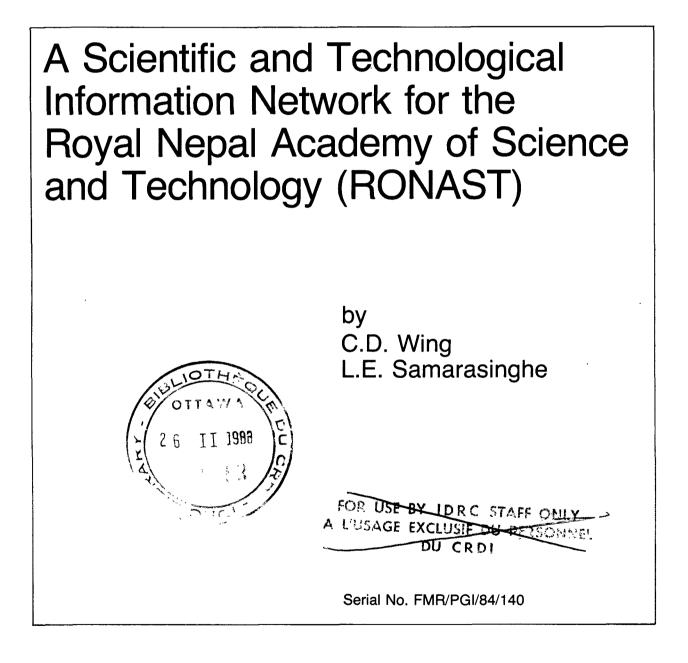Restricted
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NEPAL

Contribution to the development
of information infrastructures

A Scientific and Technological Information Network for the Royal Nepal Academy of Science and Technology (RONAST)

by
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N E P A L

A SCIENTIFIC AND TECHNOLOGICAL
INFORMATION NETWORK FOR THE
ROYAL NEPAL ACADEMY OF SCIENCE
AND TECHNOLOGY (RONAST)

by C.D. Wing
   L.E. Samarasinghe

Report prepared for His Majesty's
Government of Nepal by the United
Nations Educational, Scientific and
Cultural Organization (Unesco)
and the International Development
Research Centre (IDRC)

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PART A

RECOMMENDATIONS

1. In view of the mandate given to the Royal Nepal Academy
of Science and Technology for promoting science and technology
in Nepal with the specific function of creating a central infor-
mation system in science and technology, it is recommended
that RONAST should function as the national coordinating centre
for scientific and technological information, with responsibility
also for information policy and planning.

2. It is recommended that a national scientific and technological
information network be created by RONAST with the cooperation
of existing information and documentation centres and libraries
in- Nepal.

3. RONAST should not attempt to duplicate collections already
available in information centres and libraries in the country
but should assist those institutions to expand their information
resources and their services so as to be able also to provide
information to users outside the institutions they presently
serve.

4. The Documentation Centre of RONAST should function as
the focal point for scientific and technological information
in the country in a decentralized network which may comprise
sub-networks of specialized libraries and information centres
of discipline or mission-oriented vocation and individual
specialized and university libraries.

5. The Documentation Centre of RONAST, acting as the central
point of the network should have the following additional
functions:

    a)   the organization, coordination and promotion of
cooperation in the network

    b)   the collection, preferably in microform of secondary
materials—abstract journals, indexes, reviews etc - reference
books and books and journals on topics of importance to Nepal
not held in network or other libraries

    c)   the transfer of relevant parts of its collections to
new focal points as and when they are established

    d)   the capture, processing, storage and dissemination
of national published and unpublished documentation and
that produced outside the country but about Nepal

    e)   the formulation of network standards for bibliographic
processing and data collection based on existing international
guidelines to facilitate the exchange of information within
the network

f) the maintenance and updating of directories and inventories of scientists and technologists, current research and development programmes and scientific and technical libraries and collections

g) the updating, expansion and distribution of existing union lists of journals thereby encouraging the optimum use of existing collections

h) introduction of computerized techniques through use of a microcomputer to automate day to day transactions and to create special data bases of the activities mentioned above

i) the provision of bibliographic services from its collections and from foreign date bases with the assistance of an intermediary, provision of retrospective literature searching and selective dissemination of information (SDI)

j) the establishment of an information consolidation service which would process, analyze and evaluate existing information from diverse sources and tailor the output to the needs of specific user groups particularly less sophisticated users; and that the internal structure of RONAST permits the collaboration of specialist staff with its information workers in the preparation of these repackaged products

k) the provision of backup services including translation work and a document delivery service which would provide users with copies of documents produced anywhere in the world

l) the sponsoring of training and refresher courses on information handling techniques for local librarians and documentalists and instructional programmes on the use and sources of information for different categories of users

m) the coordination of a joint acquisitions programme in which network librarians would agree to avoid the duplication of book and journal purchases thus saving the country valuable foreign exchange and, the promotion of cooperation through activities such as interlibrary loans of books

n) the establishment and maintenance of links with regional and international information systems and centres to ensure that Nepal benefits from new developments and initiatives

o) the evaluation and subsequent introduction to Nepal of new information handling technology

6. RONAST shall set up the necessary steering committee and other technical committees as required to formulate information policy and plan and guide the development of the network.

