COVERAGE OF SCIENCE ISSUES IN PRINT MEDIA A STUDY OF DOWN TO EARTH AND SCIENCE REPORTER MAGAZINES

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ABSTRACT

Like the other fields of journalism Science Journalism has also been increasingly improving to suit the demands of periled occupation that, perversely, is needed now more than ever. In a world where both citizens and organization both science and media have been paying increased attention over all these decades. Compared to newspapers magazines especially science magazines have been way ahead in setting the agenda for the development of nations by dealing with issues, challenges and problems of nations with regard to development especially Science and Technology. In this context the researcher tried to study the coverage of news and stories covered by reputed science magazines Down to Earth and Science Reporter on their cover page. It has been observed that the coverage of Down to Earth, a magazines being published by Centre for Science and Environment has been found to be dealing with a host of issues that have wide public interest and connected to the well being of the people. Science Reporter, a Government of India publication seems to delineate from the harsh reality of poverty, corruption and impending dangers to the people's lives. It seems to touch upon the issues that are mostly routine and limited to news.

Key words: *Agenda, Public Appeal, Citizens, Public Interest*

INTRODUCTION

At a time when the entire world is being driven by science and its applications it is also its duty find solutions to the problems faced y the people all over and face the challenges posed y them. In this context science journalism is increasingly becoming much sought after, and is needed now more than ever. In a world where potential impact of GM crops; the progress space; continuous development of revolution of medical treatment like cloning, stem cells techniques, genomics; climate changes etc. mass media play an important role as most people depend on mediated channels for the ubiquitous packages of information. Their chance encounter with science information while reading or watching

news in TV would almost be minimal. In the era of news media websites, portals, blogs would readily help in promoting awareness about application aspects of science.

A BRIEF HISTORY

Science coverage is traced right from the beginning of mass media and is closely linked with the culture as it reflected on the people's perception of science information. In a number of countries scholars have tracked the evolution of *popular science* in their respective cultures (Bauer and Bucchi 2007; Broks 2006; Burnham 1987; Golinski 1992). Earlier scientists themselves used to share knowledge as widely as possible, but they moved away from direct contact. In Britain, scientists in the late eighteenth century sought to diffuse scientific understanding throughout the culture, but by nineteenth century, the advance of specialised knowledge began to create a chasm between scientists and society. Broks describes this as evolution from 'the Enlightenment ideal of "experience"' to 'the early nineteenth-century construction of "expertise"' with scientists morphing even further by the end of the nineteenth century into an even less accessible category of beings called the 'professional expert' (Broks 2006: 28). Later the job of informing has shifted to scientists to journalists who became part of the exercise of popularisation, of the science. .

The same trend has started in late nineteenth century in United States and according to Burnham (1987) several popular science magazines such as *Scientific American* and *Popular Science Monthly* were started and newspaper editors were happy to reprint texts of science lectures and to publish scientists' reflections on natural phenomena such as meteor showers. The scientists themselves were equally willing to invest time and energy in public com-munication endeavours. Scientists in the latter part of the nineteenth century tended to view popularisation as part of their job.

Twentieth century, witnessed two contrasting sides of scientists who in early period focused on communicating the science in a more professional manner later left the job to journalists later due to continuous investments in the field of professionals like journalists have taken up the mantle. However, increasing specialization and professionalization pushed scientists to a side paving way for broadening of the scope of science. Since accommodating another journalist in the name of science is expensive the job was allocated to those who have potential and interest to deal with it ably. At that time, a common practice in American news media was to allot science beat to reporters to prevent the pitfalls of reporter/source intimacy.

In post World War II scenario governments in several countries increased investments in scientific research particularly in space, , environment which forced media organizations to find full-fledged science and environmental reporters to cover what loomed as some of the major stories of the century. Gregory and Miller (1998) characterise this post-war period as the time when science journalism became an organised, visible and increasingly powerful presence in journalism.

Before twentieth century science stories remained relatively minor components of media coverage. An analysis of science coverage by four Greek newspapers, for example, found that the proportion of the news hole given over to science ranged from 1.5 to 2.5 per cent (Dimopoulos and Koulaidis 2002); similar to what Pellechia (1997) found in the United States and to what Metcalfe and Gascoigne (1995) found in Australia In USA There has been a correspondingly large drop in dedicated science sections. In 1989, weekly science sections in US newspapers numbered 95; by early 2013, only 19 survived.

SCIENCE MAGAZINES IN INDIA

The existence of various Science magazines has also contributed to Science communication in India. Three magazines namely *VigyanPuri*, *Gram Shilp* and Junior Science Digest began publishing in 1981. Further two more magazines *Vigyan* and *Vithika* started in 1986. English Science magazines like *Science Reporter* (1964), *Down to Earth* (1992) and

the latest for kids, *Brainwave* (2010) also started to cater to scientific needs of masses. *VigyanPrasar*, a premium organization of Science communication in India, also publishes Science magazines for school children and neo-literates.

Current Science, published every fortnight by the Association, in collaboration with the Indian Academy of Sciences, is the leading interdisciplinary science journal from India. ***Science Reporter*** is a monthly popular science magazine that has been published in India since 1964 by the National Institute of Science Communication and Information Resources, a Government agency based in New Delhi. It is published in English and is read principally in India and neighboring countries.

Vigyan Prasar, an autonomous institution under Department of Science and Technology, Government of India started a monthly in 1998 y name **Dream 2047 in 1998.** ***Sandarbh*** is a bimonthly magazine on science and education in Hindi published since September, 1994 in Bhopal, India. *Down To Earth* is a product of our commitment to make changes in the way we manage our environment, protect health and secure livelihoods and economic security for all. We believe strongly that we can and must do things differently. Our arm is to bring you news, perspectives and knowledge to prepare you to change the world. We believe information is a powerful driver for the new tomorrow.

