

Investigating major subject research areas of Council for Scientific and Industrial Research Journals in Ghana

P. S. OSEI-KOFI*, L. M. ABOAGYE, S. BEKOE & L. P. DZANDU

(P. S. O. & L. M. A.: CSIR-Pant Genetic Resources Research Institute, P. O. Box 7, Bunso.; S. B. & L. P. D.; CSIR-Institute of Scientific & Technological Information P. O. Box CT 2211, Accra)

*Corresponding author's email: oseikofips@gmail.com

ABSTRACT

Journals are important source of relevant and quality information. They provide current source of up-to-date information to facilitate research, teaching, learning and knowledge dissemination. The objective of the study is to investigate the major subject research areas covered by the articles of the five journals in the Council for Scientific and Industrial Research. The study was undertaken in the CSIR of Ghana in which a major device for data collection was quantitative content analysis. This mode of data collection was determined after its validity and reliability among 1,430 journal articles from four CSIR Institutes was proven. Data collected were analysed using tables and graphs to group major publications. Results from the research indicated that cereal and legumes recorded the highest (318) disciplines in all the five journals in the CSIR.

Research and development notes. Received 06 Sept 17; revised 11 May 18.

Introduction

A Journal is defined as “a publication with a continuing life that gathers together the work of many authors, according to its own editorial guidelines” (Montagnes, 1994). It is regarded as an output of research findings published for particular discipline and come periodically. Journals have been in existence for over 340 years. The history of scientific journals dates from 1665, when the French [Journal des sçavans](#) and the English Philosophical Transactions of the Royal Society first began systematically publishing research results (Kronick, 1976). These journals were published as a medium of scholarly communication. However, in Ghana, publication of journals started in the 1950s (Jaybgay, 1984).

According to Kotei (1981), the first African published journal, the Journal of African Studies started in Nairobi, Kenya in 1929. The aim of that journal was to provide an avenue for

young African intellectuals in scholarly research writing. Journals convey current information to facilitate research, teaching and learning as well as knowledge dissemination (Joe-Mensah & Bekoe, 2010; Alemna, 1994).

The role of Council for Scientific and Industrial Research (CSIR) is to generate and apply innovative technologies which efficiently and effectively exploit science and technology for socio-economic development. To safeguard the activities of the Institutes in the CSIR, a comprehensive study of articles in various disciplines were studied.

Literature Review

An Act of Parliament of the Republic of Ghana, CSIR Act 521 of 1996, the Council for Scientific and Industrial Research, Ghana's main Research and Development Organisation was re-established with a new mandate to pursue the implementation of government policies on

scientific research and development, collaborate in the collation, publication and dissemination of the results of research and other useful technical information (Yawson, 2002). According to Afolabi (1977), the only way in which a better understanding of the pattern of literature on research and technical staff publications at the CSIR can be ascertained is through a detailed analysis of its bibliometric elements. Bibliometric is a thorough study of the pattern of the literature on staff publications which enables a deeper understanding and insight to be gained into the subject (Roy & Basak, 2013; White & McCain (1989).

The staff of the Council for Scientific and Industrial Research (CSIR) are, day in day out providing information in various respective disciplines in journals. These journal publications are the source of the country's scientific and technical literature which provide a quick reference source for professionals, such as research scientists, lecturers and policy makers to facilitate their work.

Materials and methods

Quantitative content analysis was used as the investigating tool on 138 volumes of the five journals in the CSIR. At the end of data collection period, the content analysis of 1,430 articles were made from the five journals in the CSIR as the basis for the research work. Photocopies of all the abstracts in the journals under study were assembled to facilitate the quantitative content analysis of the journals. In order to smooth the progress of data collection, data were obtained from the abstracts of 1430 articles.

In order to ensure the validity of the coverage of content, discussions and consultations with experts in the field, colleagues and members of the target institutes took place. These stakeholders were involved in analysing the titles, abstracts and introduction of each article from the 138 volumes of the journals into major subject commodity areas. The number of publication disciplines of each volume of the

journals under investigation were all tallied to facilitate the analysis of the research. Of the five journals in CSIR, 142 volumes of publications were made for the fifty years of CSIR's existence. But the research was based on 138 volumes representing ninety-seven percent of the sample size.

The target area of study covered the five scholarly journals from four Research Institutes in the Council for Scientific and Industrial Research (CSIR) Ghana. The Research Institutes were Building and Road Research Institute (BRRI), Crop Research Institute (CRI), Forestry Research Institute of Ghana (FORIG) and Institute for Scientific and Technological Information (INSTI). Publication disciplines were investigated in terms of scope of a journal and thematic areas of the institutes in order to establish and interpret results of the instrument used. This was done to enable the researcher identify less research areas where much resources should be given.