7. For the establishment of the Documentation Centre and the Network RONAST should seek external funding and expert advice during the initial period, but steps should be taken early to recruit and train the Nepali specialists necessary for its future operation.

I.   INTRODUCTION

The Royal Nepal Academy of Science and Technology was constituted by His Majesty the King of Nepal on 5 December 1982. In a communiqué issued by His Majesty's Principal Secretariat dated 12 September 1983 the Arrangements Relating to the Royal Nepal Academy of Science and Technology with respect to its establishment, organization, objectives, policies, functions, duties and powers were described.

The objectives of the Academy are:

- to increase the scientific and technological capacity of the nation by properly mobilizing the natural resources and riches available in the country

- to lay the basic foundations in the fields of science and technology

- to promote research on basic and applied science and scientific and technical knowledge skills

- to promote in the public mind the scientific way of thinking and popularize science in society by disseminating science and technology

- to promote the application of science and technology in national development.

The functions, duties and powers of the Academy are described as follows:

- to formulate a national policy on science and technology

- to formulate a programme in accordance with the national policy and implement or arrange for its implementation

- to coordinate or arrange for coordination of scientific and technical research activities

- to conduct or direct studies and research in science and technology

- to hold or sponsor conferences, seminars, etc on subjects relating to science and technology and publish or arrange for the publication of books, journals, etc. on such subjects

- to undertake a technical evaluation of current studies, research and training programmes in the fields of science and technology and bring about improvement therein

- to make arrangements for obtaining financial resources
from national and international sources

- to maintain contacts with national and international
scientific and technological institutions and organizations

- to establish national laboratories in various scientific
and technological fields

- to provide financial and other forms of cooperation for
the growth of vocational institutions relating to science and
technology

- to extend financial and other forms of cooperation to
various governmental and non-governmental institutions or
individuals for research purposes

- to award prizes to individuals who have contributed to
the development, promotion or application of science and
technology

- to advise the government, the Tribhuwan University and
other appropriate institutions on matters relating to science
and technology

- to establish a central information system regarding
science and technology

As an autonomous corporate body with His Majesty as its
Chancellor, RONAST will be guided in its work and development
by an Academic Assembly comprising the Chancellor and other
eminent members including the Prime Minister, the Ministers
of Finance, Industry, Water Resources and Education, the Vice
Chancellor of RONAST, Vice Chancellor of the Tribhuvan University
and the Vice Chairman of the National Planning Commission.

In accordance with its national responsibility RONAST
is expected to properly mobilize the natural resources of
the country, promote research in the basic and applied sciences,
heighten public consciousness of the value of science and
technology and advance its application in all sectors for
enhanced social and economic development. To realize these
objectives, RONAST's functions and powers in concert with
its policy to consolidate existing infrastructures, encourage
research and assist manpower development, rank it as the
principal institution for formulation and coordination of
scientific and technological programmes undertaken in Nepal.

An essential framework to support these activities,
objectives and policy, is an efficient information system
organized in such a manner as to make the best use of existing
facilities in the country through a coordination of effort
and resources. RONAST has the mandate to establish an
information system, disseminate scientific and technological
information and promote its use and application for economic
and social development.

II. THE MISSION

At the request of the Royal Nepal Academy of Science and Technology, a joint mission was organized by Unesco and the International Development Research Centre, Canada to advise RONAST on the establishment of an appropriate information system for RONAST.

During the period 14-21 December 1983 the Mission had several meetings with the RONAST Member Secretary, Dr. Kamal K.Shrestha. The mission was briefed on the mandate and activities of the Academy including its immediate and long term plans to popularize science and technology, promote and sponsor research and establish national laboratories. Contiguous with these activities is the creation of an information system to support the work of the Academy and scientists and technologists throughout the country. The scope, requirements and functions required of the system were considered at length. The Mission was also provided with background material consisting of previous proposals and discussion papers on the organization of scientific and technical information services in Nepal. The views of librarians in the government and university sector were also ascertained (see Annex 1).

