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DOCUMENTATION OF ON-GOING PROJECTS— A Case Study

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Discusses the need and utility of directories of research in the field of Science and Technology. Presents the helpfulness of compiling a directory of on-going research in the field of Food Science and Technology. Presents the methodology for compiling the directory for on-going research and an analysis of the data contained in the directory of on-going research projects in Food Science and Technology and related areas in India (1980) compiled by the Central Food Technological Research Institute (Mysore).

1 Introduction

Recent years have seen increased investments in scientific and technological research. This is more so in industrialised countries. For example, the developed countries like U.S.A., Federal Republic of Germany and Great Britain spend 2.0% or over of GNP towards R & D. In comparison, India spends only 0.6% of its GNP, though the country has recorded significant improvements since independence. The R & D investments increased from 120 million rupees in 1958-59 to over 5,000 million rupees at present. There has also been vast improvements in R & D investments in the industrial sector. The total expenditure in this sector is about 840 million rupees which forms about 18.6% of the total S & T outlay. To this private and public sector contribute 490 and 350 million rupees respectively. Increases in these sectors from 1974-75 to 1976-77 amounted to 36% and 89% respectively. As regards S & T manpower, it increased from 20,700 in 1958-59 to about 1,30,000 in 1974-75. The industrial sector accounts for about 26% of the total manpower for R & D in the country (1, 2).

Investments for information is also more in developed countries. In the U.S.A. the cost of production and distribution of information was calculated to be 29% of GNP in 1958, 33% in 1963 and 40% in 1968, which shows a steady increase (6). Though such an estimate is not available for developing countries like India, it can be assumed that the position is far inferior. In India, as per Science and Technology Plan (3), information gets only 1.0% of total outlay for S & T, as compared to, for example 5.0% in EEC countries in 1975-77 (8). It should be agreed even this investment is a significant one.

The above factors confirm that information is indeed an important national resource, and its availability is vital to all developmental activities including R & D. However, there are problems in information availability the most evident being its volume. It is well known that the growth rate of documents is estimated to be 12.5% per year at present i.e. 1.5 million more documents per year (6). The present annual output of documents may be estimated at 10 million. There is in addition a large volume of unpublished information which is not available through formal channels like unpublished reports, on-going project information etc. Thus, there is always a gap between the information available and information existing at any point of time, and information systems of today tend to bridge this gap by creating referral tools. The 'Directory of on-going projects in Food Science and Technology' compiled by the National Information Centre for Food Science and Technology, a sectoral centre under NISSAT functioning at CFTRI, Mysore, is an effort in this direction. This paper is concerned with its compilation, analysis and evaluation.

2 Importance on Information on on-going Projects

The gap in the availability of information may be attributed to several factors. A certain amount of information is not published at all for reasons of secrecy as for example information pertaining to defence requirements. Very little can be done in regard to this kind of information. Some are brought out in memeographed form and distributed on a very limited scale. The rest of the information is in the process of generation in the course of work on projects in

different institutions. This information may get published in course of time but after considerable delay. Scientists tend to fillup this gap to some extent by communicating with other scientists working in their field directly. This personal contact has, however, physical limitations. Attending seminars, conferences, symposia etc. is another way of keeping track of current research information. However, this is possible only for a minority of scientists who may have the necessary time and resources to take part in such meetings. Thus, it has been realised that there is need for a more practical. taster and effective channel for collecting and communication of information on on-going projects. Such a channel can bring about contact among scientists working in allied fields so that they can be aware of the current trends and status in their respective fields. Another important point is that in the course of a project, information is generated at every stage of the project and such information may be of great potential value.

3 Availability of Information on on-going Projects

Two factors that are to be noted in making information available to researchers are the actual availability of information and the speed with which it has to be made available. These factors assume greater importance in the context of project oriented research as this concept is borne out of the recognition that any intellectual effort which calls for various kinds of inputs (like financial and man power) has to be need-oriented in order that it can benefit society to the maximum as against research work based on individual flare which can bring in uneconomic results. Thus, this approach to R & D is more or less accepted universally. Institutions have now adopted the procedure of spelling out their entire R & D programs in terms of a varying number of precisely planned, defined and formulated projects each of which has a time target. At each step of progress on a project, certain amount of information is needed and in the absence of such information the project cannot progress unless the needed information is generated afresh. For example, the composition, of a course cereal processing of which forms the project, should not be investigated afresh if the data is already available. Such data may either be available in published form or may have been generated as part of a project in some other institution but still