Down To Earth, the fortnightly was started by environmentalist Anil Agarwal who is committed to create awareness among the masses about science and its impending role in public. Make us aware of our challenges and believed that we could be the change in the world. It started in 1992 as a print magazine our first cover was ecological globalization in the inter-connected world. Since then we have come a long way (or not) as the world is more aware of the dangers of climate change and yet even less prepared to deal with challenges of local and global environment management.

Media help to frame social reality of Science and thus shaping public understanding about scientific issues. Research has shown (Public Attitudes to Science, 2008) that there is a consistent desire from the public to be informed of advances in Science at an early stage. Science reporting should enhance the public understanding of Science and the relevance of Science in routine life.

Science Journalism keeps people aware about the latest developments and advances in scientific world. Last two decades have witnessed a rapid growth of newer technologies in almost every field of Science be it in medical, space, environment, agriculture and the latest one in is information technology. The level of Science literacy and Science awareness need to be raised substantially, in order to harness the real fruits of scientific research.

The role of media becomes more responsible towards disseminating scientific issues in an interesting and innovative way, that everyone could understand the importance of Science. Covering Science stories is as important as covering other type of stories such as political, crime, entertainment and sports.

The advent of new technologies in print media made remarkable production of printed material. Consequently increased publication of newspapers, books, magazines and journals also included scientific literature. The National Institute of Science Communication (NISCOM), which previous was functioning as Publications and Information Directorate, began publishing of Hindi popular Science journal *Vigyan Pragati* in 1952. The *Science Reporter* and *Science Ki Duniya* followed soon after.

With an objective to take up large scale Science popularization activities, Department of Science of Technology set up 'VigyanPrasar' in 1989. Since then, it is continuing to develop, disseminate a variety of software on Science and Technology popularization in different languages which includes Audio, Video programmes as learning packages, books, magazines and journals. An online publication called ComCom is a monthly Science communication launched by VigyanPrasar, in order to keep abreast the audience about scientific developments. In

addition to this, explanations of the meaning of the most important scientific terms are also being published in the form of book archive namely "World of Science". VigyanPrasar also coordinating VIPNET since 1998, that group together over 2,000 clubs and association spread all over India, which are dedicated to the diffusion of Science.

All electronic media like Radio, television and now internet is presently contributing to progress in Science journalism in India. There is a substantial growth in various special programmes on Science, in electronic and digital forms. Science congress, scientific and industrial exhibitions, seminars, industrial and technological museums, public lectures, popular Science magazines, etc. were few among newer developments.

SCIENCE AND NEWSPAPERS

Mass media particularly newspapers started covering Science content during late 19thcentury **(Manoj Patairiya, 2007)**. There is a lot to do by press about some of the vulnerable areas of Science, which have direct impact on the society. Some newspapers have made consistent efforts over the years to bring Science issues to general public. *The 'Indian Express'* had started 'Science Express' '*The Times of India'* also publishes a page based on scientific issues. '*The Tribune'* is providing 'Health and Wellness' and 'Science and Technology' page on Thursday and Friday respectively. '*The Hindu'* is also publishing a full page on every Wednesday, dedicated to Science and Technology. Similarly Kolkata based '*The Telegraph*' has been bringing multi-coloured weekly Science supplement, 'Know How' since 1994. 'Deccan Herald' published from Bangalore has also been bringing out a regular Science and Technology supplement every week.

The primary sources of Science information for newspapers are research institutions and the scientists involved in various investigative activities. Research actions and their outcomes are the basis of all scientific information and scientists are the key actors, who need to communicate their actions to the society for its betterment. Most of the scientists publish their articles only in journals of their subjects concerned. There is a lack of proper communication of Science to common man due to scientists' way of explaining. In other words, scientists are not trained and skillful enough to be a good communicator too.

Press releases, conferences, Science journals and expert interviews are some of the potential sources of information for the journalists. Due to time constraints and target pressure, journalists often do not find time to verify the facts, to seek a deep insight in the Science issues to be covered. In this situation, it is by choice or sometimes compulsorily they are bound to rely on the pre-packaged information available to them conveniently. Besides that, reasons for Science and Technology issues to be covered in newspapers are largely influenced by level of understanding of the issue, time and space limitations, format requirements, editorial control, commercial pressures and relevance of the issues according to target readers.

REVIEW OF LITERATURE

Science journalism promotes public understanding of, and engagement with, science (Gregory & Miller, 1998). Science journalism may also help members of the public make rational choices on scientific issues that affect their daily lives. In addition to helping scientific researchers to obtain funding for more research or helping to shape personal choices on scientific or technological issues, science journalism may influence public policymaking on scientific issues (Nelkin, 1995).

Kalimuddin Sheikh Study on "*Scope of Digital Media in Diffusion to S &T Communication among Students*" revealed that Newspapers are still top most information source, as 45.5% students opted to choose newspapers as their source of information. An interesting fact was found that post graduate students read more S & T (31.77%) than national affairs (26.16%). Almost half of the respondents agreed that they read S & T as a means of knowledge enhancement and 41.34 percent for development of scientific temper. As many as

28.98% students had opted for traditional medium like newspapers/magazines, 22.90% visit website and 29.33% consult with subject experts in case of controversy/dispute within the subject.

TOPICS OF MEDIA COVERAGE OF SCIENCE

Regarding the top fields of science covered by the media, there are typical patterns which seem to be internationally consistent. Altogether, medicine/health and biology dominate science coverage worldwide (Bauer 2000; van Rooyen 2002; Bucchi and Mazzolini 2003). In a long-term study of the *New York Times*, health, medicine, and behavioural science are constant among the best-selling topics, with maximum values of some 58% (Clark and Illman 2006).

