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**INIS Data Base : A Sample Survey and Statistical Analysis**

by

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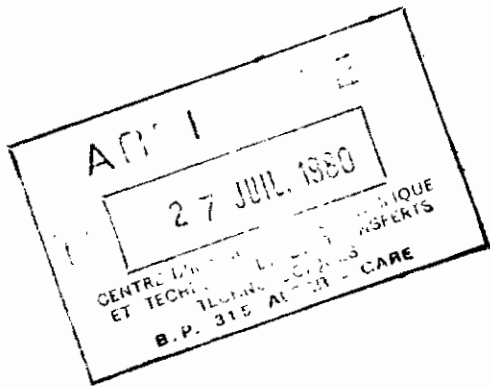
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## INTRODUCTION

International Nuclear Information System (INIS) is the first truly international co-operative venture in the field of information, based on decentralised input and centralised processing. In spite of initial misgivings about its success in some quarters, the System has successfully completed 10 years of its existence and proved extremely useful to scientists and engineers in both the developed and the developing countries. The coverage as well as sophistication of the System has also been improving with time and its data base is already available on-line. From a small number, the number of participants in the System, both the Member States and international organisations, is now 75. Its data base has increased from 4053 items in 1970 to over half a million now. The annual input to the System has now reached 75,000 items and is likely to increase further to cover practically all the worthwhile nuclear literature published in the world.

It is perhaps high time to take a good look at the INIS data base from a different angle rather than from the point of view so far adopted. This computer-based mission-oriented system is intended to cater to and meet the requirements of scientists and other professionals needing information relating to nuclear science and technology. The highly developed countries do possess sophisticated technologies and ample resources to meet the demands of their scientists to a great extent. On the other hand, most of the developing countries have neither the sophisticated communication channels, technological tools, technical man-power nor requisite financial resources to exploit the data base. How and what has INIS been able to do for these participants? Is there any way of analysing the situation and finding better utilization of INIS in all its Member States? These are difficult questions and the answers could be even more so. However, a beginning in this direction has to be made somewhere, somehow.

## SAMPLE SURVEY AND STATISTICAL ANALYSIS

Here is a report which is based on a very preliminary survey of some aspects of INIS viz. statistical analysis of the input to INIS from six developed countries and India (a developing country), in which this study has been undertaken. The choice of the countries has been a random

one, though four countries selected are top inputting ones. Omission of some other major inputters to INIS has not been deliberate but due to the random choice and the non-availability of a compatible computer to process the INIS tape at this Centre.

The main analysis is the one based on the subject categories (at the second high specific level), though a broad look has been taken at the contributions from each country to the types of literature ('B', 'J', 'P', & 'R') to the the INIS data base. The analysis has been carried out only for the last three years, ie. 1977, 1978 and 1979 (corresponding to Vols. 8, 9 & 10 of the INIS Atomindex), because the data, partly collected manually, in India by the authors as well as the ones received from INIS, Vienna, (with the kind cooperation of Dr. Romanenko and his staff) were complete only for these years. The manual approach has been too time-consuming and laborious. Even getting such statistical data using the computer at Vienna is reported to have been very time-consuming. Hence, the limited study on three years' input.

Perhaps, there is very little to interpret or deduce from the 2nd part of the study ie. on types of literature. The first part, however, is aimed at finding out whether there is a set pattern of input to any specific category from any particular country and if so, which and how significant is the same. Incidentally, the areas of specific interest to each country are automatically identified. This kind of information may not be of much relevance to the developed countries, but it could be useful to the developing ones, in as much as a developing country, which wants to initiate research in a specific field of nuclear science and technology, can, at a glance, get an idea of where and whom to write to for relevant literature in case such information is available from a statistical study of this kind- at least the authors hope so. In fact, this study ought to be done at the lowest specific level possible so that the picture would be clearer; but unfortunately, access to a compatible computer and time available even with the existing one is so inadequate that such a task could not be undertaken. If, however, a developed country is prepared to conduct the study, or assist developing countries to do the same, it might prove beneficial to the latter.

Suggestions and comments on the present study as well as for such efforts in future are invited both from the developed and the developing countries.

The analysis has been presented both as figures and in the form of tables. Symbols used have been listed in Appendix I, II & III. Results have been presented as percentage contributions and they are only approximate in some cases, since part of the data has been collected manually and there is every likelihood of human errors creeping in. However, all attempts have been made to present the results as accurately as possible.

There were a couple of points which apparently showed up as discrepancies, such as the contribution of a particular country, being almost



more than the total input to the data base in a specific subject category - but actually, this could be because of the computer counting an entry more than once, when an item has been assigned multiple categories. Again, the figures collected manually by searching the INIS Atomindex are found to differ quite often from the ones circulated by INIS, Vienna, based on computer search of the tapes. We believe that this could be due to modifications made in the INIS tapes even after the items have been printed in the Atomindex.