Results and discussion

Publication by discipline

The number of articles was grouped into major publication disciplines. Graphs were constructed from the data gathered using Microsoft Excel Office 2010 version and converted into Microsoft Word. Publications by discipline were analysed according to the thematic areas of the four participated institutes of the project.

In Fig. 1, about 47 percent of the overall articles published in the Ghana Journal of Forestry were in the realm of Forest Management. Wood Physics followed with 19 percent. Inter-discipline in nature recorded the least (3%) publication discipline. Forest Management indicated about 11% (the fourth highest) of the overall articles published in the Council for Scientific and Industrial Research Journals. The information shown on Fig. 1 and Table 1 is in conformity with the work of Willard, (2011) on natural resource economics. This is a trans-discipline field of academic research within

economics that aims to address the connections and interdependence between human economies and natural **ecosystems**. Its focus is how to operate an **economy** within the ecological constraints of earth's natural resources, Forest Management and **natural resources**. It also brings together and connects different disciplines within the natural and social sciences to broad areas of earth science, human **economics**, and natural ecosystems.

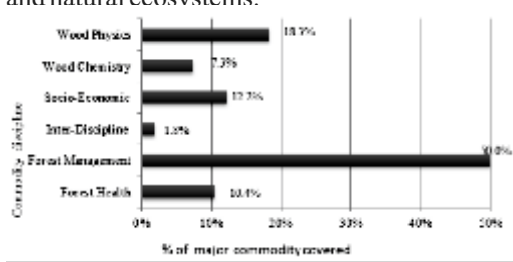


Fig. 1: GJF Major Commodity Covered (1994-2011)
Source: Authors computation

In Fig. 2, the study indicated that the Agricultural and Food Science Journal of Ghana (AFSJG) of the CSIR-Crop Research Institute covered research findings in eight of its thematic areas of operation and this is good for contributing to food security in the country. Resources and crop management produced about 53 percent of scholarly articles in the AFSJG for the period in question. This accounted for about 2 percent of articles in all the five journals in the CSIR. Abimah (2002) reported on means of improving agricultural production in Ghana, with a case study of extension education, productivity and sustainable use of natural resources. He stressed on increasing attention of research on food crops, inter-cropping and natural resources. In that same report it was recommended that Government, through the CSIR-Crops Research Institute, as well as private seed companies must embark on the breeding of improved varieties of cassava, maize, cowpea, soybean, rice, sorghum and groundnuts to resource-poor farmers.

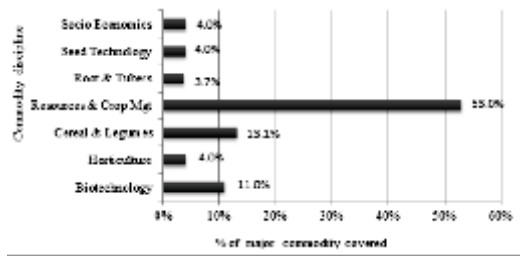


Fig. 2: AFSJ Major Commodity Covered (2002-2010)
Source: Authors computation

The analysis in Fig. 3 indicates 27 percent for Socio-Economic Development as the highest commodity area covered and eight times contributions from Geomatic Survey alone of the overall articles published in the Journal of Building and Road Research Institute. This was followed by Building Materials Development with 22 percent. Technology Transfer accounted for the least, about (6%), commodity discipline.

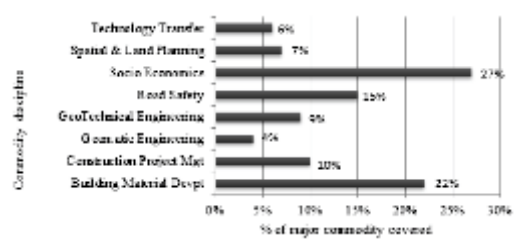


Fig. 3: JBRR Major Commodity Covered (1993-2010)
Source: Authors computation

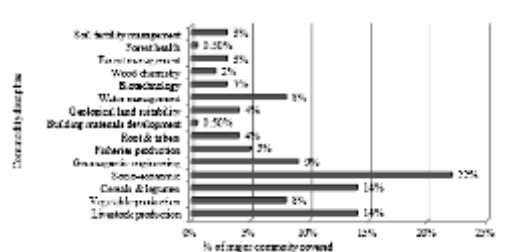


Fig. 4: GJS Major Commodity Covered (1963-2011)
Source: Authors computation

The analysis in Fig. 4 indicates 22 percent for Socio-Economic Development as the highest commodity area covered and eleven times contributions from Wood Chemistry alone of the overall articles published in Ghana Journal of Science. This was followed by Cereal & Legumes and Livestock Production with 14 percent apiece. Articles on Wood Chemistry accounted for the least, with about (2%), publication discipline. The investigation show that socio-economic commodity discipline accounted for 247 articles, recording the second highest as shown on Table 1; on Fig. 3 with 27 percent and Fig. 4 with 22 percent. According to Stads & Gogo (2011), public agricultural research and development investment doubled during 2001 to 2008 following increased government support but the country's total agricultural research and development investment as a percentage of agricultural GDP remained the lowest in Sub-Saharan Africa. Due to the significance of policy decision on resource allocations across various lines of research, detailed survey information was collected on the number of full time equivalent researchers working in specific commodity and thematic areas. Analysis of this showed that Research and development in socio-economic discipline was found to enhance food security and poverty reduction in Sub-Saharan Africa.