unpublished. Failure to get at such information naturally results in wasteful duplication. To cite an example, in an Indian R & D organisation, a project to develop a device to measure certain parameters of milk was undertaken against a specific requirement. It was the practice in that organisation to associate the librarian with the project work by making him responsible for the literature survey and collection. At the time the project in question was initiated, no evidence of the existence of a similar device was found in literature. After the successful completion of the project, the authorities decided to patent that device as it was of general applicability. At that time, a report appeared in a periodical detailing an account of an identical device. Evidently, this device was perhaps half way through development when the project in question was initiated. This further illustrates the need to create facilities for information on on-going projects.

In CFTRI, planning and implementation of projects have been systematised. There had been a demand from the project coordinators earlier that sections of annual reports containing information on projects should be included in one of the documentation publications. This was done for some time before a decision was taken to create a Directory of On-going projects. Even now, annual reports of some overseas institutes are being scanned and reported.

4 Registries of on-going Projects: Current Trend

There is now a trend towards promoting creation of registries of on-going projects at national and international levels, with the ultimate aim of having a global net work of such registries. UNISIST International Symposium on Information Systems and services in On-going research in science organised by UNESCO in collaboration with SSIE in 1975 reflects the desire of several countries in this regard (9). This conference identified the various levels of registries —local or institutional; group or agency (e.g. CSIR, ICAR, ICMR etc.); National and International. The problem for creating these registries are evidently simple at the local level but gradually increase with increase in the level of the registry. Registries at national and international levels are particularly difficult to create due to the number of institutions involved and difficulties faced in identifying

and extracting response from them. Another problem about the registries of on-going projects is their getting out of date quickly and the need for constantly updating them. It is generally agreed that use of computers is very appropriate in creating registries at higher levels. This naturally brings in the need to have standardised formats. It should also be remembered that the local registries are to preferably form the actual inputs for higher level registries for obvious reasons and this would mean the need to adhere to a common format at all levels. The conference referred to above has suggested guidelines for devising standardised formats. It is also considered preferable to restrict the coverage of individual registries by subject or some other characteristic for ease of handling enormous number of projects that may exist (5, 7).

With respect to supply of information, it can either be mandatory or voluntary. In USSR, this has been made mandatory even at the national level (9). But in political systems such as ours, it cannot be mandatory as institutions have their own rights as to what they want to supply or what not to supply. Moreover, voluntary system though difficult can really be a good system as it is based on the principle of cooperation and get built into the registry system when once value of the registry becomes wellknown. The international registry has naturally to depend upon voluntary cooperation of different countries (5).

The objectives and function of a national registry are as follows (9):

1. Registering of research and development projects undertaken by various establishment both from public and private sectors in the country.

2. Recording already completed works and collecting information connected with them such as results, papers published etc.

3. Organising accumulated information on research in a convenient way and preparation of required indexes for easy retrieval.

4. Supplying information to international information system and in turn obtaining information from it.

5. Meeting information requirements of users from institutes, consultants and industries by retrospective retrieval, SDI Service etc.

6. Repacking basic information depending upon requirements of users such as statistical information, manpower information etc.

5 Existing Systems: Some examples

It is not that there had not been sources of on-going research information in the past. It is common practice that the organisations do report current progress on the projects on hand in their own publications like annual reports. But such sources are not easily available for public use and may not carry information to desirable extent. A better method of obtaining information on projects is to have direct contact with the concerned organisations. This however, may not be easy firstly due to the correspondence involved and secondly due to possible reluctance on the part of the concerned institution to supply information. This is an additional reason to create separate information facilities covering on-going research.

There have been several systems which undertake this job in a systematic way. Current Research Information System (CRIS) of USDA and SSIE in USA are wellknown examples. In the USSR the All Union Centre for Scientific and Technical Information (VNTC) carries out this responsibility in respect of unpublished information like current R & D projects, plans of research etc. This it does by pre-registration of all R & D projects initiated in various institutions (this is mandatory by legislation) and accumulation of all information at various stages of the project. This system is computerised and continuous monitoring is done to update the information. VNTC also undertakes distribution of microcopies of project reports (9).

