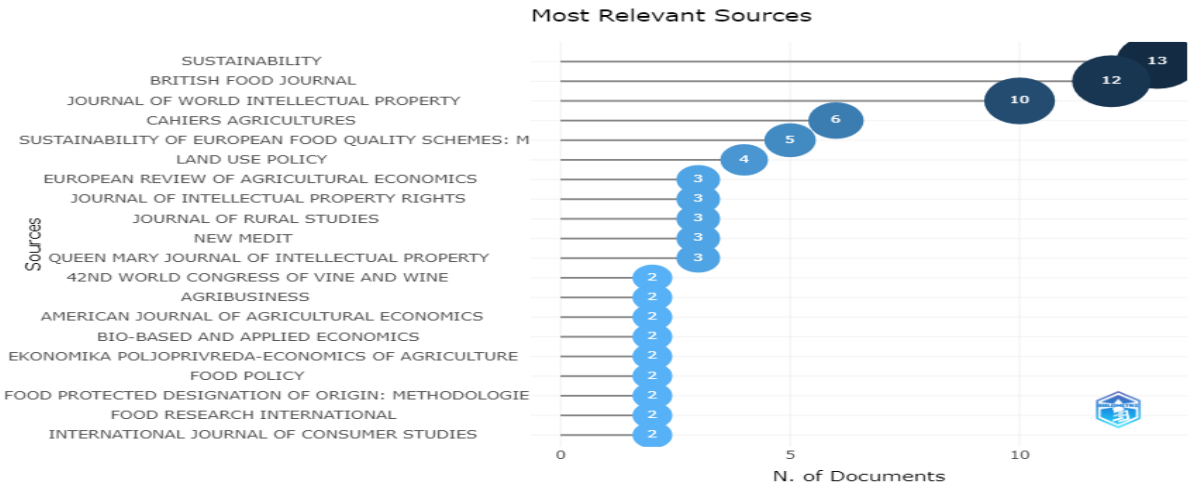

Figure 3. Most Relevant Sources

Source: Prepared by the authors using Biblioshiny from R Package

Sustainability journal is the most popular journal publishing scholarly articles on GI and sustainable development. Thirteen articles in all have been published in the journal. Sustainability journal is a cross disciplinary journal covering various disciplines related to environment, economics, social

and cultural aspects. Besides sustainability journal there are other nineteen journals which have published two or more than two documents, (British food journal, journal of world intellectual property, cahiers agricultures, land use policy, journal of intellectual property rights, journal of rural studies, new medit, Sustainability of European food quality schemes etc.). The source is as per the papers selected from the web of science. By undergoing the most relevant sources it can be concluded that the main focus of study is protection, quality with value added and rural sustainable development.

4.1.3. *Authors Performance and Most Cited Publications:*

Contribution and performance by different authors in the field along with the co-authors. The performance is indicated with the number of citations received.

Table 2. Authors performance and most cited publications

Rank	Most relevant Authors				Most cited publications		
	Name	**No of Articles**	**year**	**Co-Author**	**journal**	**Citations**	**Citation/yr.**
1	Bowen S	1	2009	Zapata Av	Journal Of Rural Studies	127	9.769
2	Bowen S	1	2010		Rural Sociology	95	7.917
3	Belletti G	1	2017	Marescotti A	World Development	55	11.000
4	Belletti G	1	2015	Marescotti A	Land Use Policy	41	5.857
5	Bowen S	1	2008	Zapata Av	Cahiers Agricultures	4	0.286
6	Adinolfi F	1	2020	Anh Nh	Sustainability	4	2.000
7	Aguilarcriado	1	2019		Sustainability	3	1.000
8	Amusan L	1	2017		African Journal Of Traditional Complementary And Alternative Medicines	2	0.400
9	Casabianca F	1	2020	Millet M	Sustainability	1	0.500
10	Casabianca F	1	2019	Millet M	Sustainability	1	0.333
11	Millet M	1	2019		British Food Journal	1	0.333
12	Casabianca F	1	2021		Sustainability	1	0
13	Berard L	1	2006		International Social Science Journal	65	4.063
14	Biasi R	1	2015		Biodiversity And Conservation	28	4.000
15	Bhat Pi	1	2009		Journal Of Intellectual Property Rights	2	0.154

Source: Prepared by the Authors

The table 2. above shows the most productive authors and the most cited journals. By studying the table, it can be concluded that there exists a difference between total citations and citations per year which has an impact on the rankings of the journals. This shows the multidisciplinary/interdisciplinary impact of the topic. The topic is not confined to a particular field/ area but has a multifaceted impact. Hence is spread across various fields and subfields.