Livestock research accounted for 12 percent as indicated on Table 1, of Fig. 4 it was 14 percent and on Fig. 5 it was 16 percent. The livestock sector globally is highly dynamic. In developing countries, it is evolving in response to rapidly increasing demand for livestock products. In developed countries however, demand for livestock products is decreasing, while many production systems are increasing their efficiency and environmental sustainability. Thornton (2010) demonstrated in his studies that demand for livestock products in the future would be heavily moderated by socio-economic factors such as human health concerns and changing socio-cultural values.

Fig. 5 indicates 34.8 percent for Cereals and

Legumes as the highest commodity area covered and six times contributions from Root and Tubers alone of the overall articles published in Ghana Journal of Agricultural Science. This was followed by Livestock Production with 16.2 percent. Articles on Forest Health and Water management recorded the least with about 0.5 percent each.

Findings from the research indicated that cereal and legumes received the highest coverage (318 articles) in all the five journals in the CSIR as indicated in Table 1 and on Fig. 5. This result conformed to the work of Johnson *et al.*, (2011) who explained in their work that, once the benefits of greater regional cooperation and economic integration become more evident and understood the political will of member states to commit national resources to cereals and legume production is likely to increase. Growing national interest is already evident in the support of countries to do programmes such as the West African Agricultural Productivity Programmes and the East African Agricultural Productivity Programmes. The results also gave a testament to the value of evidence in setting research priorities, and therefore, the need to build regional analytical research capacities.



Fig. 5: GJAS Major Commodity Covered (1968-2011) Source: Authors computation

Overall, the analysis indicated low publication disciplines in horticulture, seed technology, geomatic engineering, construction project management, geo technical engineering, and technology transfer in the CSIR as indicated on Table 1. This implied that research scientists could be encouraged to write convincing

proposals to research into the least commodity areas mentioned above. The indication of low publication disciplines in horticulture, as compared to Sudan has to do with the nations' focus. Horticultural crops are the most researched crops in Sudan, accounting for 10 percent of the country's total crop and livestock research (Maatman, *et al.*, 2012). This probably may be due to intense afforestation to mitigate the effect of the Sahara desert on Sudan's doorstep. It is therefore not surprising that Sudan's research on rain fed crops is relatively understated compared with research on irrigated crops (Faki, Gumma, & Ismail 1995).

TABLE 1
Summary of publication discipline

<i>Publication Discipline</i>	<i>GJS</i>	<i>GJAS</i>	<i>GJF</i>	<i>AFSJ</i>	<i>JBRR</i>	<i>Totals</i>
Livestock production	58	117	-	-	-	175
Vegetable production	31	59	-	-	-	90
Cereals & legumes	58	253	-	7	-	318
Socio-economic	90	104	20	11	22	247
Geomagnetic engineering	35	-	-	-	-	35
Fisheries production	21	9	-	-	-	30
Root & tubers	17	41	-	2	-	60
Building materials development	2	-	-	-	12	19
Geological land suitability	18	-	-	-	-	18
Water management	31	4	-	-	-	35
Biotechnology	10	-	-	-	2	12
Wood chemistry	8	-	12	-	-	20
Forest management	12	64	82	-	-	157
Forest health	2	4	17	-	-	23
Soil fertility management	14	72	-	-	6	92
Wood physics	-	-	30	-	-	30
Inter discipline	-	-	3	-	-	3
Horticulture	-	-	-	1	-	1
Seed technology	-	-	-	2	-	2
Construction project management	-	-	-	-	7	7
Geomatic engineering	-	-	-	-	3	3
Geo technical engineering	-	-	-	-	7	7
Road safety	-	-	-	-	12	12
Technology transfer	-	-	-	-	6	6
Resources and crop management	-	-	-	28	-	28
Totals	407	726	164	53	80	1430

Conclusion

The research established four major publication disciplines in the areas of cereal and legumes, forestry management, socio-economic and livestock production and horticulture as the least commodity discipline of the five Journals in the Council for Scientific and Industrial Research. Publishing major commodity disciplines is, therefore, a basic aspect of research dissemination and knowledge sharing process.