It was agreed that the establishment of one information centre catering to the scientific and technological information need of a whole range of users from diverse disciplines scattered throughout the country was not a feasible proposition. Such a centre would duplicate services already being provided by specialized libraries and documentation services in the country. In order that the scarce financial resources and trained manpower in the country could be used to the best advantage, it was felt that RONAST should function as a central coordinating unit for a national network of scientific and technical information in which all scientific and technical information centres and libraries in the country would be participants. Some of the professionals who were consulted expressed apprehension that the coordinating unit would attempt to control their operations and that they would lose their managerial and financial independence. On the other hand, they readily acknowledged that such a system would give direction and meaning to their individual efforts and would help them to reach out to a wide user constituency and provide it with better services.

The Mission conveyed these views to the RONAST authorities and also prepared for them a discussion paper for a national scientific and technical information system coordinated by the RONAST Documentation Centre, based upon existing resources in a decentralized network of cooperating libraries. The underlying principles of the paper were accepted and the Mission was therefore requested by RONAST to develop and elaborate on the decentralized network approach paying special attention to the requirements, scope and functions of the Documentation Centre. The results of our subsequent deliberations are contained in this report.

III. SCIENCE AND TECHNOLOGY IN NEPAL

The Research System

The framework for S and T research in Nepal consists
of two major components, the Tribhuvan University, established
in the late 1950s and specialized public institutions most
of which were created in the early 1960s.

Tribhuvan University's main role is undergraduate
education and it is Nepal's sole degree-granting institution.
In addition to its central campus at Kirtipur, the University
has over 70 other campuses scattered throughout the country.
With regard to postgraduate education, master's degree courses
are, almost without exception, taken at Kirtipur, but an
overwhelming majority of Ph. Ds are obtained outside the
country. Many of the outlying campuses provide facilities
for the study of science and technology up to the Bachelor's
degree level. They are: Institutes of Science, Forestry,
Applied Science and Technology, Agriculture and Medicine.
It is only the Institute of Science at Kirtipur which offers
M. Sc. courses; Postgraduate studies in the other disciplines
must be pursued abroad.

In addition to its academic institutes the university
also has three specialist centres devoted entirely to research.
The Research Centre for Applied Science and Technology (RECAST)
contentrates on appropriate techniques, processes and equipment
with an aim to develop local resources and existing technology
in Nepal. Two other centres, the Centre for Economic Development
and Administration (CEDA) and the Research Centre for Nepal and
Asian Studies (RCNAS), both have an interest in the study of
social change and the socio-economic impact of development
programmes with reference to the introduction of technology.
All three research centres are on the Kirtipur campus.

The majority of S and T research within the university,
mostly applied research, is thus conducted at the central
campus. Students are able to submit dissertations of original
research for their M. Sc degrees and academic staff also pursue
their own research projects. The three specialized institutions
are able to attract some foreign assistance for their programmes
as are the single discipline institutes such as agriculture,
forestry and medicine. But on the whole, scientific research
by staff throughout the university system depends on modest
local funding through the Research Division of the University.

There are many institutions in the public sector under-
taking research, including government departments, laboratories,
corporations and development projects. Many have been able to
attract a good volume of local and foreign funding for their
research and infrastructural development particularly in the

areas of medicine and public health, mining and geology and
agriculture. The most developed of the research infrastructures
is that for agriculture, the reason for this being that it has
received top priority in successive national five-year plans.
The emphasis on increasing production and productivity through
agronomic studies and plant breeding techniques gave rise to
a number of experimental research stations and laboratories
which have been established throughout the country. Many of
them house single commodity research and development programmes-
rice, wheat, maize and oilseeds- while others are multidisci-
plinary, participating in commodity research by field trials
and observation. A research complex at Khumultar in the
Kathmandu valley provides backup services through its experi-
mental and diagnostic facilities. The period 1975-1979 showed
an average increase in the local agricultural research budget
of 21% annually to stand at Rs. 28,178,000 ($2,350,000) in
1978/79. In the same decade, research manpower more than
doubled to total 773 officers and 2,450 assistants in 1979/80
/¯*_7. Over 50 per cent of the officers were working outside
  Kathmandu.

Research in the private sector is limited. Medium
scale industry tends to import its technology and processes
from India. However, Nepal does have a number of private
engineering firms which are making significant contributions
to research and development particularly in the area of micro-
hydel and biogas installations. The few government corporations
especially those which are agro-based such as the Agricultural
Tools Factory also have small but active R and D programmes.

