

WHOM DO SCIENTISTS TALK TO? THEMSELVES OR THE GENERAL PUBLIC?

Damasus Tuurosong

*Department of African and General Studies, University for
Development Studies, Wa, Ghana . Email: tupaso2000@yahoo.com*

ABSTRACT

This paper investigates issues regarding the audience of scientists in the dissemination of research. It involves an analysis of their preferred channels of communication regarding research dissemination. The fieldwork entailed the use of purposive and simple random sampling techniques to identify and select, research institutions and individual researchers, who were involved in a questionnaire survey. One hundred (100) participants, comprising male and females, from university and non-university research institutions formed the respondents. The paper reveals that although science researchers admit to the effectiveness of mass media as possible channels for science communication, they hardly make use of them to disseminate their research. Research scientists choose academic channels, namely; journals and brochures, lectures and seminars and, books over mass media sources such as newspaper and magazines, television, radio, exhibitions and fairs and, general extension services. The key reason for their preference is their perception of the inability of mass media to reach their targeted audience; other scientists. The study concludes that science researchers talk to themselves rather than the general public. This suggests that science research communication can be enhanced through improved resources, campaign for public interest in science news, media and public education, use of internet sources and increased mass media programming.

KEY WORDS: Communication medium, Mass Media, Science research, research dissemination, research institutions

1.0 INTRODUCTION

Communication of science news in the media is as old as the mass media in Ghana. The Ghana Broadcasting Corporation (GBC) was particularly instrumental in sharing science research findings with farmers and residents of deprived communities. Records at GBC show that two science programmes, "Rural Sign-Post" and "Waves and Dew", were among some of the earliest Ghana Television (GTV) programmes, when the station was inaugurated on the 31st of July, 1965. While "Rural Sign-Post" was aimed at exposing scientific methods of farming to rural communities, "Waves and Dew" was a programme on fishing and gardening.

In the 1970s, another television science programme, "Our Agricultural Front" was introduced on GTV. This programme sought to introduce farmers to the latest sci-

tific and technological discoveries in agriculture. The programme also aimed at generating interest in backyard gardening and agriculture in order to support the "Operation Feed Yourself" campaign of the then government of Ghana. In 1982, the name of the programme changed to "AGRIMAG" (Agricultural Magazine). Also, the scope of the programme was widened to include educating farmers on new agricultural methods, informing viewers on national agricultural policies and getting a feedback from farmers for policy influencing and scientific research.

Consecutively, GBC Radio also employed the innovative radio forum concept in sharing science news, mostly on farming, with rural communities. A pilot radio forum programme was launched in 1964 in the Eastern Region, which aimed at bringing technology to the attention of deprived communities (Ansah, 1985). The project was structured in four parts, namely; printed guides and visual aids, broadcasts, organized group discussions and, group action. Ansah (1985) explains that the radio forum, which was organized in several parts of the country, worked on the principle of "Listen, Discuss and Act."

In recent time, GBC's science communication efforts have led to a collaboration between the broadcast station and the Council for Scientific and Industrial Research (CSIR) in a project called "Time With CSIR" which was premiered in 1999. This one-hour programme, which was broadcast every Saturday between 10.00 and 11.00 GMT, involved the explanation of science research results to the public in everyday language. On the 10th of August, 2001, GBC Radio Two also commenced a series of programmes on the application of science and technology to poverty alleviation. The programmes were broadcast every Friday at 15.05 GMT.

While the electronic media have attempted, consistently, to promote science, the print media have not maintained any consistent policy for science communication. Apart from two "Weekly Spectator" columnists, Albin Korem, who since the early 1990s has maintained a column entitled "Food For Thought," and Tom Dorkonoo, who also had a column dedicated to science and environmental issues, no other journalists have been committed to writing science stories (Andoh, 1993).

Omari (1987) and Andoh (1993) have reported very low coverage of science news in the Ghanaian media. A decade after Andoh's study, it is useful to find out whether scientists have changed their attitude towards the mass media. It is also significant to establish scientists' reasons for either accessing the mass media to share information with the public or for declining to make use of mass media opportunities available today.

Andoh (1993) conducted his research at a time when there was no private broadcast station in Ghana. At the time, about ten newspapers and magazines were also in existence. Today, there are more than 15 private FM radio stations in Accra alone, about eight in Kumasi and more than one in each of the other eight regions of the country. The number of newspapers and magazines in the country has also more than doubled.

The proliferation of both print and broadcast media in Ghana in recent time generates curiosity regarding the extent of usage by scientific researchers. As major and popular channels for reaching the Ghanaian masses, the mass media offer opportunity for solving problems regarding the communication and utilization of scientific research.