4.1.4. *Most Relevant Keywords:*

The keywords are algorithm based; if authors keywords are selected then WOS (Web of Sciences) automatically selects the keyword plus words. These keyword plus may not appear that frequently in the actual papers like the authors keywords.

Table 3. Most Relevant Keywords both The Authors Keywords and Keywords Plus

Sr No	Authors Keywords	Frequency	Sr No	Keywords plus	Frequency
1	Geographical Indication	48	1	Quality	22
2	Geographical Indications	36	2	Terroir	18
3	Certification	10	3	Origin	17
4	European Union	9	4	Protection	16
5	Terroir	8	5	Food	11
6	Protected Geographical Indication	7	6	Geographical Indications	11
7	Olive Oil	6	7	Products	11
8	Quality	6	8	Governance	9
9	Collective Action	5	9	Systems	9
10	Competitiveness	5	10	Information	8

Source: Prepared by the Authors

Both the keywords selected (**Table 3**) are relevant and very much similar to each other. Both the keyword fields are focusing on the topic Geographical Indication (GI) and rural sustainable development. Slight differences do occur in the two fields; Authors keywords focus more on uniqueness, protection, European contribution etc but all together move towards rural development where as the keyword plus are more balanced, focusing on governance, information, terroir, quality, food etc. to achieve rural sustainable development. In a way both the keyword fields are equally comprehensive in nature and completely fulfill the purpose of research.

4.2. Scientific Mapping:

Scientific Mapping covers thematic development and citation network of the selected countries. For Thematic development the biblioshiny tool of the R package has been utilized whereas for the Citation network for countries VOS viewer has been utilized.

Thematic mapping and Thematic evolution system were first propounded by Callon, Courtial and Laville (Callon et al 1991). It is a four-quadrant system with centrality on X axis and Impact on Y axis. Quadrant 1 is of the Motor Themes meaning central and developed, Quadrant 2 is of the Basic Theme central and underdeveloped (upcoming), Quadrant 3 is of the Mische Theme Peripheral (isolated) and developed and Quadrant 4 is of emerging or declining Theme.

4.2.1. *Thematic Evolution with Keywords Plus Labels:*

What has been the trend of thematic evolution? Which were the popular themes, isolated themes, emerging themes and the declining ones? To fulfill this purpose the data is divided into three slices i) slice from 2001 to 2015 ii) slice from 2016 to 2018 and finally iii) slice of 2019 -21.

The two slices taken divide the study themes into three phases. First phase (2001-2015) is termed as the initial development phase, second phase (2016-2018) is termed as the intermediate or the maturing phase and finally the Third phase (2019-2021) is termed as the fully matured or the phase of advanced development. The authors keywords were selected with a minimum of five clusters and three labels per cluster was taken in order to avoid overcrowding amongst closely spaced different clusters. Along with the thematic slice map, bibliometrix data per slice covering the authors keywords along with the cluster has also been taken.