The mechanism for the coordination of research across
different public sector institutions and the university has
come about with the establishment of RONAST. The National
Council for Science and Technology (NCST) has as its general
functions the formulation of science policies and the promotion
and publication of research. However, RONAST, constituted by
His Majesty King Birendra and with His Majesty as its Chancellor,
has wider responsibilities for science and technology as seen
in Chapter I of this report.

S. and T. Libraries

The establishment of S and T. libraries and documentation
centres in Nepal has been haphazard and for the most part
unplanned. In general they have been viewed as a place to
store the papers of their parent bodies rather than as a
source of information or a service point which actively supports
research. Their role as providers of information from external
services in other parts of the world and information pertaining
to completed and on-going R and D experiences in Nepal has
not been significant up to the present time.

Nevertheless, it must be said that the past 3-4 years
have seen increasing activity in the information field. A
library association has been formed as a forum for promoting

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* Shama, Ramesh P. Agricultural research resource allocation
  in Nepal (In Daniels, D.; Nestel, B. eds. Resource allo-
  cation to agricultural research. Ottawa, IDRC, 1881, p. 42-48.

all aspects of library and information development; the
Library Sub-Committee of the NCST has embarked on a number
of programmes with S and T libraries including the compilation
of union lists for books and journals; links with international
information services have been forged; and several libraries
have managed to attract foreign aid funds for library and
documentation activities. In general, however, major problems
and shortcomings do exist. The situation which emerges can be
summarized thus:

a) Libraries are viewed as serving exclusively their
parent institutions. There is therefore no active cooperation
or sharing among them. Interlibrary loans, for example, are
uncommon even within the university library system or between
institutions working under the same Ministry. Further, as the
bulk of S and T libraries are in Kathmandu development workers
outside the capital have virtually no access to current infor-
mation. There are no links, service or otherwise, between the
Kathmandu libraries and field workers, even when all are part
of the same Ministry or Department.

b) Because of budgetary constraints, libraries are
starved of materials particularly the foreign journals required
for research, planning and teaching. From library to library
there is a familiar pattern of discontinuation and resubscribing
to journals, depending upon the economic climate current at the
time resulting in large gaps in journal holdings. These gaps
can rarely be filled as the annual acquisitions budgets of most
S and T libraries are barely sufficient to meet continuing
commitments.

c) Duplication of books and journals, even in libraries
in close proximity to each other, is not uncommon. For
example, the same journal titles ordered by the Khumultar
Research Complex can also be found in several other libraries
in the country. Duplication of books is also common caused
to some extent by the limited choice of suitable books available
through Kathmandu booksellers and the need to spend budgets.
No attempt has been made to rationalize acquisitions even in
single library systems or those sharing the same compound.

d) The considerable amount of information produced in
Nepal related to its own development is not consistently
collected or made available to users. The majority of develop-
ment programmes and R and D projects report their results in
mimeographed and duplicated documents produced in very limited
quantities. These documents which accurately chart Nepal's
development efforts experiences and priorities need to be
preserved. Some success in acquiring agricultural documentation
has been achieved by the National Agricultural Documentation
Centre (NADC) and for all subjects by the University Library
at Kirtipur, but as a whole, much valuable, locally produced
information goes uncaptured and is irretrievable.

e) Several libraries have special well organized collections. In addition to the two just mentioned, the University also has a unique collection of locally produced theses and a good UN section for which it is a depositary library. RECAST, as the local representative of NTIS has an extensive collection of its reports, and NADC acquires foreign theses by Nepalis and about Nepal. Other libraries like the Bureau of Mines, Industrial Services Centre, Bir Hospital Library and the National Commission on Population also have modest collections of books and journals of special interest to their clients. For brief descriptions of major S and T libraries in Nepal see Annex 2.

f) Librarians lack knowledge of modern information handling techniques. Most of them have been trained in neighbouring countries in conventional library theory and practice and have little or no knowledge of the applications of modern technology in their field. The majority are arts graduates (B.A.) with a further bachelor's degree in library science. The profession has not been able to attract science graduates due to poor career prospects and the low status of librarians within the government and university structure. Indeed, until quite recently, the post of librarian did not exist in government service which explains why many libraries are so poorly developed.

