

Who Cites Your Publications When You Work in the Tropics?

One question which working (i.e., publishing scientists) often ask themselves is *who* they are writing for. Most often, unless they work in a very applied field, the answer is that those who read and use scientific results are other scientists. Therefore, since scientists usually *cite* the publication they used in the course of the work that led to a certain paper, it is possible for the number of "users" of a given scientific paper to be assessed quite accurately on the basis of so-called "citation analyses." Such analyses can be performed to assess the impact of the scientific research conducted by a given country, such as Thailand¹ an institution such as ICLARM (see p. 3) or an individual scientist². Most citation analyses available to date are exclusively based on the computerized files of the Institute of Scientific Information (ISI) in America, and refer only to citations in

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so-called "core journals", that is, in journals that are themselves heavily cited, and which are almost all published in developed countries³.

The preliminary citation analysis presented here is based on papers or books which I have authored, co-authored or edited between 1973 and 1983, and includes any citation, by any journal, article, book, report or thesis, but excludes all self citations. The main purpose of this analysis is to assess—for the benefit of colleagues working in developing

countries—whether citation analysis can be used to measure the impact of one's work.

As in my previous analysis of reprint requests (ICLARM Newsletter, April 1982, p. 18), I should stress here that most of my papers which cover the field of aquatic and fishery biology are heavily oriented toward problems and situations arising in tropical developing countries. Altogether, 50 items are included here. Other items, which received zero citations, are discussed only in the legend of Fig. 1.

Table 1 presents the key results of the analysis. As might be seen, of the 307 citations received to date, only 31 (or 10%) were included in the ISI files.

Table 1. Citations received (excluding self citations), 1974 to 1983. Note large numbers of references received in Asia (due to ICLARM's location) and low citation counts in "core" journals (ISI files).

Type of citing publication	Residence of citing author (or of senior author if applicable)							Citations in ISI files
	Africa	Asia	Europe	Latin America & Caribbean	Oceania (incl. Australia)	USA & Canada	Total citations	
Regularly issued journal	4	16	17	5	4	19	65	31
Book, book chapter, monograph	0	48	11	0	11	13	83	0
Reports	9	42	21	1	9	17	99	0
Theses	1	43	12	3	0	1	60	0
Total	14	149	61	9	24	50	307	31



Dr. Conner Bailey, ICLARM affiliate scientist, searching for material in the library of the Research Institute for Marine Fisheries, Jakarta. Most "core" journals inadequately cover work conducted in the tropics.

Table 2. Coverage of "tropical topics"^a in six heavily cited "core" journals⁴ in marine biology, as compared with tropical topics in three "non-core" journals from tropical developing countries.

	Vol.	Year	Total pages	Pages with tropical topics	% coverage of tropical topics
"Core" journals					
J. Mar. Biol. Assoc. U.K.	63	1983	945	0	0.0
Can. J. Fish. Aquat. Sci.	38	1981	1,923	8	0.4
Bull. Jap. Soc. Sci. Fish.	49	1983	1,939	29	1.5
Limnol. Oceanogr.	26	1981	1,182	87	7.4
U.S. Fish. Bull.	79	1981	812	145	17.3
Aust. J. Mar. Freshw. Res.	33	1982	1,132	234	20.7
"Non-core" journals					
Bol. Inst. Oceanogr. S. Paulo	24-28	1975-79	1,379	1,003	72.7
Indian J. Fish.	26-28	1973-81	833	816	98.0
Fish. Res. J. Philippines	1-5	1976-80	920	912	99.0

^aAll articles based on material and data obtained or originating between the tropics of Cancer and Capricorn.