One of the few studies that compare the coverage of different scientific fields concludes that, so far, there is no convincing explanation for the different degrees of medialization (Schafer 2007). While Schafer focuses on differences between the epistemic cultures of the scientific fields themselves, 3 we argue that this perspective needs to be complemented by studying the journalistic perspective and the decision making processes of journalists: Are there certain factors especially dedicated to medical or biological issues which make them – on average – more attractive for journalists (and their readers) than other fields of science? Are some topics, regardless of their detailed content, less attractive because already their "price tag" causes negative associations (e.g., the "complicated" chemistry that everybody hated at school)? Are journalists on average more familiar with certain issues because of their educational background making these issues more attractive for them? Schafer (2007) puts the matter in a nutshell: "A reliable empirical reconstruction of the news factors in science coverage is still missing."

Another indicator for an overall conformity of these factors could be the observation that science journalism is becoming more and more science *journalism* (instead of *science* journalism), i.e., practitioners see themselves as science *journalists* rather than *science* journalists (see Rub-Mohl 1987). Especially in recent years, science journalism often has not been limited anymore to a kind of "nature protection area" (that is, for example, hidden in newspaper supplements) at the back end of the newspaper (see Elmer et al. 2008).

In another study, **Carine van Rooyen** (2007) found that the South African press published a small percentage of S&T articles. There was a lack of S&T news coverage. The local press was too dependent on foreign publications and news agencies in the provision of Science stories.

With an aim to explore the diverse aspects of the newspaper use, a study in Croatia, carried out by **MajaKrtalic and Damir Hasenay** on, "*Newspaper as a Source of Scientific Information in Social Sciences and Humanities: A Case Study of Faculty of Philosophy, University of Osijek, Croatia"*. Scientific production like books, scientific and professional papers of 138 researchers were analyzed in order to determine usage of newspapers as a source of scientific information. The study had shown that however only a small number of researchers used newspapers in their scientific research, those who did consider them crucial material for the quality of their research and once a habit of using newspapers was created, researchers tend to extensive use of newspaper collections and services of information institutions and further on pass that habit to other colleagues and students.

Top three daily English newspapers namely *Manila Bulletin*, *Philippine Daily Inquirer* and *Philippine Star*, were analysed by **Mariechel J. Navarro et. al,** in their study on, "*Print Media Reportage of Agricultural Biotechnology in the Philippines: A decade's (2000-2009) analysis of news coverage and framing*". The study revealed that in contrast to heavy representation of single sources in Science writing, the Philippine media strives for balance by citing multiple sources, wherein government accounted for 37%, civil society 22%,

international groups 16%, universities/R&D institutions 14% and private industry companies 11% share of citing source.

In their study on Science coverage on Brazilian television, **Marina Ramalho et.al,** revealed that medical Science and health were the main focused areas (44.1%), Earth Sciences covered 12.9%, Engineering and Technology issues were 11.7%, whereas Environmental Sciences were 10.4% of the total Science coverage. Brazilian TV had given preference to the scientific research done by their own country's scientists in comparison to the scientific reports of other countries, as 51.9% reports aired on TV were from various research institutions of Brazil.

In a study on, "*Science Journalism in Latin America: A case study of seven newspapers in the region*," **Luisa Massaraniet.al** revealed that the Science and Technology issues had a considerable presence in Latin American press, but there was high presence of foreign research in the newspapers under study. The study explained this on account of influence of services provided by international press agencies and also by scientific journals such as *Nature*, *Science* and *JAMA*, which distributes press releases to journalists worldwide.

Studies in India

A was study of **Vigyan Prasar** during November, December and January, 1999-2000 on Science coverage in media Hindi dailies had less Science items, only 2.5% than English which is 4.3%. Out of 52 newspapers selected for the study viz. 31 in English and 21 in Hindi, average 3.3% Science items were published Items related to health and medical were prominent (31.8%) amongst the other items Information technology (9.8%), Environment (8.1%), Space Science (6%), Agricultural Sciences (4.4%) and General Scientific Research (4.5%) were covered. Hindi newspapers had more (37.9%) coverage of healthcare than English newspapers (27.2%), whereas information technology found more coverage (11.3%) in English newspapers than in Hindi (7.8%). Science articles were published more on Sundays and Science news was prominent on other weekdays.

Meenu Srivastava, study of *regional* revealed that regional newspapers gave sufficient space to scientific and technological news and supportive reading material and suggested to set up separate science desks in newspaper houses. Apart from regular scientific inventions and researches lot of need gratification columns starting from weekend planning to summer wear, market analysis to tips on relationships have made a newspaper an "Information paper" (**ShikhaRai, P.K. Jena, 2010**).

The study by **Bharvi Dutt** and **K. C. Garg** Science and Technology coverage in Indian English-language dailies" has shown *The Times of India* has given maximum coverage to Science issues amongst the 37 English newspapers studied, but it has less coverage even when compared to sports news. English-language newspaper published in different parts of India during January to December 1996 were analyzed and the study revealed that *The Pioneer*, *The Hindu* and *The Times of India* were the newspapers that together devoted about 23 percent of the total space to items of Science and Technology. It concluded that Indian newspapers devoted far less than one percent of total printed space to articles and stories related to Science and Technology.

Bharvi Dutt and **K.C.Garg** again had undertaken the study on "*S&T coverage in English-language Indian dailies*", during April-September, 2008. According to the results, a total to 5385 items were published on different aspects of Science and Technology, in 37 newspapers published from different parts of India. This time, Health related items were also included in the study which covered almost half of items, and one third space of the total space devoted to Science items. The Times of India had given highest priority to Science coverage amongst all the newspapers, both in terms of quantum of items as well as space allocated for Science and Technology issues.

However, more emphasis is given to health and medical issues in the newspapers but a study by

Veena Algur, M.C. Yadavnnavar and **Vijaya Sorganvi** on "*Coverage of Health Issues in Newspapers: An Observational Study,*" revealed that 66 percent of the health news were related to Morbidity (Status of illness) and Mortality (Death) due to various illness. The content analysis of two national and two regional papers had concluded that only a small portion of news space was devoted to government health programmes, policies and preventive measures for communicable diseases. The study suggested that media has to be liaison between policy makers and public to formulate need based health policy.