g) The nature of the training received is partly reflected in the quality of information services available from technical libraries. Very few libraries have any output apart from accessions lists. It should be acknowledged however, that most librarians, often with inadequate support staff and equipment, cannot undertake any service other than the lending of books. There are, of course, some exceptions: e.g. University library which publishes topical bibliographies, the National Bibliography and catalogues of its special collections; NADC which is producing the Nepal Agricultural Bibliography, Nepal Agricultural Abstracts; thesis Abstracts and special subject bibliographies based upon its documentation collections; and RECAST which indexes the journals it received for a current awareness bulletin. No library is involved in the analysis and evaluation of information for repackaging to meet the needs of specific user groups.

h) Because of the constraints, particularly financial, under which most libraries operate, basic materials, furniture, equipment and staff are often lacking. Many libraries have to manage without a typewriter and typist, and even fewer have a photocopier or easy access to one.

i) There is no standardization of bibliographic processing techniques employed by S and T libraries. While almost all use various editions of the Dewey Decimal Classification, cataloguing rules are applied in an ad hoc fashion, and subject headings are taken from different lists. Even within a single

system like that of the university there is no standardization
of techniques. This effectively hampers the exchange of infor-
mation between centres and the effective production and use of
common tools such as union lists.

j) Links to a few international information services
are maintained, but these are not sufficiently exploited. NADC
as the Nepal AGRIS centre provides input to AGRIS and produces
the Nepal Agricultural Bibliography from it. Exploitation of
the AGRIS data base for provision of SDI and retrospective
searches has scope for expansion. HELLIS is represented by
the BIR Hospital Library but again its use could be broadened.
Use of the NTIS service run through the RECAST library is
encouraging. TECHNONET's focal point is the Industrial Services
Centre (ISC) but it is not known what use is made of its
services. Two further information systems, POPIN and INFOTERRA
are or will be represented by the National Commission on Popu-
lation and the Nepal MAB Committee respectively. Use of foreign
document delivery services such as those provided by the BLLD
and INSDOC are rarely used, the former because of the expense
involved and the latter because its services are generally
unknown to Nepali librarians. Links with sister libraries and
systems in the region are undeveloped.

k) In general, those libraries and documentation centres
which have built up an infrastructure and/or are able to offer
information services have usually had their local resources
supplemented by foreign aid inputs. They include the Forest
Research Library with aid from the Overseas Development Admi-
nistration of the UK and VSO; the National Commission on
Population, from USAID/UNFPA; Industrial Services Centre, from
UNIDO/UNDP; Trade Promotion Centre, from ITC/UNDP; Institute
of Engineering, from the World Bank; Institute of Agriculture
and Animal Science, from USAID; RECAST, from UNESCO; and
NADC from IDRC.

The use of S and T libraries in Nepal is generally limited
to the personnel of the institution in which it is found. A few
libraries, especially those which have received external project
assistance and the University Central Library do encourage
outside users to consult their collections, but the majority
at present have neither the resources or a stated responsibility
to do so. Users of information from S and T collections are
policy makers, administrators, research staff, students, doctors,
engineers and other professionals and practioners of S and T
applications. Their information needs - high level books and
journals, national documentation - are met to some extent
within the limitations imposed by uncertain library funding.
Even then, discovering where the required information exists
and gaining access to it is more often than not a major difficulty.

Large groups of the literate population including the interested
public, village level workers, specialists in the field, private
businessmen and entrepreneurs are poorly served by existing
information resources which are geared to serving English speaking
qualified professionals based in Kathmandu. There have been no
attempts to bring science and technology to this relatively
unsophisticated audience by creating special collections for
them although some repackaging of S and T information in the
form of manuals and guides in both English and Nepali have been
published notably by UNICEF. Nevertheless, it is apparent that
most sections of Nepali society do not have access to scientific
and technological information. A most urgent need is an impro-
vement in the provision of information to school going children
whose sources of information are often restricted to their text-
books due to the lack of libraries and of publications tailored
to their special needs and interests.

The dearth of information sources has an adverse effect
on educational and research programmes in Nepal. Schools, the
university and its campuses and research institutions in the
country are hampered by poor library collections and services
required by the variety of users from these institutions. The
most remote from science belong to groups which are uneducated
and illiterate or to poor rural communities. While often having
a better understanding of their own problems than the agents
of change, they do not have the knowledge to tackle them syste-
matically. Their only sources are contacts with rural workers,
themselves without adequate supplies of information, and the
radio which has a few programmes mostly on agriculture and
health, directed to the rural population. Strengthening of
both these sources through the provision of easily understood
repackaged information would considerably assist the rural
development workers in formulating solutions to the problems
of the population they serve.