Table 4. Associated Words and Clusters

Occurrences	Words	Cluster	Cluster_Label
3	european union	1	european union
2	gravity model	1	european union
2	protected designation of origin	1	european union
2	protected geographical indication	1	european union
19	geographical indication	2	geographical indication
4	trips	2	geographical indication
3	india	2	geographical indication
2	basmati rice	2	geographical indication
2	ipr	2	geographical indication
2	rural development	3	rural development
4	olive oil	4	olive oil
2	willingness to pay	4	olive oil
2	coffee	5	coffee
2	pgi	6	pgi
2	designation of origin	7	designation of origin
14	geographical indications	8	geographical indications
4	certification	8	geographical indications
4	quality	8	geographical indications
3	labeling	8	geographical indications
3	trademarks	8	geographical indications
2	competitive industry	8	geographical indications
2	competitiveness	8	geographical indications
2	l15	8	geographical indications
2	product differentiation	9	product differentiation
3	traditional knowledge	10	traditional knowledge
2	basmati	11	basmati

The table of different theme words and the total emerging clusters (2001-15)

(i) Slice 1 (2001-2015)

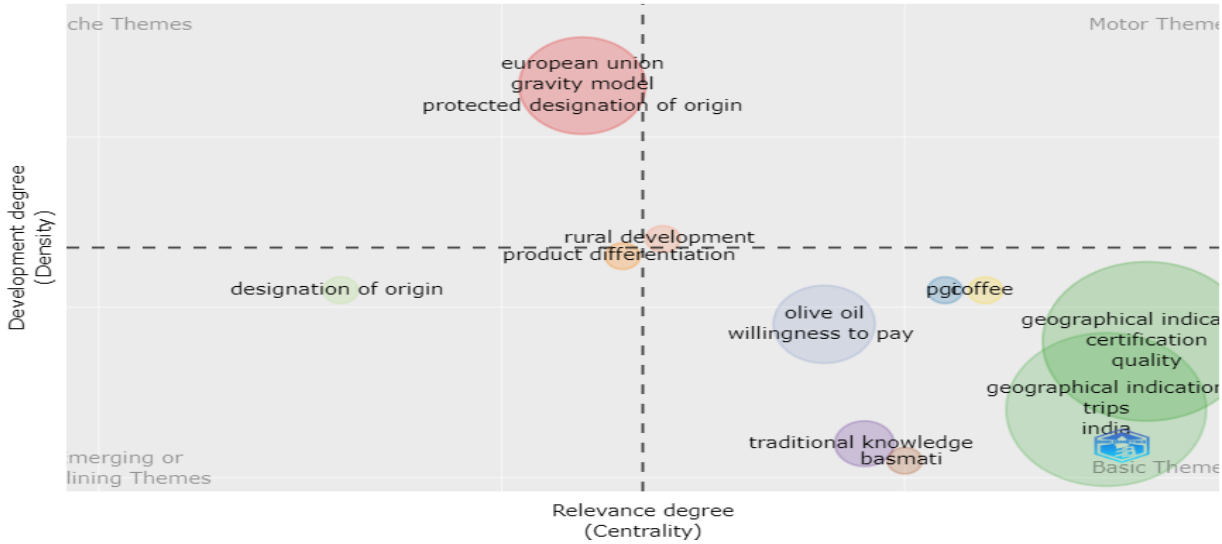

Figure 4. Thematic Evolution

Source: Prepared by the Authors using Biblioshiny from R package

In the first slice (**Figure 4;Table 4**) there are eleven clusters with single lable namely European Union, Geographical Indication, Rural Development, Olive Oil, Coffee, Protected Geographical Indication (pgi), Protected Designation of Origin (PDO), Geographical Indications, Product

Differentiation, Traditional Knowledge, Basmati. In cluster one of european union there are four more keywords existing in form of european union, gravity model, PDO and PGI. This cluster clearly indicates the dominance of the european union in terms of GI's, it was from here that certification of products and their differentiation first started. As a result the theme has resulted in getting developed as an isolated theme where more and more sub themes have been introduced to realise the premium price and ensure product supremacy. The movement is towards the mische quadrant. Rural development has already moved towards the mortar theme indicating the impact of GI in rural areas. Product differentiation and PDO show the fast emerging themes, which indicate the interest being shown by the different countries to establish the uniqueness of the GI product. Rest remaining themes fall in the underdeveloped quadrant where a lots of potential lies, this quadrant clearly indicates the work being undertaken at a majorn scale in the countries outside the EU and USA, especially India which has initiated the pace of product differentiation and registration, mostly emphasising the Basmati case. This quadrant 2 has clearly indicated the need for the work to be done in terms of certification, product differentiation on the basis of traditional knowledge, PDO and PGI, which will realise premium price and willingness to pay, it will further instigate optimum use of resources affecting the environment and catering for rural sustainable development.