Another study by **Meenu Kumar** on "*Comparison of Science Coverage in Hindi and English Newspaper of India: A Content Analysis Approach*" had concluded that, on an average, only 2.04 percent literature were published on Science and Technology issue and English newspaper were devoting more space to Science coverage as compared to Hindi Dailies. The study had also shown that health and medicine were the major issues of amongst all Science issues.

In an effort to analyze the amount of Science and Technology space in regional newspapers **Arulcelvan S.** conducted study on "*Science and Technology dissemination through Tamil newspapers*" taking four popular Tamil newspapers of year 2008, which revealed that only 3.5% of Science news were published and that too getting stories from news agencies. Newspapers did not have enough dedicated, trained Science reporters and writers. A similar study by **Arulchelvan S.** on*"Science and Technology content in Indian Newspapers: A critique*" in 2009 concluded that English dailies devoted 6.26% while 3.5% of vernacular (mainly Tamil newspaper) comprised of Science and Technology content. To explore specialized issues of Science, in newspapers the author also conducted a study with topic, *"A Study on Public Awareness and Media Coverage of Nuclear Energy Issues in India,"* which revealed that newspapers were not giving more concentration on nuclear issues unless and otherwise any emergency arises.

In a study on health related issues **Sunitha Kuppuswamy, Balachander Kamatchi** and **P.B. Shankar Narayan** on the topic, "*Coverage of Health News in Indian Mainstream Media*", concluded that health news were given only 1.3% space of the total newspaper space, in two newspapers namely The Hindu and Deccan Chronicle. Majority of health news was regarding specific diseases and conditions followed by Public Health Issues, in Deccan Chronicle and Camp and Campaign news were published in The Hindu. The study also presented the views of Health Specialists and Journalists, where specialists were of the view that newspapers must use simple language understandable easily by common masses and journalists opined that news stories were published on the basis of articles that have already been published in peer reviewed journals and issues raised in newspapers were according to the need of people.

A study on Agriculture technologies in newspapers was conducted by **BiswajitLahiri** and **Siddhartha D. Mukhopadhay** on selected four newspapers from April 2006 to March 2007. Their study on topic, "*Content Analysis of Farm Information Communicated through Selected Newspapers*" concluded that all the four Bengali newspapers *Aajkal, Ananda bazaar Patrika, Bartaman and SambadPratidin,* emphasized Agricultural Policy, crisis, agricultural marketing and rural development type of farm information. Out of the four newspapers,*Bartaman* had devoted maximum space (1.01%) of total space of newspaper, as compared to the minimum space (0.21%) in *Aajkal*.

Recent studies with the objective to know the Science content in newspapers is by **S. Anil Kumar.** In his study "*Science Coverage in Print Media and Regional Languages*" a content analysis of six Malayalam and two English newspapers, concluded that Science coverage in selected Malayalam newspaper during 2010 was only 1.05%, whereas English newspapers devoted only 0.07% of space for Science issues.

It is rightly said that research is always partial. Research on Science coverage is very

consistent and regular however, analyzing the Science coverage and subsequently seeking readers' perception on the coverage of Science contents in newspapers is a first attempt in research in Science communication.

CONTENT ANALYSIS AS A RESEARCH METHOD

Content analysis, a research technique in mass communications, as well as in social science research is a method of analysis, as well as observation (Kerlinger, 1973). With the help of this method the data is obtained from records and documents is analysed systematically and scientifically to draw valid conclusions. Holsti (1968) defined it as "any technique for making inferences by systematically and objectively identifying specified characteristics of messages". Three newspapers were selected for the present study keeping in view their circulation, geographical location, and the language. They are published from Guntur, Andhra Pradesh which is the native district of the researcher.

NEED OF THE STUDY

With the growing concern for fast spreading pollution and serious implication of climate change extra awareness has been growing against science in the public in the process of chairing doubts and to learn more about this problem people have been looking towards mass media to enhance information levels and gain knowledge mainly agriculture, health and medicine are the areas in which lot of activity on behalf of scientist Ngo's and foreign institutions have been continuously to the knowledge of lot the people with the institution as well as the administration of the institution have been tiring to establish association with the public directly mediate communication has been strengthen is networks in which mass media a major partner no mass media talks about so many issues related science it is the cover page of magazine or special stories TV channels would set the agenda for stakeholder as well as experts to take up the application of knowledge. Science forward unless consisted methods or employed to strengthen science communication and journalism people would be at lass for genre information tried to ascertain as to how magazines of science have been handling the issues and problem related to science in public life content analysis method was adopted to find out what type of issues or tired has cover page stories by two prominent science magazines of the country. i.e., the researchers wanted to study and elaborate study of all the issues of 15 years from 2001-15 but since the science reporter was started in 2003 issues of that magazine were analyzed from 2003-2015 basing on pilot study of one year i.e., 2005. Categories of science stories were developed basing on the earlier studies and current magazines pilot study report. 20 themes were identified and studied a code sheet was developed to draw data of magazines of those 15 years since it is only cover page study only frequency, only gather as more or less the number of pages of cover page story and more or less the same space was not calculated them year wise analysis and cumulative analysis on the sample the magazines.