Recommendations

The study recommends that support from universities, donors, and international institutions could play a key role in further developing cereal and legume capacity within Africa. More studies in livestock production should be carried out in future in Ghana. The innovation systems required to improve horticulture and other least subject disciplines could accelerate food security and agricultural growth, as well as engage multiple actors within and beyond the agricultural sector to coordinate their learning and action.

Acknowledgment

Our profound gratitude goes to Dr Samuel Smith Esseh, and Mrs. Lucy Ry-Kottoh, of the department of publishing studies, Kwame Nkrumah University of Science and Technology, Kumasi for their useful suggestions during the study and in the preparation of the article. We appreciate the Council for Scientific and Industrial Research Institutes which supported the study.

REFERENCES

- Abimah, L.** (2002). Improving agricultural production in Ghana; A case study of extension education for migrant farmers in Awudome communities in the Volta region. *A Dissertation submitted to the University of Ghana, in partial fulfilment of the requirement for the award of Master of Arts Degree in Adult Education.* ugspace.ug.edu.gh/.../Abimah%20Lawrence_Improving%20Agricultural%20Producti.

- Afolabi, M.** (1977). The literature of librarianship in Nigeria, 1950-73: Publication, citation and bibliographic control. *Nigeria Libraries*, **Vol.12**, Nos. 2 & 3, pp. 171-191.
- Alemna, A. A.** (1994). Scholarly publishing at the University of Ghana 1976-1986. Implementing for academic library development. *International Journal of Information and Library Research*. **Vol. 6** No. 3.
- Council for Scientific and Industrial Research** (1999). *CSIR Handbook*. Accra, Ghana, CSIR Secretariat.
- Council for Scientific and Industrial Research** (2010). *CSIR Handbook*. Accra, Ghana, CSIR Secretariat.
- Council for Scientific and Industrial Research** (2010 Senior Members' Revised Conditions of Service.
- Faki, H. H. M., Gumaa, Y. T. & Ismail, M. A.** (1995). Potential of the Sudan's irrigated sector in cereal grains production: Analysis of various policy options. *Agricultural systems* **48** (4): 385-532.
- Jaybgay, J.** (1984). *Scholarly Publishing in Francophone Africa*. The Africa book publishing record pp. 103.
- Joe Mensah, K. & Bekoe, S.** (2010). Journal publishing in Ghana: Review of the state and patronage. *Journal of Building and Road Research, Ghana Vol. 12*, No. 1
- Johnson, M., Benin, S., Diao, X., & You, L.** (2011). Incorporating research & development spill overs and wide effects: Prioritizing regional agricultural research & development investments in Africa. Conference Working Paper 15
- Kotei, A.** (1981). *The Book Today in Africa*, University Press, London. Pp50.
- Kronick, D. A.** (1976). "History of Scientific and Technical Periodicals," 2nd ed. Scarecrow.
- Maatman, A., Wongtschowski, M., Heemskerck, W., Sellamna, N., Davis, K., Nahdy, S., Ochola, W. & Kisauzi, D.** (2012). Competitive Agricultural Systems and Enterprises (CASE): *A Grassroots Approach to Agribusiness Development in Sub-Saharan Africa*. **Vol. 2**
- Montagnes, I.** (1991). *Editing and publication: A training manual*. Manila, Philippines: International Rice Research Institute.
- Roy, S. B. & Basak, M.** (2013). Journal of documentation: A Bibliometric Study. *Library Philosophy and Practice (e-journal)* Paper 945. Retrieved from <http://digitalcommons.unl.edu/libphilprac/945>
- Stads, G. J., & Gogo, J. O.** (2004). Ghana. ASTI Country Brief No. 13. Technology transfer in the CSIR.
- Thornton, P. K.** (2010). Livestock production: recent trends, future prospects. *Philos Trans R Soc Lond B Biol Sci* v.365 (1554); 2010 Sep 27 PMC2935116
- Washington, D. C. & The Hague:** International Food Policy Research Institute and International Service for National Agricultural Research. University of Ghana. *Various years. University of Ghana Legon annual*
- White, H. D. & McCain, K. W.** (1989). "Bibliometric" *In Annual Review of Information Science and Technology*. *Vol. 24*: 119-186. Edited by Martha. Williams, Amsterdam; Elsevier.
- Willard, B.** (2011). "3 Sustainability Models" citing *The Power of Sustainable Thinking* by Bob Doppelt, and *The Necessary Revolution* by Peter Senge et al. Retrieved on: 2011-05-03.
- Yawson, R. M.** (2002): *Technology commercialisation and intellectual property rights in Ghana*. By an Act of Parliament of the Republic of Ghana, CSIR Act 521 of 1996. Published in: The International Conference on TRIPS-Next Agenda for Developing Countries. Hyderabad, India. Retrieved from <http://mpr.ub.unimuenchen.de/id/eprint/33185>