## DISCUSSION

(1) Figs. 1, 7 and 13 present contributions of nuclear literature, in percentage, from the seven countries under study, to the INIS data base for the years 1977, 1978 and 1979 respectively. The US has consistently topped the list with contributions ranging from 26% to 29%, with the USSR always emerging as the second with a percentage ranging from 15 to 21. The third place is taken up by FRG in 1977 and 1978, with the UK overtaking it in 1979 to occupy the third position. France, India & Italy have emerged consistently as 5th, 6th and 7th respectively.

(2) The overall picture that emerges from figs. 2, 8, 14 (corresponding to tables 2, 8 and 14) based on the study of types of literature is more or less uniform over the period covered. The preference (above 50%) for publication of literature as journal articles, (classified as 'J' here) seems to be strikingly predominant as can logically be expected. The quickest way of communicating scientific information, with the widest dissemination, is undoubtedly through core journals. An in-depth survey of the journals can bring out the actual core journals publishing these papers. The logical sequence is kept up, as expected, by reports (type 'R') ranking second with a contribution around 25%, followed by book forms (type 'B') around 9%. Patents constitute 3 to 4%.

(3) An in-depth analysis of the contribution of each country to the types of literature 'B', 'J', 'P' and 'R' in the three years are presented in figs. 3 to 6 (for 1977), figs. 9 to 12 (1978) and figs. 15 to 18 (1979).

Publications of type 'B' amount to about 17% for the US, whereas it is rather low for the USSR, i.e. about 4% to 5% only. The UK, FRG, & FR have a figure of 7 to 10% in the three years under study. India has an average contribution of 5%, whereas Italy has none. In type 'J', the USSR is almost as high as the US. The UK is ahead of FR and FRG in this category. IN and IT are low, but, consistent. Though the US and the USSR are leading in other categories, it is FRG which leads in the type of literature, 'P', throughout. FR is significant with the percentage of 8% to 15%. IN and IT have none. The type 'R' is dominated by the US, as is well-known. SU is also significant and the rest of the countries seem to have a very small percentage of report literature to contribute to the INIS data base.

(4) The analysis of the subject categories carried out at the second highest level of specificity ie. A1 to F6 highlights the following :

**Category A (A1, A2 and A3) :-** Category A2 appears to be more dominant as far as contribution from most of the countries is concerned. Even Italy, whose contribution to the other categories is not significant, has provided 5 to 10% of the literature in this category. The maximum contribution, which follows almost a set pattern throughout this study, is from the United States followed by the Soviet Union and then by either the UK or FRG. India's contribution, though not high, is still consistent in the category A. The contribution to A3 has also been consistent in the case of India and FRG whereas A1 is the prominent category for the UK.

**Category B (B1, B2 and B3) :-** The highest contribution is from the US in 1977 and 1979 whereas the SU takes this place in 1978. Italy's contribution is practically nil. India's contribution has been consistent, though low. France's contribution is just comparable to that of India. The UK and FRG rank third and fourth respectively.

**Category C (C1, C2, C3, C4, C5 and C6) :-** Maximum contribution is from the US, where the literature seems to be abundant in categories C3 and C5 in particular. The contribution from the SU is strikingly low, except for C1. India is fairly involved in research in the fields covered by C3 and C4 as can be seen from the figures. FRG, the UK and FR also seem to be quite active in this area of research. Italy has inputted hardly anything in this category.

**Category D (D1 and D2) :-** A uniform pattern emerges for all the three years in contributions from the US, SU, FRG, UK, FR and IN, ranking in that order. FRG, UK and FR seem to be almost on par as far as the contribution in this category is concerned, though it is not as high as that of the first two countries. India's contribution is also significant in 1978 whereas that of Italy is negligible.

**Category E (E1, E2, E3, E4 and E5) :-** The maximum contribution in the INIS data base comes from this category. The US tops with large contributions under E5 and E3, whereas the SU contributes more under E1 and E4. FRG seems to have an emphasis on E1 and E2, UK on E3 and E4, FR on E1 and IN on E2 and E4. Italy's contribution is almost negligible.

**Category F (F1, F2, F3, F4, F5 and F6) :-** There seems to be an overwhelming percentage of contribution from the US to this category. Soviet Union's contribution is almost negligible except for F5 in 1977 and 1979 and F1 in 1978. FRG, UK and FR rank in that order after the SU. India's contribution is very low or nil. Italy's contribution is mostly nil. This trend may be due to factors governed by national and governmental policies or some other considerations.

It is noteworthy that, though India's contribution is not impressive, it has been consistent throughout. It is highly gratifying to us that we have been inputting literature practically in all fields covered by INIS, right from category 'A1' to 'F6'. Of course, it is not possible to input literature falling under some categories of 'F', because the nuclear laws, regulations, etc. are yet to take the final shape in India.