IV. NETWORKING: SHARING AND COORDINATION

It can be seen from the foregoing discussion that while
many of the S and T libraries have not yet reached a high
level of development in terms of collections and services,
information infrastructure development, increasing support
from national and foreign sources, together with a growing
"information awareness" in the country, are bringing about insti-
tutional changes leading to improved access to information.
Further, information professionals in the country are keen to
promote their services and to improve them through cooperation
as exemplified in their enthusiastic participation in the Nepal
Library Association and the union lists project of the NCST
Library Sub-Committee. Such initiatives need to be supported
and developed. It is important that future plans for library
and information development embody an understanding and recognition
of the global characteristics of information. Such an under-
standing - the volume, nature and accessibility of current
information - has implications on the design and organization
of S and T information services in Nepal.

The accelerating pace of research in science and technology
in recent years has resulted in a substantial increase of
information reported in an ever growing number of publications.
A significant feature is the trend towards interdisciplinary
studies which requires that the main providers of information -
libraries and documentation centres - organize themselves to
meet the demand for information to support such studies. As
these requirements cannot be satisfied by one individual library
of any country, given the abundance and diversity of to-day's
information, there is a need to develop mechanisms for coopera-
tion and interconnection thus creating an effective and integrated
information system and avoiding duplication of effort and
investment.

A further consideration, not to be overlooked, is that
the results of research, regardless of their place of origin,
need to be shared if they are to contribute to world wide
research endeavours. This again implies the establishment
of a system to collect and disseminate local information to
an international and national audience and to acquire relevant
information produced outside the country.

The above observations when applied to the development of
a scientific and technological information system in Nepal
would require it to acquire systematically, information both
national and foreign, to support research, development and
education. This should be achieved by the coordination of
information institutions in the country and cooperation among
them for rationalization of collections and improvement of
services. The need to reinforce the service capabilities of
the individual libraries in such a system is evident and
a   special   effort will be required in training manpower
for providing modern, efficient and timely information services.
Cooperating libraries should be encouraged and assisted to
improve their collections of books and journals and to acquire
the equipment necessary for provision of information services
to users.

The interconnection of libraries and documentation centres in the network should be based upon the following concerns:

1. it should provide user-oriented services for all categories of users. The services should be designed on the basis of studies of user needs and should include specially constructed programmes for training of users

2. it should support research and development in science and technology by offering services which respond rapidly to requests from users with the most relevant and recent information pertaining to their queries

3. it should be instrumental in making scientific and technological information publicly available

4. the users of the network and its services should be concerned in the design, evaluation and management of the system

5. the system be flexible enough to adequately respond to advances and changes of emphasis in science and technology and the consequent modifications of user needs, to changes of national priorities in these fields and to introduction of new information technologies.

The network structure would be based on the philosophy of sharing material and other resources through the designation of subject focal points, with guidance, support and coordination provided by a central focal point, the RONAST Documentation Centre. In the specific context of Nepal, this approach as opposed to a central facility in the form of a national science library can be further justified in a number of ways.

First are reasons of economy. A central facility would demand a huge initial investment for buildings, staff, equipment and collections of books and journals, an investment which would be burdensome to a small country like Nepal. Recurring costs would also be high and would need substantial annual increases to cope with the ever rising cost of materials.

A centralized system will result in a duplication of expenditure for books and journals because however strong the centre may be, existing scientific and technologic libraries still have to serve their own specialist clientele who would demand to have at their disposal a minimum set of scientific and technical publications. These libraries therefore will continue to grow in spite of a central facility because their immediate users are concentrated around them.

A number of special collections formed over several years already exist in Nepal and these will not be matched by a centralized system unless very large investments on acquisitions and processing are made. It is difficult to envisage that one large library in Nepal could collect all the information which might be required by the diverse range of users

of scientific and technical information in the country.   Even
in developed countries the trend is towards networking which
permits the sharing of the resources of several libraries.
For practical considerations, therefore, a central science
library would have to draw upon established collections and
expertise.

In a country with poor internal communications a minimum
set of information materials must be within easy reach of the
users if they are to be able to conduct their research and
duties effectively.   For example, important books, journals
and documents concerning cotton must be available to the
scientists in the cotton growing areas of south west Nepal.
Similarly tea research workers in the east need ready access
to information about tea and the food processing industry of
the south east must have relevant information on its subject
at hand. The availability and proximity of such specialist
information to many categories of users working on a wide
variety of subjects both within and outside Kathmandu can
be better assured through a decentralized system than through
one which is centralized.