Not much research has been conducted on Ghanaian scientists to find out whether the stereotypical picture of the scientist as a shy and reticent mass media source, applies to them. Also, much of the research into the subject has focused on the perceptions of journalists about scientists. This paper investigates how scientists view the mass media and media persons in Ghana as a step towards promoting a symbiotic relationship between these two protagonists in the science communication model. Specifically, it communicates the findings of a study that sought to:

- identify the communication channels open to scientists in the sharing of their research findings with the public;
- find out the most frequently used communication channels by scientists;
- determine the level of confidence scientists have in journalists' ability to accurately communicate scientific findings and;
- establish the frequency with which scientists publish their research findings in the mass media.

2.0 THEORETICAL FRAMEWORK

The major theoretical framework informing analysis is the theory of development communications. The theory is framed on the principle that communication can only serve the developmental needs of people where the beneficiary community members are involved in formulating developmental plans. Participation is central to any effective use of communication in the development process, since "it is only through participation that sustainable social change can be achieved" (Okunna, 1995).

Participatory development is the involvement of beneficiary communities in making decisions that affect their lives. Participation requires that beneficiaries express their views and make suggestions and requests for integration into development programmes (Zakes, 1993). According to Eyben and Ladbury (1995), the concept of participation in development has been in use since the 1930s. Freire (1970) is perhaps the most renowned proponent of the concept of participatory communication.

Similarly, Fraser and Restrepo-Estrada (1998) found a direct link between communication and true participation. They pointed out that the two concepts are two sides of the same coin. They posit that "before people of a community can participate, they must have appropriate information, and they must follow a communication process to reach a collective perception of the local situation and of the options for improvement" (Fraser and Restrepo-Estrada, 1998:48).

The main essence of participatory communication is to inform people and in so doing enable them contribute their points of view, reach consensus, and carry out an agreed change or development action together (Servaes, 1995). For participatory communication to achieve its objective, the appropriate communication channels must be employed. The basic tenets and principles of development communication and especially the diffusion of innovations are relevant to the present study, which attempts to investigate scientists' mode of communicating research findings.

Science research findings are development messages, which when communicated, effect social change and pave the way for development. It is essential to establish the various methods employed by science researchers to diffuse their innovations to the public. This study is particularly interested in determining the extent to which scientists make use of the media in sharing their research results with the public. It would be useful to determine whether scientists employ the top-down or the horizontal system when communicating their findings to beneficiaries of innovations.

3.0 METHODOLOGY

3.1 Sample and Sampling

Selected scientists in university and non-university institutions within Accra were involved in the fieldwork. Purposive sampling technique in selecting institutions while simple random sampling technique was used to select individual participants in both categories. The Council for Scientific and Industrial Research (CSIR) and Ghana Atomic Energy Commission (GAEC), the two leaders in scientific research and policy influencing were selected to represent non-university science institutions. At the university level, five science departments or institutions of the University of Ghana were involved in the field research. These comprised ten departments (i.e., Biochemistry, Botany, Chemistry, Computer Science, Physics, Geology, Mathematics, Nutrition and Food Science, Statistics and Zoology) of the Faculty of Science, Faculty of Agriculture, Ghana Medical School (UGMS) and the Noguchi Memorial Institute for Medical Research (NMIMR); all of the university. For purposes of this study, departments within the Faculty of Agriculture were classified as one.

A total of 100 scientists comprising 50 non-university and 50 university scientists, were selected for this study. Out of the 50 non-university scientists, a sample of 25 each was drawn from research staff lists of GAEC and CSIR. In the case of university scientists, ten lecturers were selected from each of the five sampled faculty, department or institution, namely; Faculty of Agriculture, Departments of Physics and Botany, University of Ghana Medical School and Noguchi. The sampling procedure for this study conformed to that used in Dunwoody and Ryan (1987).

3.2 Data Collection and Analysis

Questionnaires were administered with the help of two assistants. The fieldwork took place between April and May, 2000 and in April, 2001. The questionnaire consisted

of three sections. The first section, Section A, contained questions regarding scientists' areas of research, their channels of communication and their views on public interest in science communication. Section B of the questionnaire covered scientists' views on the efficiency of the media as channels for sharing science research and scientists' relationship with media personnel. The third section of the questionnaire covered demographic data of respondents. The questionnaire had in all 35 items. Out of the 35 items, 30 were close-ended questions while five were open-ended items.