Table 5. Associated Words and Clusters

Occurrences	Words	Cluster	Cluster_Label
2	supply chain	1	supply chain
12	geographical indications	2	geographical indications
4	european union	2	geographical indications
2	food	2	geographical indications
2	governance	2	geographical indications
2	protected geographical indications	3	protected geographical indications
3	certification	4	certification
2	competitiveness	4	certification
15	geographical indication	5	geographical indication
3	collective action	5	geographical indication
3	intellectual property	5	geographical indication
2	protected geographical indication	5	geographical indication
3	pdo	6	pdo
3	pgi	6	pdo
2	conjoint analysis	6	pdo
2	agriculture	7	agriculture
2	olive oil	7	agriculture
2	organic farming	7	agriculture
2	terroir	7	agriculture

The table of different theme words and the total emerging clusters (2016-18).

(ii) Slice 2 (2016-2018)

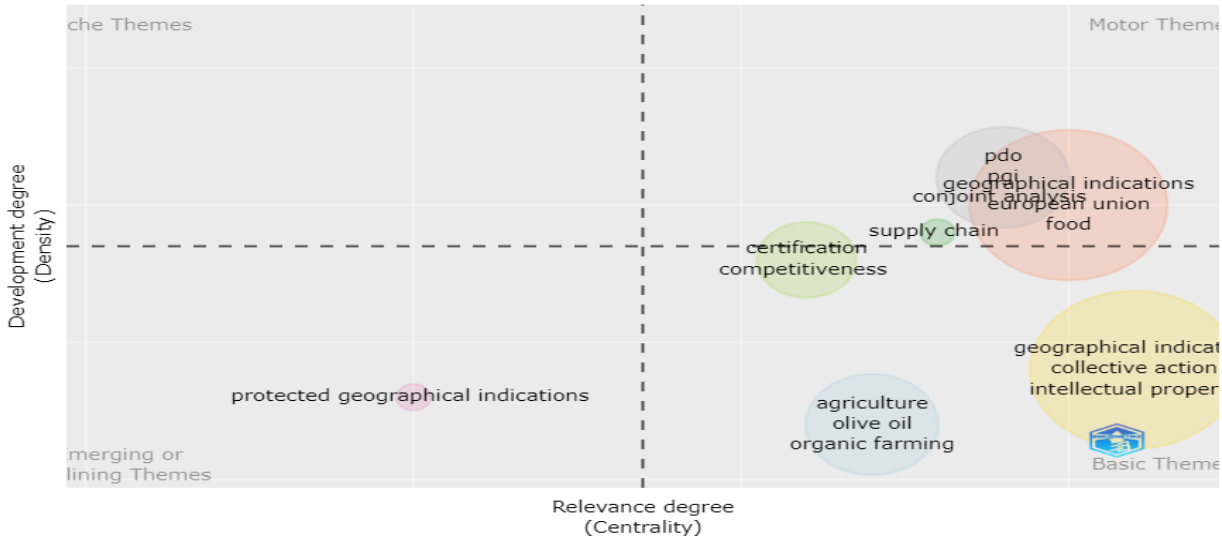

Figure 5. Thematic Evolution

Source: Prepared by the Authors using Biblioshiny from R package

The second slice (**Figure 5; Table 5**) has seven clusters with two geographical indications and geographical indication, one on agriculture and one on PDO being the dominant ones, having more frequency of different words. They indicate the importance and the amount of work being done in the respective field with an aim to benefit both the consumers and producers. In the mortor theme European union has paved the way for others to follow. More stress has been on the PDO, PGI, conjoint analysis for product performance, stress has been laid on the registration of maximum food products and ensuring the supply chain. Maximum stress has been on the certification in order to prevent duplicity and get the maximum out of a particular product. Basic theme or the developing quadrant indicates the importance of rural development with more of the work being done in the field of agriculture ensuring more of the protection in the developing world. The importance of terroir is also stressed upon. Competitiveness and the development of the intellectual rights also offers a good scope to be worked upon and