AGENDA SETTING THEORY

Agenda setting describes a very powerful influence of the media – the ability to tell us what issues are important. As far back as 1922, the newspaper columnist Walter Lippman was concerned that the media had the power to present images to the public. McCombs and Shaw investigated presidential campaigns in 1968, 1972 and 1976. In the research done in 1968 they focused on two elements i.e. awareness and information. Investigating the agenda-setting function of the mass media, they attempted to assess the relationship between what voters in one community said were important issues and the actual content of the media messages used during the campaign. McCombs and Shaw concluded that the mass media exerted a significant influence on what voters considered to be the major issues of the campaign. In this context the researcher tried to study the coverage given to science stories by two

most popular science magazines in the country i.e *Down to Earth* and *Science Reporter*

METHODOLOGY

The researcher tried to find out the salience of stories of science in the above said magazines and studied the cover page items only as it clearly shows the kind of agenda set by the magazines for the public in general and activists and governments in specific. From the starting of new millennium 15 years were selected for the study. A sample of all the issues of published in these years were identified as the sample. Since *Science reporter* was started later than the Down to Earth issues from the beginning were selected for the study. A total of 156 issues of *Science Reporter* and 360 issues of *Down to Earth* were selected for the study.

DATA ANALYSIS

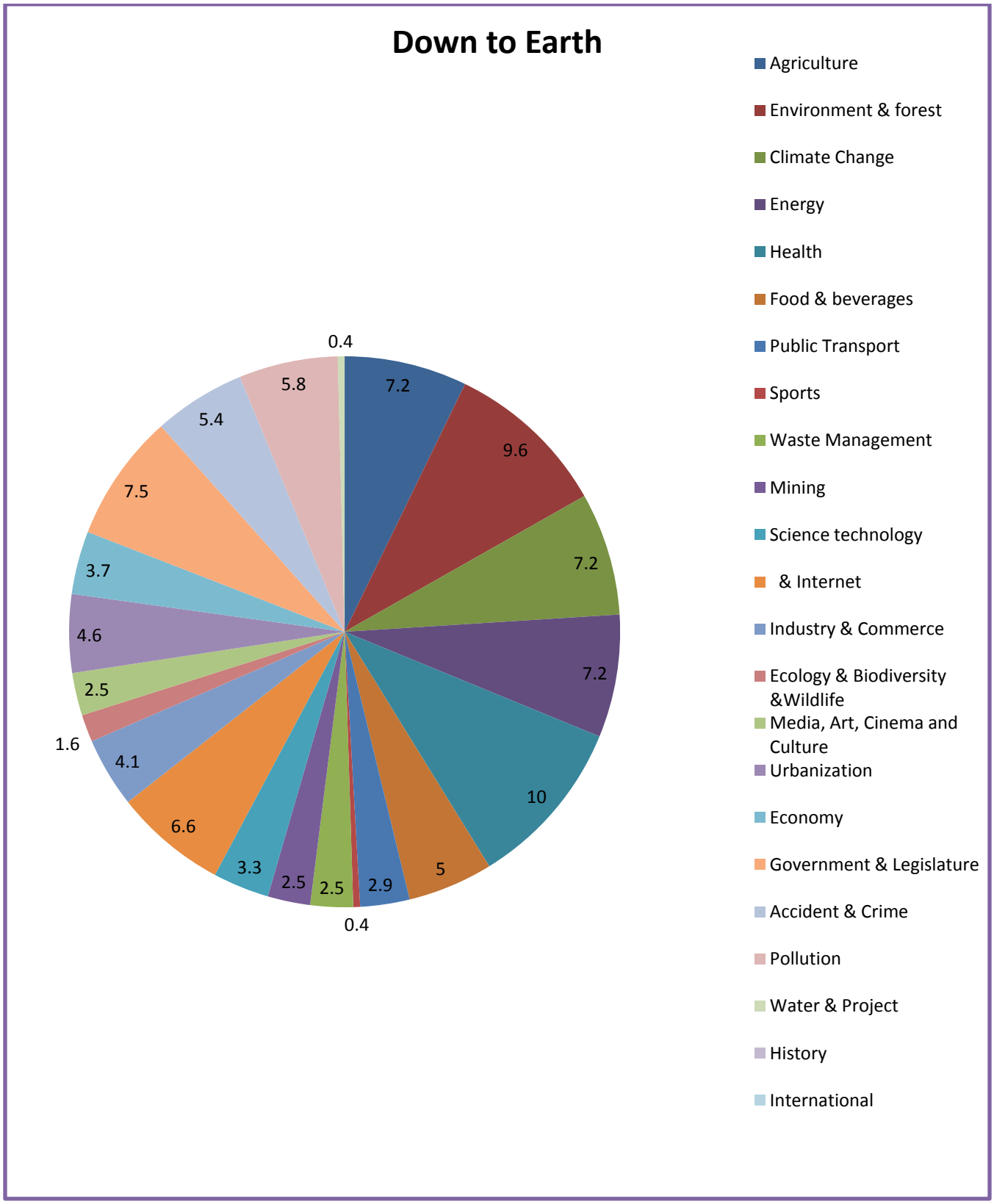
In the coverage of *Down to Earth* magazine it has been observed that among the categories health topped with 10.0% followed by environment and forest (9.6%), accident and crime (7.5%). Agriculture, climate change, energy(7.2%) took next place followed by industry and commerce(6.6%), water and projects(5.8%), pollution(5.4%), food and beverages(5.0%), economy(4.6%), ecology, biodiversity and wildlife(4.1%); government and legislature(3.7%), science and technology(2.1%), public transport(2.9%), waste management, mining, urbanization 2.5% each, media art, cinema and culture(1.6%) and space (1.2%). Finally Sports (0.4%) and History (0.4%) were also touched upon to a little extent.