In Canada also such a facility exists in regard to data on federally supported research conducted in universities as a result of a cabinet directive to National Research Council of Canada (9).

Notable examples among the developing countries that have been reported are the efforts of National Science Development

Board of Phillipines to 'cataloguing of Phillipines Scientific and Technical Studies' and that of Indonesian Institute of Science which is currently developing a facility (9).

At an international level Current Agricultural Research Information System (CARIS) of FAO is a notable example.

In India, CSIR (INSDOC) periodically brings out "Current Research Projects" and Indian Council of Agricultural Research maintains a roster of current projects in progress in its subordinate institutions and periodically brings out lists. There is also a "Directory of Scientific Research in Indian Universities", brought out in 1974. Perhaps a good example of a continuous dissemination system on on-going projects is the one issued by DRDO entitled "Abstracts of R & D projects". It is mandatory to the organisations under Defence Research and Development Organisation (DRDO) to send information pertaining to progress on projects. For this purpose, a specific format has been devised. However, this publication is not available outside defence departments. All these Indian efforts at documenting on-going research are at levels of councils or departments covering only the institutes coming under them. With the NISSAT having become operative, a computerised national registry can be hoped for in the near future.

A fairly comprehensive account of existing systems has been given by Samaha (7).

6 Directory of On-going Projects in Food Science Technology and related areas in India

6.1 Objectives

NICFOS is a sectoral centre under NISSAT vested with the functions of collecting and organising information in food science and technology particularly to suit the Indian context for effective dissemination. Resources of information on On-going projects being limited, it was proposed in 1978 to compile a "Directory of On-going Projects" in the field.

The objectives of the directory is as follows (5):

1. Bring together information on all projects in progress in the country in food science and technology and the related areas.

2. Organise the information in a way (say classified sequence) as to bring related projects in juxtaposition.

3. Providing the indexes like subject, institution and the contributor indexes for easy retrieval.

Though the directory was though of as a referral tool, it was decided to collect all the associated information on the projects like reports, copies of published papers etc. so that xerox copies of them could be supplied on requests. It was also decided that the directory would be updated periodically, at least once in two years.

62 INFORMATION COLLECTION

621 Selection of methodology

Information on ongoing projects can be collected in several ways. The different possible approaches are: visits and interviews, scrutiny of published sources like annual reports, and issue of questionnaires. Visits to other institutions which are located in various parts of the country are naturally expensive, and published sources are unreliable as with them one cannot be sure of exhaustivity either in project coverage or information on individual projects. It was therefore decided to adopt the questionnaire method. Accordingly, a questionnaire (Appendix 1) was designed for the purpose of following to a great extent the format designed by DRTC for their pilot project on on-going projects.

622 Identification of Institutions.

There are many organisations in the country, big and small, which are concerned with R & D in food science and technology. To identify them for the purpose of the directory, various directories, mailing lists of CFTRI publications, and lists of participants in various seminars and symposia held in CFTRI were persued. The CFTRI had published a Directory of Food Processing and Allied Industries in India in 1970 and this was a very useful aid in our selection of organisations. The other directories that were of use were: (a) Directory of Scientific Research Institutes in India and

(b) Universities Hand Book. A systematic search through some periodicals known to publish papers in the field was also made to note down the organisations to which the contributors belonged. Some major institutions specialising in engineering, technology, agriculture, medicine etc. and certain state and central government departments concerned with activities related to food were assumed to be potential cdntributors and included in our mailing list. In all about 700 institutions were selected.

623 Distribution and Return of Questionnaires

Questionnaires, numbering about 3000 were disturbed to not only Heads of Institutions but also to Heads of disciplines which were considered likely to be engaged in work related to food science and technology.

It was necessary to follow up on the questionnaire by sending prompt reminders. The first reminder was sent after one month and subsequent reminders were at fortnightly intervals. A very small number of institutions were very prompt in returning filled in questionnaires. However, majority responded only after being reminded. About 30% of the institutions replied that they were not undertaking any R & D in food science and technology. Some institutions notably the Defence Institutes and a few commercial organisations were reluctant to supply the necessary information for reasons of secrecy. However, nearly 50% of the institutions responded favourably and returned filled-in questionnaires supplying about 1500 projects. Out of these projects, 958 projects were selected for inclusion in the directory as coming under the purview of food science and technology and related areas (5).