The focal points of the network would be brought into
being by RONAST devolving its overall responsibility
for s and t information   on   a   sector   by   sector
basis.   This will result in certain existing libraries, subject
and mission-oriented ones and multidisciplinary ones, being
designated as special centres but with a responsibility of
providing~ services at a national level.   Their infrastructure
would necessarily be strengthened in terms of collections,
equipment and manpower to enable them to assume their larger
national roles.   For disciplines where suitable centres cannot
be idenditied the RONAST Documentation Centre will assume
responsibility for providing the national service until
such time as the designation of an appropriate institution.

Once established and operating smoothly the focal points
may wish to constitute their own subnetworks with an aim to
provide services within narrowly defined subject areas.   For
example, the agricultural research system with its commodity
oriented research institutions, lends itself to a subnetwork
of the agricultural information focal point whereby each
component would be strengthened as necessary to offer specialized
services in the area of its expertise.   The network can therefore
evolve as a three tiered structure with the RONAST Documentation
Centre devolving responsibilities by broad subject areas
such as medicine and agriculture to a second tier whose focal
points could, if appropriate, create a new level, the third
tier.   Each component of the network would retain its authority
and independence and would not be administratively or financially
subordinate to the next higher level.   This is important given
that network components will fall under a wide variety of
parent bodies.

The subject components of the second level would comprise the pure sciences - botany, chemistry, zoology, mathematics, physics - and also those related scientific and technological disciplines reflecting national priorities. These, we feel would include agriculture, medicine, forestry, mining and geology, industry and engineering - disciplines which support the priority sectors of the current national five year plan (1980-1985), as well rural development and industrial advancement.

One component which should not be overlooked is socio-economics. No scientific or technological innovations and applications designed to benefit society can ignore past experiences or their social and economic impact. Further, the introduction of technology without due consideration of social conditions can lead to negative consequences. This is observed for example in the mechanization of industry and agriculture resulting in the loss of job opportunities for labour and the inability of cottage industry and crafts to compete with mass produced products. A socio-economic information focal point would help to provide decision makers with essential information in this important area and bridge the information gap that exists in the effects of science on society.

It must be stressed however that the final institutional and subject components of the network are a matter for national deliberation involving negotiation with the institutions concerned, the information professionals whose cooperation will be of utmost importance and the establishment of priorities related to national plans and aspirations.

V. NETWORK SERVICES AND ACTIVITIES

The success of the network in terms of its provision of services to support S and T research in Nepal will depend upon the creation of a strong body at the centre able to coordinate the activities of the focal points and strengthen them so that they can carry out their responsibilities effectively. This is important if the coordinating centre is not to become burdened with a large volume of user requests necessitating a considerable staff cadre and the acquisition and management of huge collections of literature. It is important to emphasize that the Centre must be viewed by the network as having their interests in mind, of being supportive of their efforts to provide better services to users and that it is not going to be a competitor or gain an administrative hold over them. Thus the Centre must promote a spirit of cooperation in which it gives more than it takes.

Network support

This is especially true when one considers that RONAST will be requesting its focal points to shoulder a national responsibility whereas previously they would have had an institutional perspective. We have seen that the required staff, professional, technical and clerical as well as essential equipment are often not provided for in many of the existing libraries. These constraints coupled with added responsibilities will in many cases necessitate an infusion of funds into needy libraries whose participation in the network is indispensable. Such network support we believe must originate from RONAST after a survey of needs has been completed. The support might come in the form of centrally acquired equipment, books and journals to fill gaps, recruitment of temporary staff to undertake specific tasks such as typing catalogue cards or processing backlogs of documents, or as a direct transfer of funds which the recipient library itself administers. The disbursement of money and materials in this way instills a commitment on the recipient library to pull its weight in the network. Whichever strategy is selected – direct grant or central purchase – the aim will be to upgrade existing facilities especially in terms of collections and equipment, so that all network components are able to offer equally reliable services.

Collections

The collections to be assembled at RONAST will take full cognizance of the supportive, service-oriented, complementary and non-competitive role of the Documentation Centre. The existence of the focal points with their clientele concentrated around them demands that it is they who must house the special subject collections. It will be left to RONAST therefore to concentrate on particular disciplines and types of documents not covered by other units in the network.