The responses to the structured questionnaires were analysed qualitatively and quantitatively. Values for the open-ended questions were categorized before they were coded. The computer programme SPSS was used to run the frequencies and percentages as well as statistical tests to analyse the data collected.

4.0 RESEARCH FINDINGS

4.1 Sample Characteristics

The respondents comprised both male (76.6%) and female (23.4%). These respondents were either second degree holders (38.89%) or third degree holders (33.7%). Those of Professorial rank were 24.5% while first degree holders comprised 3.1% of respondents in that category.

Table 1: Age of Respondents

Age in Years	Percentage
20 – 30	8.4
31 – 40	31.6
41 – 50	30.5
51 – 60	23.2
60+	6.3

Source: Field Data

From Table 1 above, it is clear that majority of the respondents are within the 31 – 40 and 41 – 50 age groups. Few respondents within the retirement age (6.3%) were still actively engaged in research.

Table 2: Annual Income of Respondents

Annual Income in Cedis	Percentage
Under 1 million	2.4
1 – 2.4 million	10.8
2.5 – 6.4 million	17.5
6.5 – 9 million	44.6
9.1 – 12 million	16.5
Over 12 million	4.1

Source: Field Data

Table 2 above shows that majority of the respondents were within the 6.5 – 9 million cedis income bracket. It also emerged from the study that 2.4% of respondents received an annual salary below one million cedis as at April 2001, when the fieldwork was conducted. Again, respondents to this study had either spent 11-15 years as research scientists (26.3%), 6 - 10 years (25.3%) or 1 - 5 years (23.2%). Only 13.7% had been research scientists for 16-20 years and 11.6% had spent more than 20 years in science laboratories.

4.2 Preferred Channels for Communication of Science Research Results

On preferred channels of communication, respondents indicated their preferences among eight popular channels. These channels included brochures and journals, lectures and seminars, books, newspapers and magazines, televisions, radio, exhibitions and fairs and, general extensions services. The research revealed that compared to other channels, brochures and journals were most preferred by science researchers. Lectures and seminars emerged as the second most preferred medium for communicating science research findings. The least used medium of communication, according to respondents to this study, was general extension services. It is significant to note that when considered together, the different types of the mass media, newspapers and magazines, television and radio emerged as the third most significant channel for communicating science research findings, accounting for 22.1% of respondents' communication habits. See Table 3 below.

Table 3: Preferred Channels for Science Communication

Communication Channels	Percentage
Brochures and Science Journals	33.7
Lectures and Seminars	24
Publication in Books	12.5
Newspapers and Magazines	9.1
Television	6.7
Radio	6.3
Exhibitions and Fairs	4.8
General Extension Services	2.4
Total	100

Source: Field Survey

The main reason assigned for respondent preference for brochures and journals was its ability to reach target audience - other scientists. Earlier studies capture various reasons that explain why scientists communicate to their colleagues. Nelkin (1982) found that scientists defined "good" scientists as those who worked toward adding to the body of scientific knowledge through publications in science journals. Russell (1982) also established that research typically labeled "science" is by virtue of publi-

cation in refereed journals. Dunwoody and Ryan, (1985), on the other hand, noted that priority of scientific publication over public dissemination is an unwritten rule in science.

These reasons account, in part, for the preference of scientists for journals compared to other mass media for disseminating their research. Indeed, more than half of the respondents (55.8%) to this study have never communicated their research findings through the mass media. However, a little over half of the respondents (51%) said they had ever been interviewed by a journalist. Out of those who granted interviews, 56.6% said they had not done so "often", while 35.5% said they granted interviews "once" with only 4.8%, 1.6% and another 1.6% saying that their interviews with journalists were "quite often", "often" and "very often" respectively.

4.3 Persons Who Initiated Mass Media Interviews

Even more revealing was the finding that scientists hardly ever go out of their way to initiate mass media coverage of their research results. Only above a fifth (21.1%) of the respondents had ever initiated a mass media interview, while more than three-quarters (78.9%) had never gone out of their way to call a journalist to discuss their research results. Perhaps as Gascoigne and Metcalfe (1997) observed, scientists see communication through the mass media as more of an optional activity than a basic part of their work. Respondents who initiated mass media interviews cited educating the public (70.4%) as the main motivation for their action. This corroborates the findings of DiBella et al (1991), which showed that nearly half of the respondents in their study also cited public education as the main motivation.

The data from this study do not support existing research that scientists are constrained by the need for peer review of their research by societies to which they belong, or by their employers and research funding agencies (Dunwoody and Ryan, 1985). Ghanaian scientists say they are free to initiate stories with the mass media (82.4%). Only 17.6% of respondents felt constrained in their efforts to communicate research findings.

