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COFFEE PLANTATION RESEARCH IN INDIA : A SCIENTOMETRIC STUDY

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Introduction

Publication is an indicator of the scientific activity in every subject field or of a community of scholars or of a county. Research and Development is vital to the healthy growth of science and scientific disciplines. Evaluation of the research output by an individual, or a group of scientists, a nation or a group of nations is imminent for identifying scientific priorities and corresponding policy decisions/modifications for the development of Science Technology and Agriculture. A number of evaluating studies are being generated since a few decades serving as guidelines in the process of measurement of scientific growth. The present aimed at bridging the gap by bringing out evaluation study on research out put of coffee and coffee plantation.

Motivating Factors

A pre-study overall review of literature on the Indian research performance revealed results both in favor of growth and decline after the 1990s. Literature has more evidences regarding the decline in research publications output of Indian science as reported in studies by Arunachalam (Declining Trend in Indian S&T literature, 1998; Is science in India on the decline?, 2002). The first of the needs for such a study intended to subject Coffee Plant research to a scientometric analysis for Indian research performance.

Absence of studies measuring Indian Coffee Plant research output, particularly those based on data for longer periods give rise to a need to conduct a study based on one of the most comprehensive databases available with global coverage. The present study attempts to undertake a scientometric analysis of the Indian contributions to Coffee Plant research and its relative position world wide based on its performance during a period of 13 years spanning from 2000 to 2012.

Choice of the Topic

The availability of immense, accurate and up-to-date economic and technical information on the basis of periodical evaluation has been recognised by many nations and corporations for picturising the dimensions of performance through scientometric approach. 'Scientometrics' as a subject of study and its application, when compared with many other subject fields, is of recent origin under the umbrel region 'Library and Information Science.' It has been attracting scholars to work on its various aspects, as evaluation of generated information, plays a vital role in policy making and economic planning.

Scientometric tools are used to measure and compare the scientific activities at various levels of aggregation including institutions, sectors, provinces and countries. Many scholarly, research publications have been brought out analyzing/evaluating the research performance of individual scientists as discussed in the papers of Hirsch Muddiman; Sangam,et al.; scientific institutions as in that of Vinkler;

Mapping of research on specific areas at national level as in the paper of Arunachalam and Gunasekaran; disciplines and subject fields as in the paper by Kademani et al., In this context the present research problem aimed at measuring and ordering the research on coffee plant and the problem entitled as "Mapping of Plantation Research in India with Special Reference to Coffee Plant Research: A Scientometric Study",

Objectives of the Study

In this study the investigator presents the Scientometric analysis of the Coffee Plant research literature (2000 – 2012) from India in a global context. Hence, the study aims to collect the global output data in Coffee Plant in order to fix up the relative position of India while fulfilling the major objective of identifying the dimension of literature output in Coffee Plant research from India. The main objectives of the present study are as follows:

1) To find out the quantitative and qualitative aspects of the world literature output in Coffee Plant research has found recorded in Web of Science between 2000 and 2012;
2) To find out the growth rate of Coffee Plant research literature output during the years covered under the present study;
3) To identify the country-wise distribution of global Coffee Plant literature output;
4) To map the authorship pattern in the Coffee Plant research literature output and the strength and weakness of authorship clusters;
5) To identify the core journals with a higher productivity in Coffee Plant and their performance during the years under study;
6) To apply the Price's Fundamental Law of Science and his 80x20 rule to find out whether the results attest to the laws;
7) To identify the quantum of contributions by participating nations in the Coffee Plant research and the relative position of India among them;

The Present Study is undertaken aiming at the Scientometric analysis of Coffee Plant research literature output from India facilitating a global outlook.

Scope of the Study

The study aims to map the structure of Coffee Plant research literature output at the national level from India in the context of global performance – in order to get a comparative picture of Indian research performance and thus to know where India stands among the various countries of the world. Based on the analysis, the study aims to arrive at future course of projections in authorship pattern, language and country of publications. In addition, the study proposes to apply the empirical laws of Lotka; Bradford; Price; and Subramaniam.

The electronically organized and consolidated primary and secondary database of publications are immense, accurate and updated continuously. This well-articulated, documented record in standardized format facilitates Scientometric and Bibliometric analysis of research literature output.

Data Collection and Framework of Analysis

The data required for the investigation was downloaded from the Web of Science, published online by Thomson Reuters, (Institute for Scientific Information, Philadelphia), USA. Web of Science database was searched in April 2013 to obtain the universe of

research volume of data in the field of Coffee Plant from January 1, 2000 to December 31, 2012. Download was not restricted to the data of records pertained to India alone.

The prime key used for search and download was Coffee Plant besides the publication date. Subsequently relevant keywords were used for sorting the downloaded records. The data captured was subjected to data cleaning operation and deletion of duplicate records, thereby ensuring a perfect set of data required for the study.

The data thus obtained finally resulted in a total of 10553 records for all the 13 years under coverage. The total number of Coffee Plant research contributions over the period, under individual year labels, between 2000–2012 has been used as the index of total Coffee Plant research productivity.

The framework of analysis includes factors such as Year-wise Distribution and Growth rate, Authorship Pattern and its Trend obtained through Time Series Analysis, Collaborative Trend, Collaboration Coefficient, Per capita Authorship, Author Survival rate to find out continuants and terminators, Languages of Publications, Core list of Journals, Country of origin and Publishing destinations, Institutional affiliation of Indian authors, Indian State-wise share of the contributions, Growth trend of Indian Coffee Plant research besides the application of Bradford's Law, Lotka's Law, Subramaniam's formula, Price's 80 x 20 Rule, Price's Fundamental Law of Science, Research Output and Specialty Index.