It should however be pointed out that inspite of using a specifically designed questionnaire to collect information, very few institutions actually stuck to the format prescribed in sending information. Many institutions sent in incomplete information, some even to the extent of giving only titles of projects. A few others forwarded their latest project reports and pointed out to the relevant portions from where we could get the necessary information. We had very little choice but to utilise the information provided and/or to go through the reports etc. for filling up the questionnaires ourselves (5).

Though the questionnaire itself was quite exhaustive, a simplified format was used in the directory for reasons of brevity. The data elements for each project entry were (5):

- Project title
- Name and address of Organisations
- Project category
- Cost
- Duration
- Sponsor(s)
- Investigator(s)
- Discription
- Reports
- Papers published

6.3 *EDITING AND TECHNICAL PROCESSING*

Each questionnaire was gone through carefully, and the relevant portions to actually form parts of the entry were marked. Each project was entered on a card as per the format decided together with selected information. The projects were then classified according to colon classification sheme and sequenced. Cards for main class headings and sub-headings were inserted in appropriate places, and frozen (5).

Three indexes were also prepared, namely subject, Institution and Investigator. For purpose of subject indexing, we used the DRTC methodology of preparing subject strings but rendered each entry in a format resembling what could be called a 'Heading and Phrase System as is the practice with Food Science and Technology Abstracts and other CAB publications. We selected this practice because of the likelihood of most of the users being familiar with it. The Institution Index was prepared both under the name of the main institution and under the names of departments or disciplines with each entry referring to the serial number of the relevant projects. The invetigator index consisted of the names of the participating scientists rendered as per prescription of Classified Catalogue code and each name entry referring to the serial number of the project (5).

7 Evaluation

An analysis of the directory was carried out to assess particularly the discipline-wise and commodity-wise emphasis and magnitude of involvement of individual institutions or a group of institutions (5).

Area wise distribution of the projects is given in Table 1. The core areas of food technology had naturally the highest number of projects (645). The number in related areas were: Engineering and equipment—84; Economic and Social aspects—concerned with establishing economic feasibility and survey of needs etc.—54; Chemical technology—concerned with development and production of chemicals used in food industry—36; Animal husbandry—mostly concerning improved dairying practices of obtaining better quality products—34; Medicine—concerned with nutritional aspects etc.—33; and so on.

Table 2 gives the number of projects devoted to different commodities. Cereals, millets and pulses had the highest number of projects—176, followed by dairy products—141, fruits and vegetables—120, sea foods—72, fats, oilseeds and nuts—71 and so on. The emphasis in this respect was attributed to be based on (a) popularity of the products among the people (b) vulnarability to spoilage (c) Nutritional needs of the people. The products of an additive or supplementary nature received lesser emphasis.

Institution-wise distribution (Table 1) shows that the agricultural institutions accounted for the maximum number of projects (Agricultural Universities—245 and ICAR-211; Total—456). CSIR contributed 185 projects and State and Central Government Departments 141. CFTRI itself contributed 121 projects. Only 16 projects were contributed by industries. But this numerical parameter is misleading. It was observed that the agricultural institutions had a tendency to split up a possible big project into smaller ones thus accounting for a large number of projects. CSIR practice was different. Its projects were really well defined and formulated according to principles accepted by all CSIR institutions. It was not clear whether other organisations had any such accepted principles. Therefore, the magnitude of an institution's involvement must be

Table 1 – Institutional Pattern.

Institutions	ICAR	CSIR	ICMR	Agri. Univ. & Coll.	Cent. & State Govt. Res. Inst.	Univ. Dept. & Teaching Inst.	Industries	Govt. Depts.	Total	Percentage
Engineering & Equipment	14	9	55	3	2					
Engineering & Equipment	14	9		55	3	2		1	84	8.77
Packaging	1	7		1		1	4		14	1.46
Chemical Technology	1	18		1	6	10			36	3.76
Food Science & Technology	135	125	31	144	113	68	19	10	645	67.33
Fats & Oils	1	5	1		3	7	5		22	2.30
Microbiology	4	1			3	1			9	0.94
Agriculture	4	3		17			2		26	2.71
Animal Husbandry	12	3		17			1	1	34	3.55
Medicine		11	7	3	8	1		3	33	3.44
Catering Technology								1	1	0.10
Economic & Social Aspects	39	3		7	5				54	5.64
TOTAL	211	185	39	245	141	90	31	16	958	100.00
PERCENTAGE	22.03	19.31	4.07	25.57	14.72	9.39	3.24	1.67	100.00	

Table 2—No. of Projects on different commodities.