Evidence from this study suggests that scientists fail to communicate their findings through the mass media because of the incompetence of journalists rather than distrust for the effectiveness of mass media channels. Respondents gave a 67.4% endorsement to the mass media as effective channels for sharing research findings with target audiences. Only 32.6% distrusted the mass media's effectiveness as channels for science communication. Table 5 below also shows that the main strength of the mass media is their ability to reach target audiences of science research. Only 4.5% said mass media personnel were accurate in covering science news.

Table 5: What Makes the Mass Media Effective?

Strengths of Media	Percentage
Ability to reach target Audiences	76.1
Media persons are skilled in reporting science news	10.4
Media gives comprehensive coverage of science news	9.0
Media persons are accurate in covering science news	4.5

Source: Field Survey

Compared to non-university respondents, university respondents had greater confidence in the science communication skills of journalists. Analyses of the data showed that while a tenth (10.3%) of university scientists said journalists were skilled in science reporting, no non-university scientist trusted the competence of media personnel.

Table 6: Reasons for choice of Mass Media by Type of Scientist

Reasons	Type of Scientist		Total
	University	Non-University	
They reach the target audiences	30.9%	45.6%	76.5%
Mass Media are accurate in science coverage	1.5%	2.9%	4.4%
Mass Media gives comprehensive science coverage	5.9%	2.9%	8.8%
Mass Media personnel are skilled in science coverage	10.3%	0	10.3%
TOTAL	48.5%	51.5%	100%

Source: Field Survey

Table 6 suggests that more non-university scientists (45.6%) than university scientists (30.9%) felt the mass media reached target audiences. Again, 10.3% each of university and non-university scientists preferred lectures, seminars, talks and symposia as science communication channels. However, non-university scientists had a slightly higher preference for the mass media than university scientists did. While 2% of university scientists had the mass media as their preferred channel of communication, 3.1% of non-university scientists settled for the mass media. This is surpris-

ing because, as indicated earlier, university scientists expressed greater confidence than their non-university colleagues, in the mass media's ability to communicate science research.

No university scientists selected newspapers and magazines as their preferred communication channels. On the other hand, no non-university scientist chose radio or general extension services as their preferred media. An analysis of the data showed that media personnel tended to interview more university compared to non-university scientists.

Table 7: How Often Have You Granted Media Interviews?

Reasons	Type of Scientist		Total
	University	Non-University	
Very Often	4.5%	1.6%	6.1
Often	2.5%	2%	4.5
Quite Often	4%	1	5
Not Often	21.3%	21	42.3
Once	15.6%	26.5	42.1
TOTAL	47.9%	52.1%	100%

Source: Field Survey

Table 7 shows that scientists have not granted frequent media interviews. University scientists indicated that they have not often granted interviews (21.3%) or have granted interviews only once (15.6%). Similarly, 26.5% of non-university scientists granted media interviews only once while 21% had not granted such interviews often. Of the two types of scientists, university compared to non-university scientists granted more interviews. Perhaps, university-based respondents' greater tolerance of the media was the result of their more frequent interaction with media personnel. Gascoigne and Metcalfe (1997) found that the greater the interaction between scientists and journalists, the more both parties came to understand and appreciate their work and difficulties.

The findings of this study again show that in communicating their findings, respondents are motivated by their wish to get the public informed (32.6%) and to contribute to academia (26.3%). Other scientists also communicate their research findings

as a requirement from their employers (14.7%). A cross tabulation of the main motivation for communicating science research against employer agency of respondents reveals that the greatest motivation for university-based respondents who communicate their findings is to contribute to academic work (18.9%). Only 7.4% of non-university-based respondents communicate out of the desire to contribute to academia. This can be expected since university-based respondents are in academic institutions with research mandates. Getting the general public informed was the motivational factor for 16.8% of non-university-based respondents. This is probably because of the institutional mandates of these two non-university research institutions -- CSIR and GAEC. The two research institutions are required to conduct and monitor research for utilization of policy makers and the public.

Analysis of the data also indicates that income levels of respondents have nothing to do with motivation for communicating their findings. Educating the public emerged as the main motivation for all income groups, while all income groups rated enhancement of financial gain the least motivational factor for communicating research findings.