good amount of work is being done in this field as well. Protected Designation of Origin (PDO) also shows signs of an emerging theme especially indicating a lot of potential in the developing world. It offers a good scope for researchers in this part of the world to research and save the people and the resources from getting exploited especially from the people of developed world. NO theme has become isolated as the Mische quadrant is empty, it clearly indicates the impact of geographical indication and rural sustainable development being felt worldwide. This has led to the local participation, respecting traditional knowledge and bio-diversity conservation.

Table 6. Associated Words and Clusters

Occurrences	Words	Cluster	Cluster_Label
2	climate change	1	climate change
2	wine	1	climate change
3	protected geographical indication	2	protected geographical indication
2	beer	2	protected geographical indication
14	geographical indication	3	geographical indication
2	rural development	3	geographical indication
10	geographical indications	4	geographical indications
5	terroir	4	geographical indications
3	food quality	4	geographical indications
2	corsica	4	geographical indications
3	certification	5	certification
2	africa	5	certification
2	honey	5	certification
2	dairy products	6	dairy products
2	geographical indication (gi)	7	geographical indication (gi)
2	european union	8	european union
2	food labelling	8	european union
2	food quality schemes	8	european union
2	slovenia	8	european union

The table of different theme words and the total emerging clusters (2019-21).

(iii) Slice 3 (2019-21)

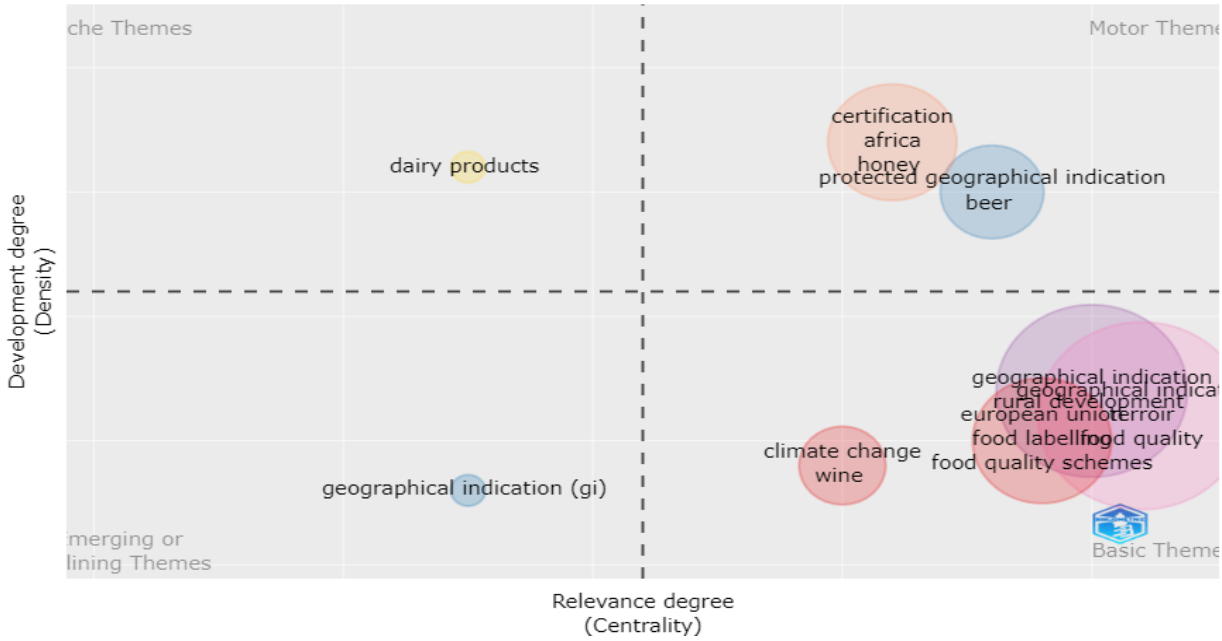

Figure 6. Thematic Evolution

Source: Prepared by the Authors using Biblioshiny from R package

The third slice (**Figure 6; Table 6**) shows eight clusters in which the protected geographical indication and certification have become fully developed and highly impactful in the mortar theme. Africa has shown promising results with a lot of work in the field of geographical indication and related certifications coming up from this part of the world. This has increased the flow of research