Table 1. Distribution of coverage related to Down to Earth magazine

S. No	Categories	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total	%
1	**Agriculture**	2	1	-	1	5	3	1	2	-	2	17	7.2
2	**Environment & forest**	1	4	5	4	2	1	-	3	2	1	23	9.6
3	**Climate Change**	1	2	1	3	-	2	3	-	2	3	17	7.2
4	**Energy**	-	1	1	2	3	1	4	2	-	3	17	7.2
5	**Health**	6	1	1	1		2	2	4	4	3	24	10.0
6	**Food & beverages**	2	1	2	1	3	-	1	1	-	1	12	5.0
7	**Public Transport**	-	1	2	-	2	-	1	-	1	-	7	2.9
8	**Sports**	-	-	1	-	-	-	-	-	-	-	1	0.4
9	**Waste Management**	-	1	1	1	1	-	1	-	1	-	6	2.5
10	**Mining**	-	2	-	-	-	1	1	1	1	-	6	2.5
11	**Science technology & Internet**	-	-	-	-	-	2	1	1	-	1	5	2.1
12	**Industry &**	1	-	4	2	3	1	-	1	1	3	16	6.6

	Commerce												
13	**Ecology & Biodiversity &Wildlife**	1	1	-	2	-	1	1	1	2	1	10	4.1
14	**Media, Art, Cinema and Culture**	1	-	-	-	-	-	-	1	-	2	4	1.6
15	**Urbanization**	2	2	-	1	-	-	-	-	-	1	6	2.5
16	**Economy**	-	-	-	-	1	2	1	1	5	1	11	4.6
17	**Government & Legislature**	3	1	-	-	-	2	1	1	1	-	9	3.7
18	**Accident & Crime**	-	2	3	2	2	1	1	2	3	2	18	7.5
19	**Pollution**	-	2	-	1	2	4	3	1	-	-	13	5.4
20	**Water & Project**	3	2	2	2	-	1	2	1	1	-	14	5.8
21	**History**	-	-	-	1	-	-	-	-	-	-	1	0.4
22	**International**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	-	-
23	**Space**	1	-	1	-	-	-	-	1	**-**	**-**	3	1.2
	Total	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**240**	**100**

Figure 1. Depiction of coverage of Science and Environment stories by *Down to Earth*



In the *Science Reporter* magazine almost one third of the coverage constitutes science and technology(31.8%) followed by ecology, biodiversity and wild life (12.5%), health(11.7%) as well as space (11%).Whereas Media, Art, Cinema and Culture were given 5% coverage. The other categories such as accident and crime, agriculture, environment and forest, climate change, energy all of 3.3% were followed by food and beverages(2.5%), industry and commerce(2.5%), water and project(2.5%) which were in the next positions. The categories that are far behind are international, pollution, public transport, sports, waste management were given 0.8% etc. Another interesting factor that is observed is that in this magazine government and legislature as well as History issue coverage was found to be zero.

Table 2. Distribution of coverage related to Science Reporter magazine

S. No	Categories	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total	%
1	Agriculture	1	-	2	-	-	-	-	-	-	1	4	3.3
2	Environment & forest	-	-	-	-	-	1	2	1	-		4	3.3
3	Climate Change	-	-	-	1	2	-	-	1	-	-	4	3.3
4	Energy	1	1	-	-	-	-	1	-	-	1	4	3.3
5	Health	3	2	2	3		1		2	1		14	11.7
6	Food & beverages	1	-	-	-	-	-	-	-	1	1	3	2.5
7	Public Transport	-	-	-	-	-	-	-	-	1	-	1	0.8
8	Sports	-	-	-	-	-	1	-	-	-	-	1	0.8
9	Waste Management	-	-	-	-	-	-	-	1	-	-	1	0.8
10	Mining	-	-	-	-	-	-	-	-	-	-	-	-
11	Science technology & Internet	2	4	3	2	3	4	7	3	5	5	38	31.8
12	Industry & Commerce	-	-	1	-	2	-	-	-	-	-	3	2.5
13	Ecology & Biodiversity &Wildlife	4	2	1	-	1	1	1	2	1	2	15	12.5
14	Media, Art, Cinema and Culture	-	1	1	-	2	1	-	1	-	-	6	5.0

15	**Urbanization**	-	-	-	-	-	-	-	-	-	-	-	-
16	**Economy**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
17	**Government & Legislature**	-	-	-	-	-	-	-	-	-	-	-	-
18	**Accident & Crime**	-	-	1	2	-	1	-	-	-	-	4	3.3
19	**Pollution**		1	-	-	-	-	-	-	-	-	1	0.8
20	**Water & Project**	-	-	-	1	1	-	-	-	1	-	3	2.5
21	**History**	-	-	-	-	-	-	-	-	-	-	-	-
22	**International**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	1	1	0.8
23	**Space**	-	1	1	3	1	2	**1**	1	2	1	13	11.0
	Total	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**120**	**100**

Figure 2. Depiction of coverage of Science and Environment stories by *Science Reporter*