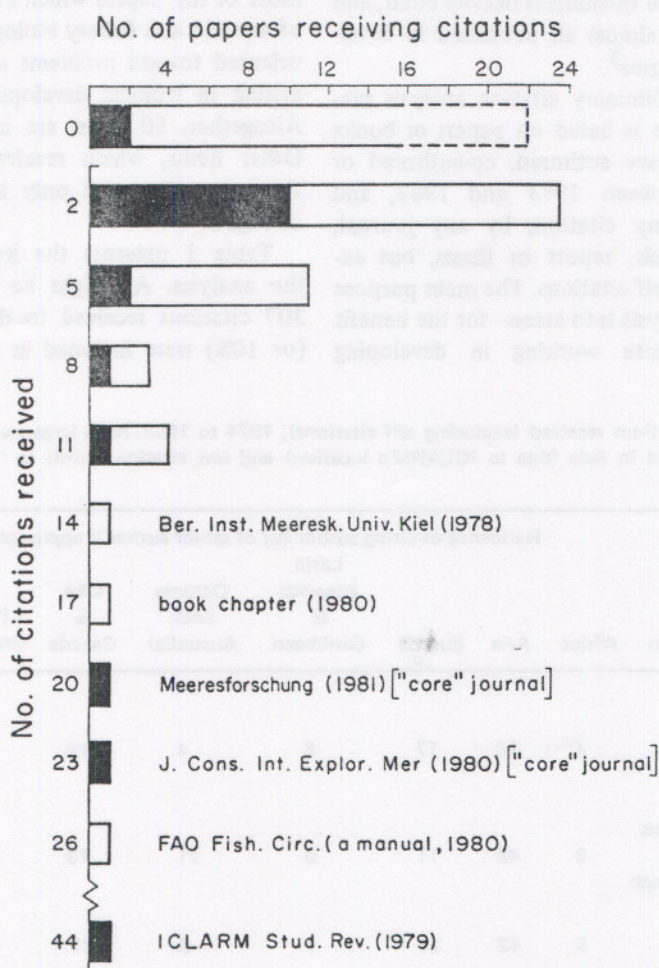


Fig. 1. Frequency distribution of citations received (1974-1983). Note that distribution is strongly asymmetrical, with a few heavily cited papers, and a large number with very few citations (papers with zero citation include only items up to 1982, since papers published in 1983 are not likely to be cited the same year). Black portions of histogram represent number of papers belonging to the primary literature (i.e., refereed journals and monographs).

The explanation for this extraordinary result is

- ISI deals only with "core" journals, i.e., journals which themselves are heavily cited.
- Most "core" journals inadequately cover work conducted in the tropics, as opposed to "non-core" journals that are published in the tropics (see Table 2).

ISI justifies quite legitimately the selection of "core" journals by a number of reasons, one of which is the fact that most citations are accumulated by articles published in "core" journals. However, Fig. 1 shows that of my six best cited papers (more than 12 references), only two were published in "core" journals as defined by ISI.

Two very important "core" journals in marine biology are the Journal of the Marine Biological Association of the United Kingdom and the Canadian Journal of Fisheries and Aquatic Sciences⁴. Taken together, these two journals devote 0.3% of their pages to tropical topics—either because they do not receive high quality manuscripts from scientists working in the tropics, or because their editorial policy does not encourage such submissions. The situation is now such that occasional "tropical" papers published in these journals, or in others like them, will generally not be accessible to scientists working in the tropics because their non-coverage of relevant topics magnifies their high price. This leads to the paradoxical situation that some highly cited North American or European journals may be—as viewed from the tropics—fringe journals that may be less valuable than an abstract service (e.g., ASFA) or current awareness publication such as "Current Contents" and ordering reprints.

- Yuthavong, Y. 1983. The input and output of science and technology in Thailand. J. Sci. Soc. Thailand 9: 1-4.
- Garfield, E. 1983. How to use citation analysis for faculty evaluations, and when is it relevant? Part 2. Current Contents 14(45): 5-13.
- Garfield, E. 1983. Third world research. Part I. Where it is published, and how often it is cited. Current Contents 14(33): 5-15.
- Garfield, E. 1980. The literature of marine biology. Biol. Morya (3): 3-20. Transl. 1982 by Plenum Publ. Corp.

This essay was reprinted in Pauly (1984), and I added the following postscript:

The above essay, originally published in April 1984, had two follow-ups worth elaborating upon:

Shortly after the publication of the essay, I was contacted by Y. Yuthavong, of Mahidol University, Bangkok, to help prepare and attend an “International workshop to assess the coverage of the scientific output of the Third World” (Moravcsik 1986) [...]. This allowed me to visit the Institute of Scientific Information in Philadelphia and meet its extraordinary founder, Dr. E. Garfield. Thus, in the unlikely event that I should be asked to write the forward to one of his annual collections of essays, I will be able to indicate - as is the tradition for these volumes - when and where, and why I first met Dr. Garfield.

The overall lesson here: write, and you shall be invited to meetings

The above essay suggested a 1:10 ratio for ISI to non-ISI citations for scientists working in the tropics. Virtually the same ratio was found in a study conducted six years later, covering the citations received by the senior staff of the institution with which I am affiliated (Maclean *et al.*, 1990). Thus, ISI may have a problem with its coverage of the tropical literature indeed, as might also be the case for those who rely exclusively on ISI citation counts to evaluate work done on the South (not an irrelevant point in an age of *global* changes).

References

- Moravcsik, M.J. 1986. Strengthening the coverage of third world science. The final report of
the Philadelphia Workshop and of the discussions preceding and following that workshop, July 1985. Institute of Theoretical Science, University of Oregon, Eugene, OR. 16 p.
- Maclean, J. 1984. Characteristics of the tropical fisheries literature. ICLARM Newsletter 7(2): 3-4.
- Pauly, D. 1994. *On the sex of fish and the gender of scientists: essays in fisheries science*. Chapman & Hall, London, 250 p.