Commodity	No. of Projects
Cereals	74
Millets	52
Pulses	50
Nuts and Oilseeds	46
Fruits and Vegetables	120
Milk and Milk Products	141
Bakery Products	15
Meat and Meat Products	37
Seafood and their products	72
Fats and Oils	25
Beverages (Alcoholic & Non-Alcoholic)	24
Foods of Microbial origin	21
Starch, Sugar and Confectionery	15
Species, Condiments & Flavours	31
Food Additives	24
Chemicals (including pesticides)	40

Table 3—Institution-wise Man Power and Budgetary Pattern.

Institutions	Manpower (Av./Project)	Cost (in Lakhs)	
		Core Areas	Pen pheral Areas
C.F.T.R.I.	3.8	96.980	11.480
Other CSIR Labs.	3.7	11.770	2.325
Agric. Universities	2.5	12.690	18.570
I.C.A.R.	2.5	8.840	24.000
I.C.M.R.	–	–	–
Univ./Teaching Institutions	2.6	9.225	00.595
Govt. Sponsored Res. Institute	2.5.	–	–
Govt. Departments	2.1	317.560	96.400
Industry	3.0	21.075	–

assessed by taking into account the actual content and depth of projects together with financial and man poer inputs as well as related published records. From this point of view, CFTRI showed out as the most premier institution with a total financial outlay of more than Rs. 100 lakhs and an average of 3.8 men deployed per project (Table 3). It is also significant, some projects sponsored by some Central government departments with huge financial outlay were concerned with production, distribution and evaluation of certain novel products developed by CFTRI.

In brief, the directory brings out the following:

1) A variety of institutions are involved in R & D in food technology and related areas in the country.

2) Reveals the country's emphasis by different areas and commodities.

3) Gives an idea of status of R & D in food technology in the country.

4) Indicates gaps pointing out areas in which R & D work can be initiated or accelerated.

5) To the information centre itself, it gives an idea of the various institutional sources of information as well as centres' potential users; and help orientation of its information services both in content and format.

8 Concluding Remarks

The directory which is priced publication is in great demand both within the country as well as abroad. Follow-up querries regarding the projects are being continuously received including those from organisations such as FAO, Rome. Another significant response is that there are please to update the directory which is intended to be taken up very shortly. A better response from the concerned institutions for the updated version is expected in view of the impact the present directory has created. It is also intended to adopt a format which would be suitable for conversion to machine readable form at a later date.

9 Acknowledgement

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11 APPENDIX I

ON-GOING PROJECTS IN FOOD SCIENCE AND TECHNOLOGY IN INDIA

Project Proforma

(Kindly use additional sheets wherever necessary)

– – –

0.1 Name of the Institution

0.2 Address

0.3 Head of Institutions (Name)

0.4 Kind of Institution

☐ R & D Industry ☐

Teaching ☐ Any other (Please indicate)

1.1 Project Code Number (not to be filled)

1.2 Project title

1.3 Nature of the project

Fundamental ☐ Survey ☐

Applied ☐ Any other (Please indicate)

Explanatory ☐

2.1 Sponsoring Body

2.2 Funding Agency

2.3 Estimated expenditure of the project

3.1 Date of initiation of project

3.2 Probable date of completion

4. Objectives (short range and long range)

Appendix I

5. Short description of the project (methodology, equipment etc) and any applications envisaged.

6.1 Present status

6.2 Further work envisaged

7.1 Project reports

Interim	Yes/No
Final	Yes/No

7.2 Published papers (please list)

8.1 Project Leader(s)
(Name and Designation)

8.2 Other members of project team (please list)

9. Is pilot plant work involved? Yes/No
(If yes, please give details)

10. Suggested keywords

11. Related projects, if any

12. Any other information.

Date:

Signature
Name and Address