Mapping of Crop Science Research Output: A Scientometric Analysis

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Abstract

The study analyses the research output in Crop Science Research out during the period 1981-2010 and the analyses included year wise distribution research growth, relative growth rate, exponential growth, Asian Countries publications' share, citation impact, share of international collaborative papers and major collaborative partner countries patterns of research communication in most productive journals

Keywords

Crop Science Research Output; Scientometric Analysis; Year wise distribution
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INTRODUCTION

This study reveals the nature of research publications in the field of Crop Sciences. Bibliographic output reach activities in country wise through the study are estimated. Now a days, research depicts much interest in publishing the articles in the field of Crop Science. Crop Science is an multidisciplinary subject that employs and develops theories and methods of physical sciences for the investigation of biological systems. This study explains the both theoretical and empirical discussion relating to research publications in the field of Crop Science from the published reports. This analysis helps to identify the key issues affecting the research field. Scientometric techniques are employed to analyze the publications on Crop Science to identify the nature and the significance of publications.

OBJECTIVES

The objective of the study is to present status of Crop science research in India and China using different Scientometric parameters.

1. To examine the growth rate, doubling time and exponential growth rate of Crop Science research output at national and international levels.
2. To study the relative research effort in Crop science by the scientists.
3. To find out the impact made by the research in Crop science surrogate measures;
4. To study the pattern of citation of Crop Science Research.

METHODOLOGY

Data was collected from the Science Citation Index (SCI) Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (AHCI) which is available via the Web of Science (WoS). The WoS is a search platform provided by Thomson Reuters (the former Thomson Scientific emerged from the Institute for Scientific Information (ISI) in Philadelphia). SCI database is one of the very comprehensive databases covering all aspects of science. The study period (1981-2010) selected as the database is available in machine from 1981. The search string "Crop Science" in the "Basic search" field of SCI was used during 1981-2010 to download the records on the subjects of Crop Science. A total of 10795 records were downloaded and analyzed by using the Histcite software application as per the objectives of the study

RESULTS AND DISCUSSIONS

Table 1: Year Wise Distribution of Crop Science Research Productivity During 1981 to 2010

S.No	Year	Records	Percent	TLCS	TGCS
1	1981	42	0.4	93	271
2	1982	50	0.5	46	219
3	1983	93	0.9	34	707
4	1984	118	1.1	105	559
5	1985	167	1.5	82	437
6	1986	150	1.4	146	1261
7	1987	218	2	205	881
8	1988	187	1.7	160	656
9	1989	167	1.5	132	592
10	1990	216	2	154	721
11	1991	437	4	613	5573
12	1992	497	4.6	443	6215
13	1993	425	3.9	353	4408
14	1994	516	4.8	392	4937
15	1995	479	4.4	342	7727
16	1996	432	4	252	3924
17	1997	434	4	306	6612
18	1998	427	4	314	6402
19	1999	385	3.6	251	7114
20	2000	370	3.4	211	5195
21	2001	412	3.8	290	6480
22	2002	390	3.7	155	4198
23	2003	466	4.3	229	5591
24	2004	466	4.3	174	5421
25	2005	487	4.5	131	3727
26	2006	565	5.2	173	3664
27	2007	496	4.6	122	3547
28	2008	523	4.9	120	2382
29	2009	587	5.4	64	1696
30	2010	593	5.5	14	585
Total		**10795**	**100**	**6106**	**101702**

Observing by TLCS (Total Local Citation Scores) overall period 6106 citation scores measured. The year of 1991 with 613 (10.04 %) is having highest citation scores. Next to that the year of 1992 having 443 (7.26 %) local citation scores. The years of 1993, 1994, 1995, 1997 and 1998 are identified the citation scores were 306 to 392. The years of 1987, 1996, 1999, 2000, 2001 and 2003 are having local citation scores were 205 to 290. The years of 1984, 1986, 1988, 1989, 1990, 2002, 2004, 2005, 2006, 2007 and 2008 are having local citation scores 105 to 174. The years of 1981, 1982, 1983, 1985, 2009 and 2010 are having local citation scores were below 100 (starting from 14 to 93).

Examined by TGCS (Total Global Citation Scores) overall period thirty years 101,702 citation scores measured. The year of 1995 with 7727 (7.59 %) is having highest global citation scores. Next to that the year of 1999 having 7144 (7.02 %) global citation scores. The years of 1992, 1998, 1997 and 2001 are identified the global citation scores were 6215 to 6480. The years of 1991, 2000, 2003 and 2004 are having global citation scores were 5195 to 5591. The years of 1993, 1994 and 2002 are having global citation scores 4198 to 4937. The years of 1996, 2005, 2006 and 2007 are having global citation scores were 3547 to 3924. Year of 2008 has 2382 global citation score. The years of 1986 and 2009 having the global citation scores 1261 to 1696. The remaining years of 1981, 1982, 1983, 1984, 1985, 1987,1988, 1989, 1990 and 2010 are having global citation scores were below thousand (219 to 881). There are variations in the number of publications of articles during this period taken for study. The accumulated percentage level indicates that the growth trend is gradually increased by recent years.