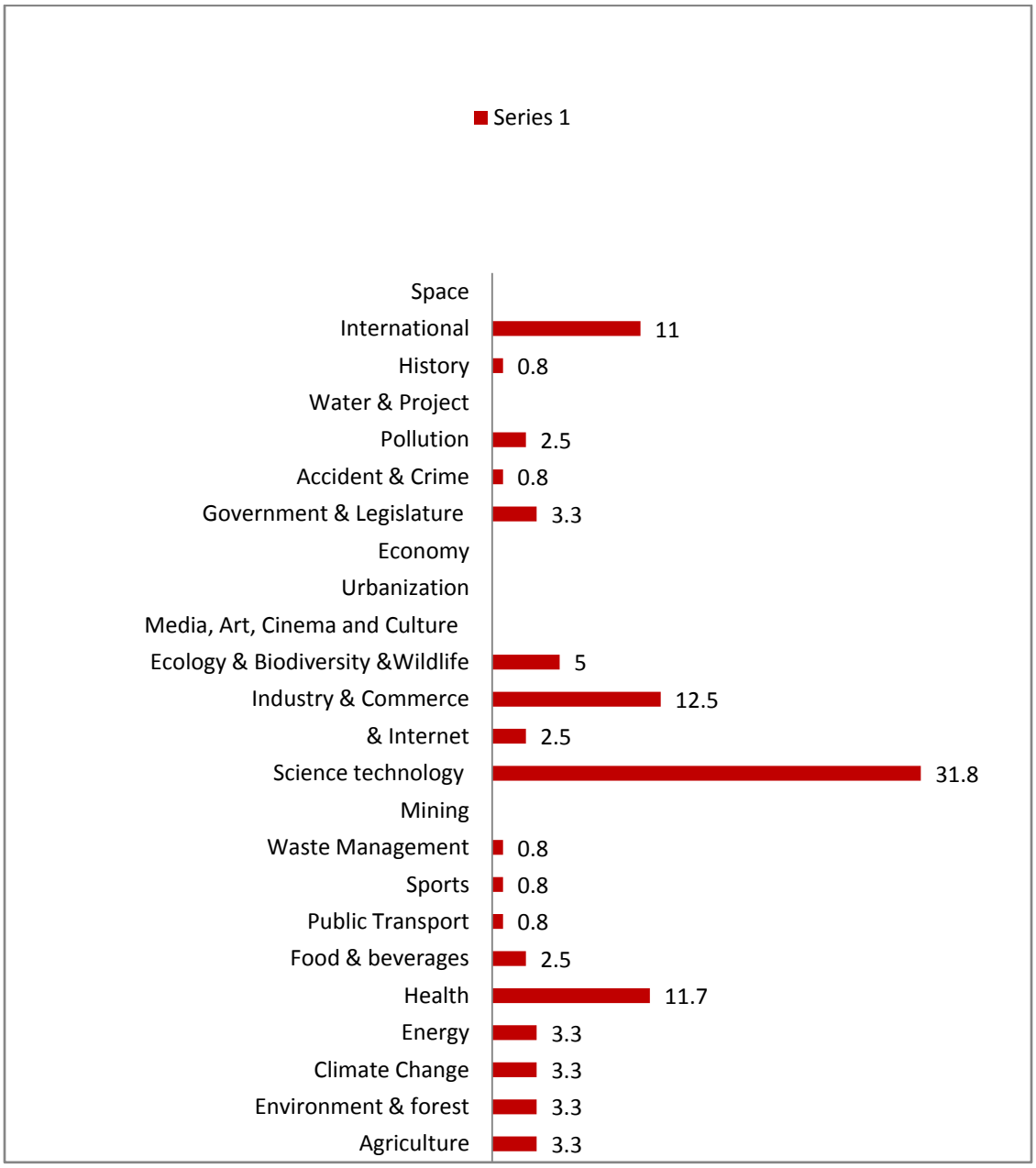
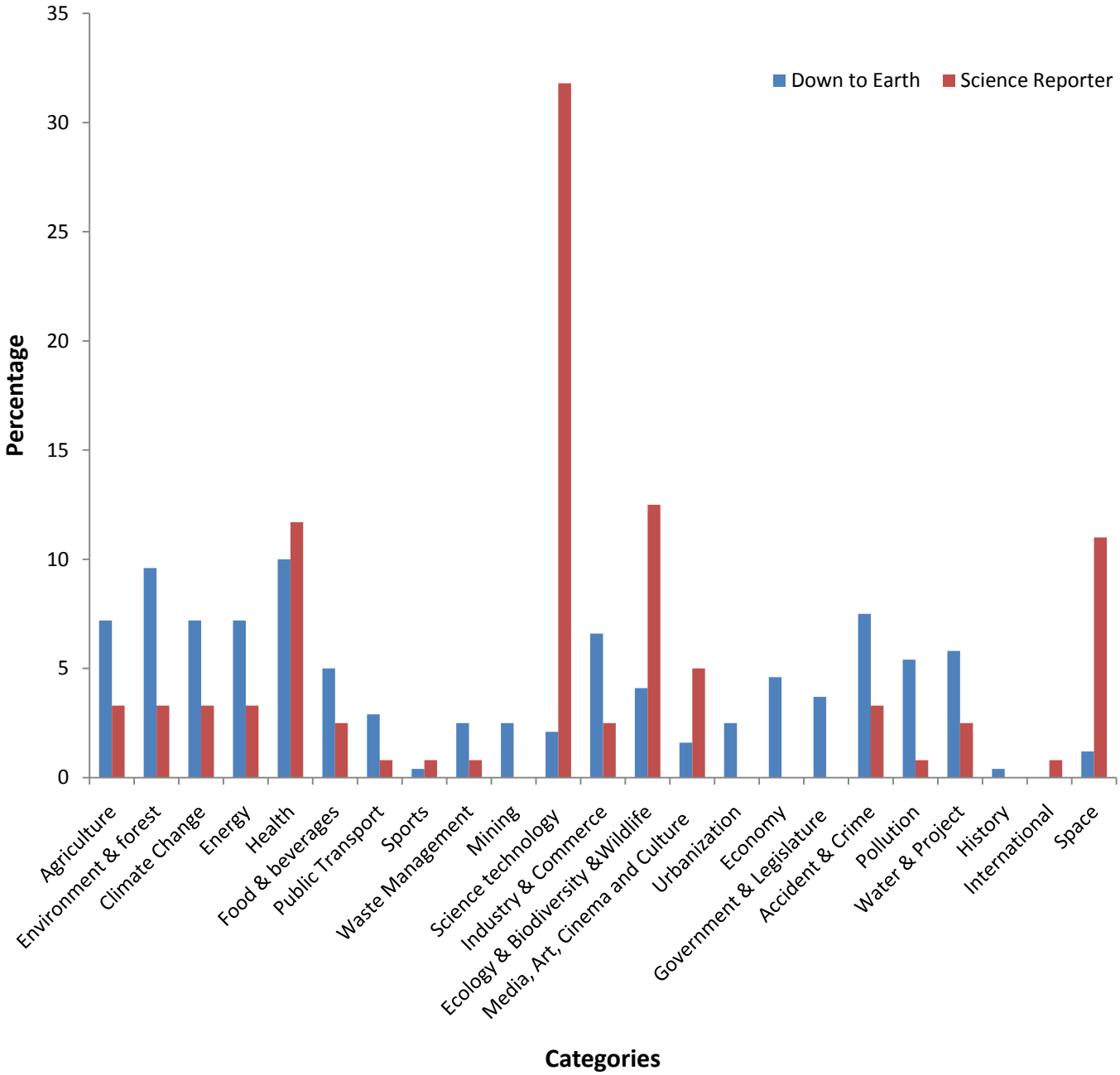


