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The Information Drain: Obstacles to Research in Africa

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THE INFORMATION DRAIN: OBSTACLES TO RESEARCH IN AFRICA

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There appears to be a consensus among African scholars and politicians that the continent has not benefited enough from its scientific research efforts. In an address to a recent congress of the Pan-African Union of Science and Technology, Ghana's Head of State laid the blame squarely on African scientists themselves (New Nigerian, 5 February 1990). Usman (1979), a historian and social critic, had earlier referred to Nigerian academicians as 'intellectual robots'. Aliu and Mohammed (1990) commented on indiscriminate importation of technology as impeding rather than facilitating development, and proposed more funding for indigenous research by African governments.

The purpose of research is to generate knowledge, and access to this knowledge is as important as the research process itself (Aliu and Mohammed, 1990; Bozimo, 1983). Access to locally generated information appears to be a problem in Nigeria at various levels, judging by the accusations and counter-accusations in the nation's print media. Government officials as well as the private sector say that scientists and their establishments do not provide them with research results. Scientists and other researchers argue that they are under-funded and ill-equipped. African scholars give warning of their isolation from world research streams owing to lack of current journals and books (Aliu and Mohammed, 1990; Kumar, 1990), a situation which is likely to worsen in sub-Saharan Africa because of foreign-exchange problems resulting from structural adjustment programmes (Kumar, 1990).

Partly to alleviate this particular problem, there has been an increase in the number of locally published journals in most disciplines in Nigeria during the past decade. A study of the ten-year citation pattern of the *Nigerian Journal of Science (NJS)*, however, did not provide support for the assumption that local publications alone would enhance interaction, even between Nigerian scientists (Bozimo, 1983). The study showed that out of a total 1303 journal citations made in 175 articles in the *NJS* during a period of 10 years, only 15 were to articles published in the journal itself, and 12 of these were citations by the authors themselves. One important implication of the low impact of the journal is an unhealthy fragmentation among the Nigerian scientific community which might, among other things, interfere with the discipline's self-correcting methodology. Perhaps the best confirmation of Bozimo's study is the proliferation of journals throughout the country soon after it was published without due regard to the issues raised.

The 'Information Age' consists partly of the realisation that information is a resource, and one which is perhaps distinguished from other resources only by the fact that it is available to anyone who can obtain and use it faster than it decays. The implications of this new age and its tools have been subjects of both hope and fear. Will a handful of technologically advanced countries restrict the role of all others to that of passive consumers of finished products (Dupont, 1986)? Or will

some countries skip the industrialisation stage and go directly to information-based industries (Valantin and Balson, 1986)?

The present study was undertaken to determine what, if anything, happens to the information being generated by scientists in Nigeria, using requests for off-prints received by staff of the Faculty of Veterinary Medicine in the Ahmadu Bello University, Zaria, as sources of data.

Results of the Study

Most faculty staff did not file or keep track of requests for their articles. In all, 865 requests for a total of 61 articles published between 1974 and 1987 were recovered from 13 authors. It was claimed that all requests had been honoured by the authors, except where off-prints had been exhausted. Unfortunately, authors did not keep exact records of which requests were or were not honoured. None of the 61 articles included in this study could be recovered from the faculty's library, and no author had more than 3 off-prints in his or her possession.

The results are summarised in Tables 1 to 5. Sixty-one articles were published in 38 different journals. More articles were published in journals located in advanced (83.6%) than in developing (16.4%) countries. Furthermore, more requests (835; average 16.4) were received for articles published in journals located in the 'North' than for those located in the 'South' (30; average 3.0). The effect of publishing articles by Nigerian scientists in local and other journals located in the South seems to be to reduce the total number of requests received without increasing requests from Nigeria and other African countries.

Research information generated by Nigerian veterinary scientists has been used in 53 countries, with about the same number of advanced (27) and developing (26) countries asking for at least one article (see Table 2). However, the advanced countries accounted for approximately 82% of all requests received for Nigerian articles, and for most requests for the different categories of uses, as shown in the table.