work being undertaken in the direction of rural sustenance and bio-diversity conservation. Geographical indication in the emerging quadrant shows healthy signs of the research done and the amount which can be done can yield progressive results. Dairy sector has attained the isolation theme by making in the Mische quadrant, but still indicates the work which can be done by the whole world for the progress and prosperity of this dairy sector. Cluster of European union is in the lead, although a lot has been done here but still European union offers a good scope because it is the European union where certification matters a lot. It is the product registered with the European union ensures good returns and is the valued commodity with the consumers. Related to it are the different aspects of certifications, themes of climate change, rural development, terroir, food quality, beverages etc which offer a great potential of work to be done and appear as the developing themes.

4.2.2. *Citation—Countries Network:*

The data pertaining to citation-countries and the stated network is algorithm based and is generated through VOS viewer.

Table 7. Countries & Citation Network **(**Selected countries with the maximum link strength.)

Sr No	Countries	Documents	Citations	Total link strength
1	Italy	32	461	139
2	USA	20	813	124
3	France	27	192	79
4	Germany	7	50	53
5	Austria	5	59	44
6	Spain	18	154	42
7	Japan	8	29	28
8	Belgium	6	26	27
9	Netherlands	4	56	27
10	England	7	70	24
11	South Korea	5	28	19
12	India	15	110	17
13	Australia	6	61	13
14	Turkey	7	12	13
15	Portugal	4	66	11
16	Denmark	5	10	8
17	Brazil	9	33	5
18	Peoples R China	6	27	5
19	Serbia	4	4	0

Source: Prepared by the Authors (Data generated through Vos Viewer)

Maximum number of countries per document= 25.
Minimum document from a country= 4.
Out of 49 countries 19 countries meet the threshold. And out of 19 countries 18 countries are properly connected.
Total items= 18, Total links= 87, Total link strength= 339.
Total number of Clusters= 4
Cluster 1= Australia, Austria, England, Germany, India, Japan.
Cluster 2= Denmark, Netherlands, Peoples R China, South Korea, Turkey, USA.
Cluster 3= Belgium, Brazil, France.
Cluster 4= Italy, Portugal, Spain.