Age of a respondent also had little to do with motivation to communicate their research findings. All age groups cited public education as their over-riding motivational force. But it is worth noting that a 100% of respondents aged 61 and above cited public education as the motivation for communication. At that age, they would probably have retired and would not communicate their findings for financial gain or peer recognition. It was evident from the data that middle-aged scientists (41-50 years) rated "hope of gaining peer recognition" second to public education (7.4%). Respondents aged 51 to 60 years were motivated more by their positions as spokespersons (7.4%) than by the hope of gaining peer recognition (3.7%).

Inadequate financial support (44.7%) emerged as the main obstacle to communicating science research. Unavailability of communication tools was also cited by 18.8% of respondents. This is contrary to the findings of Gascoigne and Metcalfe (1997) which rated lack of time and the need to maintain secrecy about commercial agreements as leading obstacles to communicating science research. Scientists surveyed by Gascoigne and Metcalfe (1997) did not even regard finance as an obstacle to their communication efforts.

5.0 CONCLUSION

The paper concludes that scientists communicate their research to themselves rather than the general public. It shows that although science researchers use varied communication sources their preferred choices are those media that enable them to reach out to fellow academic scientists.

The paper demonstrates that science researchers choose communication media perceived to best reach their target audience; other scientists. It revealed that both uni-

versity and non-university institutions preferred communication media that enabled them to reach out to colleague scientists as well as contribute to the building of scientific knowledge. Thus, their most preferred media of communication were academic avenues comprising brochures and journals, lectures and seminars and, books; compared to mass communication media such as newspapers and magazines, television, radio, exhibitions and fairs, and general extension services. Brochures and journals were the most preferred while general extension services were least preferred. These preferences were in spite of the paucity of academic media in Ghana.

The paper also demonstrates that although science researchers encounter mass media practitioners, they do not perceive the mass media as an effective channel for the dissemination of scientific research. The main reason assigned was the perceived incompetence regarding ability to reach perceived science audience rather than distrust of journalists. More than half of the respondents said they had never used mass media to disseminate research although about the same proportion said they had ever been interviewed by a journalist. Non-university, compared to university-based science researchers, had a higher preference for mass media sources.

6.0 RECOMMENDATIONS FOR IMPROVING SCIENCE COMMUNICATIONS

A respondent at GAEC likened national government's failure to provide adequate financial support for research work at science institutions to a man that sets up an empty shop and pays a shopkeeper to look after it. For this respondent, scientists in Ghana are idle and getting rusty due to inadequate funds to carry out research. Most respondents had no doubt that if funding was provided for science research, the country would benefit tremendously from scientific discoveries. Aware that funding from government is drying up, some scientists feel private industries and external donor agencies should be encouraged to support scientific research.

Also, the scientists interviewed are concerned about the lack of science journals to communicate their research findings. *The Ghana Journal of Science* and *Ghana Journal of Agricultural Science* were the main science journals in the country at the time at the fieldwork. Apart from the paucity of avenues, neither of the two available journals published regularly. Considering the fact that journals are their favorite channels for disseminating research findings, many scientists just keep their findings in laboratories when the two journals fail to issue. The paucity of journals publishing avenues was attributed to unavailability of resources. The respondents indicated that improved financial support for the two leading science journals would enhance the dissemination of science research findings.

In an age when science and technology influence every facet of human life, perceived lack of public enthusiasm for science news is a cause for concern. A serious campaign is essential for whipping up public interest in science research findings. Perhaps as Mazur (1981) suggested, the abstract manner in which science news is pre-

sented in the media has contributed to public indifference to science news. If media personnel and scientists are trained in the skills of communicating science news, the public might get more excited about science research findings.

To enhance science communication in Ghana, science research institutions may also need to consider the recommendations of Gascoigne and Metcalfe (1997) that research institutions should make a coordinated and concerted effort to plan and target mass media activities more effectively, in order to develop a stronger corporate identity and image. They also recommended that scientists make stories relevant and interesting for the general public and called for encouragement and support for science communication.

As far back as 1971, Rogers and Shoemaker contended: "a combination of mass media and interpersonal communication is the most effective way of reaching people with new ideas and persuading them to utilize these innovations." This argument is worth considering in the Ghanaian context.

Chappell and Hartz (1999) believe science communication will be improved where science societies and organizations make use of the worldwide web to disseminate information about major advances in science. Their study further recommended training in science reporting for media persons and mass media skill courses for science researchers.

Fortunately, scientists surveyed in this study seemed to have confidence in the effectiveness of the media to disseminate accurately science research findings. Thus, encouraging frequent interaction between media personnel and scientists would ensure that the two groups form a partnership for science communication. The introduction of more science programmes such as 'Time with CSIR' on television and radio could help boost dissemination.

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