Table 3. Distribution of directional analysis of the coverage of items by both the magazines

		Down to Earth			*Science Reporter*		
S. No	**Categories**	F	UF	N	F	UF	N
1	**Agriculture**	7	5	5	4		
2	**Environment & forest**	3	12	8	3		1
3	**Climate Change**	4	3	10	2		2
4	**Energy**	4	8	5	2		2
5	**Health**	2	15	7	4	2	8
6	**Food & beverages**	-	10	2	1		2
7	**Public Transport**	2	4	1			1
8	**Sports**	-	-	1			1
9	**Waste Management**	2	4	-			1
10	**Mining**	1	5				
11	**Science technology & Internet**		3	2	25	1	12
12	**Industry & Commerce**	3	9	4	1		2
13	**Ecology & Biodiversity &Wildlife**		9	1	11		4
14	**Media, Art, Cinema and Culture**	2	1	1	1 50		5
15	**Urbanization**		5	1			
16	**Economy**	1	5	5			
17	**Government & Legislature**		8	1			
18	**Accident & Crime**		13	5	1	1	2
19	**Pollution**	1	10	2		1	
20	**Water & Project**	1	10	3	2		1
21	**History**		1				
22	**International**			-			1
23	**Space**		2	1	8		5
	Total	**33**	**142**	**65**	**65**	**5**	**50**

Figure 3. Distribution of coverage related to Down to Earth and Science Reporter magazines



COEFFICIENT OF IMBALANCE OF DOWN TO EARTH AND SCIENCE REPORTER MAGAZINES

Down to Earth = -0.26872
Science reporter = 0.02083
Chi square = 112.774

- From the data it can be inferred that *Down to Earth* is determined to bring out the problems faced by the people, the misdeeds of governments and the challenges being faced by the society as a whole as many of the stories are related to the health, environment, forests, accidents and crime, agriculture, climate change,, energy.
- Though health continued to be dominant in both the magazines in *Science Reporter* space, media art and cinema found prominent places in the order of coverage.
- Environment, forests, accidents and crime, agriculture, climate change, energy were relegated to the last places. This is clearly evident because the CSE is being published by an independent NGO which always stood for the public good. Whereas "*Science Reporter*" is run by the Government of India.
- Another interesting feature is the *Science Reporter* regularly dealt with the stories related to space whereas the *Down to Earth* has not published much about it. Almost all the items related to space published by the *Science Reporter* are of ISRO. Whenever the space organization sent a satellite or launch vehicle into the space SR reported it in a most favorable manner.
- It is noticed that objectives of both the magazines are clear in their outlook as *Down to Earth* is issue based and discusses it with the support of the data collected from the research studies.
- The depth of studies is also evident in the *Down to Earth* and in *Science Reporter* it is mostly event based or publicity oriented. The importance given to media, entertainment art and cinema supports the earlier argument that this magazine is not much about the depth of the subjects and portrays the concept in an outward manner.
- Success stories or positive outlook at some of the programmes well received by the public seems to be found missing in the case of Down to Earth.
- The language and the presentation of the concepts also clearly differ from each other. CSE discusses the issues in the spirit of public cause and upholds scientific temperament. More visuals, descriptions and supporting evidences from those who are associated with it are observed in the *Down to Earth*. Whereas it is more of narrative format in the case of *Science Reporter*.

The treatment of the topics dealt by the magazines shows that the *Down to Earth* is more people friendly and strives to cover the issues in a critical manner so that the government departments as well as civil society notices them and try to settle the problems and find solutions effectively. In *Down to Earth's* coverage more number of negative news are observed followed by neutral stories. Compared to others number of favorable stories is very less in this magazine of CSE. It deals with the subject in various angles of benefits, loss as well as the lapses of various agencies that are associated with it. Whereas, in *Science Reporter* many stories tried to support the government and painted a rosy picture. Repeatedly they tried to portray that everything is perfect and helping the public at large.

CONCLUSIONS AND SUGGESTIONS

Both the magazines have dealt with the science and its related topics in an elaborate manner. Since their main objective seems to be dealing with the science and its associated topics the range of topics is very wide and broad. But their orientation towards the various perspectives seems to be very different which is evident in the analysis. The *Down to Earth* was more analytical and critical in handling the issues. It covered all the dimensions and seemed to be more objective and presented the issues in an impartial manner. But the *Science Reporter* which is being published from a government department seems to be more narrative and supporting the government. On certain occasions it seemed to be campaigning for the government departments.

The magazines need to reorganize their objectives and can as well change the outlook of the formats.

- The *Down To Earth* can incorporate more topics in related to media, art, literatures and cinema at least in the perspective of science and technology as they too seem to be contributing to the development in a supportive manner.
- International issues can be dealt with as the regular readers would not miss them.
- The magazine can even pursue the feedback of the readers and redesign the presentation.
- The general governmental orders, amendments to acts related to science and environment can also be given by *Down To Earth*
- *Science Reporter* may try to come out of the routines and should publish the news as well as stories in the scientific spirit.
- Both the magazines can provide more and more visuals such as photos, cartoons and supporting sketches wherever necessary.
- Participation of experts, common men needs to be incorporated by adding more and more of the opinions of the public.

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