VOS Viewer: Citation Network

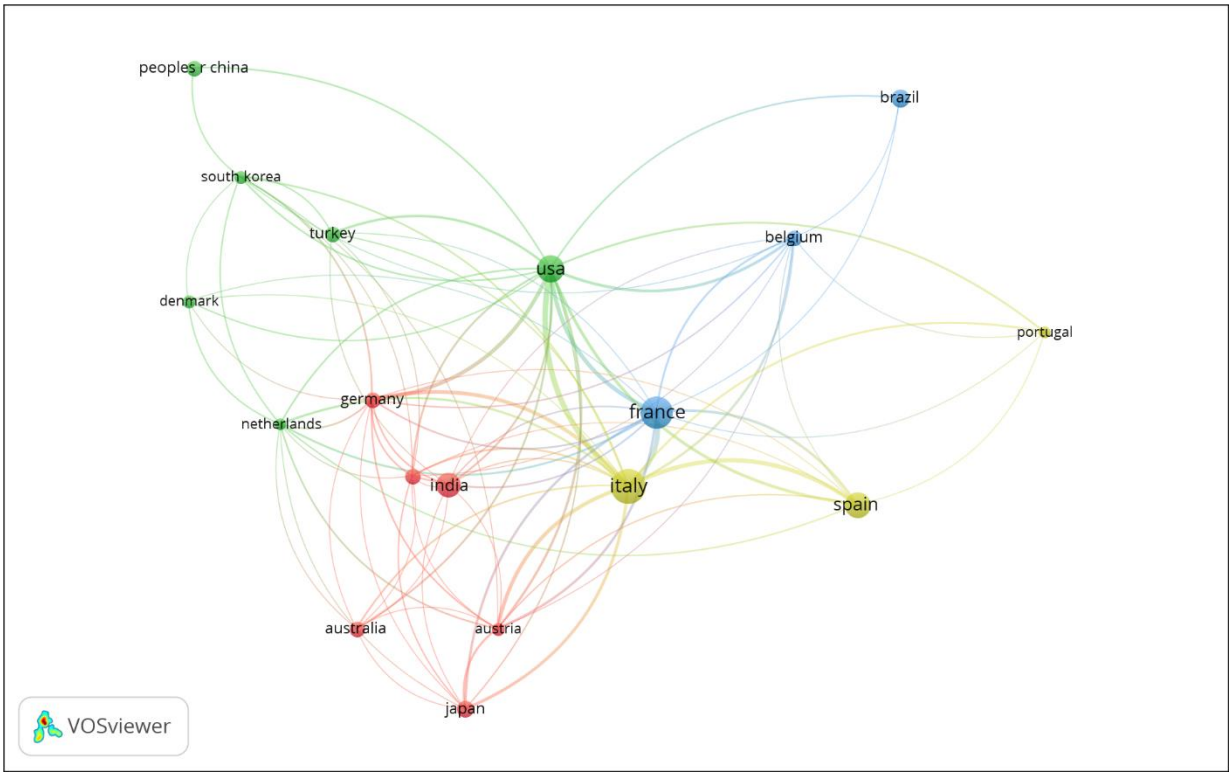

Figure 7. Citation Network of Different Countries

Source: Prepared by the Authors using the Vos Viewer

The citation network pattern (**Figure 7**) shows four groups/clusters. It indicates the significance of the work being done on Geographical Indication and Rural Sustainable Development. Europe is by far leading when it comes to certification and rural development followed by USA, Asia is also a good contributor with some amount of the work being done in Australia and Brazil. France commands, when it comes to providing protection to the various products and rural sustainable development. The concept of certification was first started in France itself (Lindquist 1999). USA has a good link strength and more citations than the other countries, it is having links with all the 17 countries. These eighteen countries have contributed a lot and significant work being done in the field of geographical indications and impact on sustainable development.

5. CONCLUSION:

Certification establishes the uniqueness of the product which needs to be recognized by the consumers (Dias et al 2018), the willingness to pay and getting a premium price are due to value added to the product which force for its conservation further affecting the concerned environment, it also gets preserved (Lybbert et al 2002).

The paper highlights the importance of the topic which is not confined to a single field but is interdisciplinary/multidisciplinary in nature. Bibliometric analysis indicates the amount of work done which is present in the form of literature and also decides upon the future directions of the research to be carried out. The performance analysis clearly indicates that it was in the year 2019 that maximum work was done on the GI's and rural sustainable development while multidisciplinary journals appeared as most relevant sources, showing the popularity across various disciplines. The science mapping shows that the main contributors being Europe and USA with Asia and Southern Hemispheric countries also making significant amount of contribution. The thematic mapping is an indicative of the prevalent trends. By dividing the evolution of themes in

two three slices more clarity appears. By undergoing all the three slices of thematic evolution from 2001 to 2021 it can be concluded that a lot has been done on the themes of impact of Geographical Indications, San people and patents, Sustainable development where the theme geographical indications occupying three different quadrants in the pre maturing, maturing and the matured stage. The themes like sustainability pertaining to the conservation of the natural resource and the local people leading to landscape management, geographical indication along with certification offer a wide range of scope of work like development, conservation in relation to GI and its environmental implications, governance in terms of performance in the market as a parameter of Rural livelihood ,community development, food networks and gastronomic tourism and knowledge are the areas where a lot needs to be researched by all the disciplines. India is new to this theme of research and lots of potential lies in the field of GI and Rural sustainable development in the country. Main is the dissemination of the knowledge to the masses and certification of maximum products within the country as well as outside the country internationally.

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