Journal location	Number of journals	Number of articles	Total	Reprint requests	
				from Nigeria (%)	from Africa (%)
Nigeria	4	5	11	0.00	0.00
Africa*	2	2	8	0.00	25.00
India	3	3	11	0.00	0.00
'South' total	9	10	30	0.00	6.67**
'North' total	29	51	835	0.36	7.42**
Overall total	38	61	865	0.35	7.40**

* Excluding Nigeria
 ** Mainly from Republic of South Africa and international organisations based in Kenya and Zimbabwe.

A list of the countries which asked for published Nigerian veterinary articles is presented in Table 3, ranked in order of magnitude of requests and spread or diversity of information requested. All the 8 requests from Zimbabwe were in reality from an American research organisation. Similarly, 88% (21) of the 24 requests from Kenya were from international research organisations based in that country. On a geo-political basis, North American and European countries asked for the most information, and African sub-regions the least.

A sensible and significant association ($0.025 < p < 0.050$) existed between the speciality of the published veterinary information and the type of user or requester. Industries made more requests for articles on pharmacology, parasitology and medicine, and less for those on anatomy and pathology. Non-military government officers asked for more veterinary public health articles and less for physiology, while military personnel asked for more on medicine and less on anatomy than expected; anatomy information was of more interest to academics.

Source of countries requesting information	Number of countries requesting information	Nature of request					Total request
		Academic	Defence	Policy	Commerce		
'North'	27 (51%)	541 (81%)	15 (94%)	104 (86%)	48 (86%)	708 (82%)	
'South'	26 (49%)	131 (19%)	1 (6%)	17 (14%)	8 (14%)	157 (18%)	
Totals	53	672	16	121	56	865	

Requests from Ministries of Defence or departments associated with them were all either from US A ('North') or India ('South'). All requests from private sectors in the 'South' were either from South America (7) or Indonesia (1). Fifty-five of the 865 requests (6.3%) were excluded from this analysis because they were either not dated or their dates could not be deciphered.

The older an article, the fewer the number of requests for it (Table 4), a trend substantiated by a highly significant ($p < 0.005$) 'goodness of fit' chi-square. Only 1% of the requests received were for articles published more than two years previously.

Requests from the various sectors did not differ significantly in terms of their speed for time lag. However, the economic location of both the requester and the journal publishers was significantly associated with the lag in requests ($p < 0.005$). Requests from developing countries tended to have greater lags than those from advanced countries (see Table 5). There was a decreasing tendency for requests for old articles published in journals located in advanced countries, and an increasing one for those published in Africa.

Implications for Researchers

Unlike their counterparts in advanced countries, scientists in Africa are faced with a lack of both current published journals and electronic information retrieval systems, as well as funding for attending all but the most local of conferences. Requests for off-prints make it possible to obtain current information at the cost of a postage stamp in the local currency, and should therefore be of vastly more importance to scientists in Third World nations.

Table 3. Extent and spread of requests for published Nigerian veterinary information

Country	Number of requests received	% of total	Number of articles requested	% of total
USA	238	27.5	45	73.8
Czechoslovakia	71	8.2	30	49.2
Canada	62	7.2	26	42.6
France	51	5.9	28	45.9
Germany (West)	35	4.0	21	34.4
United Kingdom	35	4.0	20	32.8
Argentina	33	3.8	17	27.9
Kenya	24(a)	2.8	10	16.3
Poland	23	2.7	10	16.3
Australia	23	2.7	9	14.8
Japan	22	2.5	13	21.3
Spain	21	2.4	20	32.8
Germany (East)	18	2.1	13	21.3
South Africa	18	2.1	8	13.1
Hungary	16	1.9	15	24.6
India	14	1.6	9	14.8
Cuba	13	1.5	11	18.0
Switzerland	13	1.5	8	13.1
Mexico	12	1.4	7	11.5
Brazil	11	1.3	10	16.3
Belgium	10	1.2	7	11.5
Venezuela	10	1.2	6	9.8
Holland	9	1.0	7	11.5
Bulgaria	9	1.0	6	9.8
Zimbabwe	8(a)	0.9	6	9.8
Denmark	7	0.8	6	9.8
Israel	6	0.7	5	8.2