Table 2: Relative Growth Rate of the Research Output of Crop Science

Year	R. o/p	Cum. o/p	$log_e 1^p$	$log_e 2^p$	Rt(P)	Dt(P)
1981	42	42	-	3.74	-	-
1982	50	92	3.74	3.91	0.17	4.08
1983	93	185	3.91	4.53	0.62	1.12
1984	118	303	4.53	4.77	0.24	2.89
1985	167	470	4.77	5.12	0.35	1.98
1986	150	620	5.12	5.01	0.11	6.30
1987	218	838	5.01	5.38	0.37	1.87
1988	187	1025	5.38	5.23	0.15	4.62
1989	167	1192	5.23	5.12	0.11	6.30
1990	216	1408	5.12	5.38	0.26	2.67
1991	437	1845	5.38	6.08	0.7	0.99
1992	497	2342	6.08	6.21	0.13	5.33
1993	425	2767	6.21	6.05	0.16	4.33
1994	516	3283	6.05	6.25	0.20	3.47
1995	479	3762	6.25	6.17	0.08	8.66
1996	432	4194	6.17	6.07	0.10	6.93

1997	434	4628	6.07	6.07	0.0	0
1998	427	5055	6.07	6.06	0.01	69.30
1999	385	5440	6.06	5.95	0.11	6.30
2000	370	5810	5.95	5.91	0.04	17.33
2001	412	6222	5.91	6.02	0.11	6.30
2002	390	6612	6.02	5.97	0.05	13.86
2003	466	7078	5.97	6.14	0.17	4.08
2004	466	7544	6.14	6.14	0.0	0
2005	487	8031	6.14	6.19	0.05	13.86
2006	565	8596	6.19	6.34	0.15	4.62
2007	496	9092	6.34	6.21	0.13	5.33
2008	523	9615	6.21	6.26	0.05	13.86
2009	587	10202	6.26	6.38	0.12	5.78
2010	593	10795	6.38	6.39	0.01	69.30
Total	**10795**		**164.66**	**171.05**	**4.75 (0.16)**	**291.44 (9.71)**

Contrary to this, the Doubling Time for publication of all sources of Crop Science research output has decreased from 4.08 in 1981 to 69.3 in 2010. The doubling time for publications at the aggregate level has been computed as 9.71 years.

It is this carried that there is a general progressive increase in the number of publications of research output on Crop Science . However, its relative growth rate has shown a declining trend, which means the rate of increase is low in terms of proportion, and this has been highlighted by doubling time for publications, which is more than the relative growth rate. Hence the second hypothesis (The relative growth rate of total scientific publications shows a declining trend and the doubling time for publications reflects an increasing trend) and third hypothesis (There is extensive level of increase in the growth of Crop Science research output, indicating the progressive performance of research in the field) noted in chapter 3 has been substantiated.

Table 3: Exponential Growth Rate in Number of Publication was observed during 1981 to 2010

years	Number of publication	Growth rate
1981	42	-
1982	50	1.19
1983	93	1.86
1984	118	1.27
1985	167	1.42
1986	150	0.90
1987	218	1.45
1988	187	0.86
1989	167	0.89
1990	216	1.29
1991	437	**2.02**
1992	497	1.14
1993	425	0.86
1994	516	1.21
1995	479	0.93
1996	432	0.90
1997	434	1.00
1998	427	0.98
1999	385	0.90
2000	370	0.96
2001	412	1.11
2002	390	0.95
2003	466	1.19
2004	466	1.0
2005	487	1.05
2006	565	1.16
2007	496	0.88
2008	523	1.05
2009	587	1.12
2010	593	1.01
Total	**10795**	**32.55 (1.09)**

The above Table 4.7 reveals the Exponential Growth rate of over all publications on Crop Science during thirty years. An exponential growth rate in number of publication was observed during 1981 to 2010. The highest growth rate (2.02 %) was found during 1991 with 437 publications followed by (1.86 %) with 93 publications during 1983, during 1987 (1.45 %) with 218 publications, at 1985 (1.42 %) with 167 publications, 1.29 percents during 1990, 1.27 percents at 1984, 1.21 percents at 1994, 1.19 percents at 1982 and 2003, 1.16 percents at 2006, 1.14

percents at 1992, 1.12 percents at 2009, 1.11 percents at 2001, 1.05 percents at 2005 and 2008. 1.01 percents at 2010, only one percents at 1997 and 2004. 0.98 percents at 1998, 0.96 percents at 2000, 0.95 percents at 2002, 0.93 percents at 1995, 0.9 percents at 1986, 1996 and 1999. 0.89 percents at 1989, 0.88 percents at 2007 and 0.86 percents at 1988 and 1993. The average exponential growth rate is 1.09 during the sample periods.

CONCLUSION

In this study, the literature on Crop Science, a promising new material, has been analyzed by scientometric methods. The time evolution of the overall number of Publications reveals that the impact increase of the Crop Science research papers is possibly going to outrun the impact increase of the related research fields on Sago. The average number of publications produced per year was 21.76%. The highest number of publications produced in 2010 was 593. It can be clearly visualized from the table that the growth of the literature was very low during 1981 and 1982 and it peaked during 2006, 2009 and 2010.

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