Hypotheses

The researcher formulated the following set of hypotheses in order to fulfill the objectives of the study:

1. Collaborative research output in Coffee Plant is dominant over that of individual research.
2. Scientists mostly prefer to publish their contributions in journals published from developed countries.
3. The scientific productivity of Scientists in Coffee Plant is in conformity to the Lotka's inverse square law of scientific productivity.
4. The study conforms to Bradford's Law of scattering and Price's 80 x 20 rules.
5. There exists a strong positive correlation between the publication count and journals.
6. There exists a strong positive correlation between the publication count and authors.

Limitations of the Study

Records for this study have been drawn exclusively from Web of Science which follows its own standards for the inclusion or omission of items or periodicals in its coverage.

The contributions of authors with an address pertained to India or its component cities only have been counted into the study. Though Indian authors are there elsewhere outside the geographical boundaries of India and their contributions have not been included into the present study.

Gender related facets could not be included in this study as the Web of Sciences Database does not include such 'gender' information for the contributors. The records were downloaded using appropriate keywords ensuring the download of relevant required data/records output from the Web of Science. The generalizations are based exclusively on the records downloaded for the purpose of this study and publications falling outside the coverage of Web of Science are not covered in the present study.

Major Findings of the Study

A sum total of 10553 records spanning from 2000 to 2012 covering a period of thirteen calendar years were obtained from the Web of Science and, organized, sorted out by chosen specific fields in records and analyzed.

- The year-wise global distribution of research productivity in Coffee Plant for a period of 13 years from 2000 to 2012. The total publication count is found to be 10553 and the maximum output occurred in the year 2012 numbering 1231 and this formed 11.66 per cent of the total output. The least count of the total output was in the year 2000 with 4.45 per cent.
- The overall distribution pattern of citation in Research Literature in Coffee Plant during the period 2000-2012 is 10553 Articles with 137509 references. The year-wise distribution of citation during the study period. It is noted that citation referred in 2004 attains the first place with respect to overall citations, which has shared 13.17 percent, references cited in 2002 comes in the second place sharing 11.64percent with 16006 references and references cited in 2012 gets the last place sharing 1.05 percent. There is a sub total of 137509 references in the 10553 articles of Research Literature in Coffee Plan with 13.03 references per article.
- In an overall view the average annual growth rate of Coffee Plant research at the global level was found to be 0.08.
- The relative strength of authorship pattern. It is found that, multiple authors formed 48.00 per cent of the total research output, while double authorship formed 19.43 per cent. Single authorship had a score of 32.57 per cent which was smaller in number when compared to the other types. Further it is found that multiple author ship was dominant. The results regarding multiple authors prove the hypothesis positive.
- Degree of collaboration had an initial value of 0.63 per cent in the years 2005 and 2006 and this increased to 0.71 in the year 2012.
- The language of publications. The research literature output in Coffee Plant during the period of coverage was found to be in 23 languages among which English was predominant with 92.988 per cent. Non-English contributions belonging to other 22 languages shared 7.012 per cent of the total output forming a meager number. English proved to be the lingua franca to the scientific community engaged in Coffee Plant research across the world. Out of the 7.012 per cent of non-English literature, a majority was in European languages that included Portuguese, Spanish, German, French and Japanese. Italian and Chinese also figured in. There was a single article in Arabic Language while there was not even a single one in Hindi.
- Among the difference format of publications, Articles (82.40%) are well ahead of all other types of articles followed by Review (5.01%), Proceedings Paper (4.06%) and Meeting Abstract (3.67%). These categories constitute more than 82% of the articles.
- Bradford's formula is applied to the publication counts in Coffee Plants, sorting them out in a Journals based productivity zones. The total number of journals figured in the present study was 2957, which were ranked in a descending order of their publication counts (productivity). The top ranking publication count was by Journal of Agricultural and Food Chemistry United States with 34 papers forming 11.57 per cent.
- Here in the present study, out of the 2957 journals contributing a total of 10553 publications, 2415 journals (i.e. 34 per cent instead of Price's 20 per cent of the total journals) contributed 8165 publications accounting for nearly 80 per cent of the total

output. Hence it is observed that the present study does not confine with that of the price 80-20 rule.

- It is found that the results of research in Coffee Plant originated from 117 countries of which United States ranked first forming 18.89 per cent of the total publication count. Second in the ranked order was Brazil with 10.300 per cent and United Kingdom occupied the third rank with 5.33 per cent.

Indian Contributions

- Research productivity in Coffee Plant during the period from 2000 to 2012 by the Indian contributors. It is found that research output was found to be high in the year 2012 (13.82 percent) followed by 10.55 percent in the years 2009 and 2011. Further it is found that during the year 2000 there was less publication at all from India and from the year 2005 there was an increasing trend in research literature. It may be concluded that the growth of research literature output show a uniform growth during the study period.
- Number of items published in India has been the items; Articles (86.91 percent) are well ahead of all other types of articles followed by Review (9.45 percent), Proceedings Paper (1.82 percent) and Editorial Material (0.74 percent). These categories constitute more than 87 percent of the articles.
- The article written by Kashyap, D.R and etal., published in the Bioresource Technology in the year 2001 got received the higher citation of 199. While in the article written by Pandey, A in the Biochemical Engineering Journal in the year 2003 holds second position receiving 195 citations.
- Among the top 10 cited authors, Ramesh K. and Hendre, Prasad S, U. V. has got highest citation of each 61 with average citation per year 10.17. The second highest citation is cited by Singh, SP as 24 with average citation as 1.71 per year.

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