*(a) Mainly from international organisations
Chile, Iran, Nigeria, Colombia, Ireland, Italy, New Zealand, Sweden and the USSR made 3 requests (0.4% of total); Costa Rica, Mozambique, Sudan, Turkey, Uruguay, Burkina Faso and Iceland made 2 requests (0.2% of total); Austria, Egypt, Indonesia, Malawi, Papua New Guinea, Senegal, Sri Lanka, Zaire and Zambia made 1 request (0.01% of total)*

Yet the data given in Tables 2 and 3 show that this method is not sufficiently exploited by scientists in Africa. Indeed, their greater time-lag suggests that even the smaller number of requests from developing countries are less likely to be honoured by authors compared with

those from advanced countries, because authors' off-prints are a limited resource and are sent out on 'first-requested-first-served' basis.

It is a fact that Nigerians are likely to have more direct access to information published in Nigerian journals, and therefore have less need to ask for that category of off-prints (as shown in Table 1). However, this does not explain the low number and spread of requests from Nigerians for information published elsewhere in Africa, or in India and in advanced countries; nor does it explain the relative paucity of requests from Africa (Tables 1 and 3). Moreover, Bozimo (1983) has shown that even where journals were supplied automatically to Nigerian scientists, the published information had virtually no impact on the design of subsequent research projects, partly owing to lack of pressure from the local economy (Cooper, 1973).

Lag (years)	0	1	2	3	4	5	6	7	8	9	10	Total
Frequency of request	559	229	14	5	1	0	0	0	0	0	2	810
% of total	69.0	28.3	1.7	100

Source of request	Lag (years)			Total
	0	1	2+	
North	469	185	8	662
South	90	44	14	148
Total	559	229	22	810

The greater overall time-lag of requests (including those from advanced countries) for articles published in local journals is probably due to the irregular nature of the local journals compared with those published in advanced countries. Many Nigerian journals go through an endless circle of deaths and rebirths; some publish several volumes simultaneously but bearing different dates, while others are published in 2-3 year instalments with no regard for the processes of information decay. Since its establishment in 1969 in the faculty studied here, the *Student Veterinarian* has appeared at the rate of 0.7 volumes per year (Hamman, 1990), a monumental success according to the current Editor-in-Chief.

The failure to recover off-prints of any of the 61 articles from the faculty library is probably due to a combination of factors. Some authors may not have deposited off-prints in the

library. Library staff in the faculty do complain of users failing to return borrowed materials, but the fact the defaulters remain anonymous suggests basic problems with record-keeping.

Within the field of veterinary science, the specialty of the information was significantly associated with the type of user. This suggests that the details of the pattern of global use of published information will depend on the discipline being studied, so that the position of a country in the Information League (Table 3) will depend on the relevance of the information to its economy. However, in view of the fact that all the articles whose requests were studied here were relevant to Nigeria and other developing African countries, there is little hope that the total picture of the 'information drain' will be any less alarming for other disciplines in developing African countries.

The results of this study also have implications for international development science. Argentina in particular, but also India, Cuba and Brazil, were the most (veterinary) information-conscious of the countries classified as 'South'. Of the industrialised nations, Czechoslovakia was a surprise, dominating Eastern Europe and second only to the United States; the USSR asked for only three off-prints from Nigeria during the period covered by the study; China did not ask for any (Table 3). Moreover, political barriers do not seem to inhibit international exchange of information. Thus Israel requested as many off-prints as the West African sub-region; the Republic of South Africa asked for three times as many.

Complaints from government and non-government officers in Nigeria and elsewhere in Africa about the failure of their scientists to supply them with published information should be viewed from the following comparison. The US Ministry of Defense alone, during the period under study, asked for more Nigeria-generated veterinary information than all the scientists, agriculturalists, veterinarians, students, industrialists, libraries and policy-makers of 48 African developing countries, including Nigeria itself.

Vambu (1972) and Ezeokoli (1988) have questioned the ability of Africans to accumulate and share knowledge across the generations and to build upon earlier achievements by others of their kind, and suggested that this cultural attitude may have contributed immensely to the continent's state of underdevelopment. Sustainable development in Africa will thus require:

- more extensive and comprehensive studies to confirm the existence, causes, dynamics and implications of the 'information drain' from Nigeria and other developing countries;
- support from all parties in the North and South for an increased commitment to share knowledge and research findings within Africa.

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