One important category of material is secondary sources -
bibliographies, abstract journals, library catalogues - all
essential materials for tracing requested information, compiling
bibliographies and responding to enquiries. Reference books are
also required if RONAST is to be able to provide the kinds of
miscellaneous information which the users will inevitably need.
They would include standard works such as dictionaries and ency-
clopaedias, directories and statistical compilations relating
to science and technology and ancillary subjects like population,
GNP and industrial data which is often required to support R and
D programmes. Books and journals which will be acquired and
housed by RONAST will concentrate on those subjects not adequately
covered by existing library resources but which are of importance
to Nepal, e.g. water resources, engineering and ecology. Support
to the realization of the objectives of RONAST will also be taken
into consideration by purchase of materials dealing with S and
T management and policies as well as documents and publications
reflecting international experiences in S and T. A collection
of information science publications is also required to keep
abreast of new techniques and technological developments of
potential interest to the network.

But the most important collection will be that of the S and
T information generated in Nepal itself and information about
Nepal published outside the country. First are the local journals
which report S and T results in the pure and applied sciences. This
literature is relatively easy to capture coming as it does from
established organizations within the government and the university.
The difficult and more pressing challenge is to collect the reports
and unpublished documents (gray literature) which are the results
of considerable investment in time and money and which are of
particular relevance to the economic and social development of
Nepal. Collection of this material must receive top priority.
Certainly, RONAST is in a privilege position for acquiring this
literature given its far reaching mandate. RONAST must, for
example, stipulate that the results of all the programmes it
supports, negotiates or advises are deposited at the Centre.

Libraries which already collect similar documentation such
as the University library with its collection of theses should
be requested to submit periodically to RONAST complete records
of such items for inclusion in the national S and T data base
to be created at the Academy.

Services

The provision of information services in Nepal is still in
its infancy. As mentioned earlier few librarians have the time,
resources or practical knowledge to undertake anything more than
the compilation of an accessions list. RONAST should promote and
assist the improvement of services to the scientific community
particularly to potential users outside of Kathmandu Valley who

are the most remote from organized libraries and documentation
centres. In such activities it should seek the cooperation of
network members who could undertake,under contract,specialized
work such as the compilation and joint publishing of subject
bibliographies. An illustration of the types of services which
can be offered is given below.

1. Bibliographies. Different types of bibliographies listing
current and retrospective literature can be prepared on demand
by RONAST using its own collections and those of network libraries
and from international sources. In anticipation of a need for
information on a topic of national concern or interest RONAST
could take the initiative to prepare special bibliographies and
reports or newsletters based upon such bibliographies. A current
bibliography based upon the collections of local literature
established at RONAST is seen as an urgent need for the dissemination
of national information to users throughout the country. It would
be analytical in nature to include indexed periodical articles.
The provision of abstracts would increase its utility.

2. Selective Dissemination of Information (SDI). Keeping
users informed of new literature produced in their subject fields
can be accomplished by an SDI programme. This personal service
requires the RONAST Documentation Centre to canvass potential
users so that a profile of their interests can be maintained and
matched against new document references. Because of the large
volume of current scientific information being produced worldwide,
many libraries now take advantage of commercial data bases for
their SDI services. RONAST too should consider using these data
bases in addition to providing a manual service based upon the
journals, books and local documentation it receives. It is worth
mentioning that SDI for agriculture can be had from NADC through
the AGRIS data base. A well organized SDI service has good potential
for reaching users outside of Kathmandu. Focal points too should
be encouraged to provide a manual service to supplement that offered
by RONAST.

3. Current Contents. As with SDI, users, especially those
out of Kathmandu wanting to keep up-to-date in their subject,
will benefit from a current contents service whereby the contents
pages of current journals to which they require access are copied
and distributed to them. This service can be based on the journals
received at RONAST and the focal points. Users would be able
to request photocopies of articles from the library holding the
journal.

4. Information consolidation. It is recognized that many
categories of people are virtually excluded from making use of
existing S and T information sources, which cater, in the main,
to an English speaking clientele. Entrepreneurs, businessmen,
extension workers are not able to interpret and digest technolo-
gical information couched in the technical language of science in
predominantly English language publications. We are convinced

that for the popularization of science and technology and
the enhancement of industrial and social development in Nepal,
a programme of repackaging information, which evaluates and
consolidates existing knowledge into a form readily understood
by end-users, is highly desirable. For example, the increasing
number of medium and small scale biscuit industries can be provided
with a document in Nepali which evaluates low cost machinery and
equipment, indicates costs and possible returns and, to encourage
diversification of products, gives a number of recipes geared to
commercial production. Children could be made more aware of
science and technology and its applications by the production
of well written local language booklets on subjects such as
computers, or protecting one's health. For illiterate children
and adults, the messages of science could be conveyed in locally
produced audiovisual materials.

The output of this service will obviously be tailored to
specific end-user groups. There are possibilities for manuals,
instructional booklets, literature reviews, state of the art
reports as well as audiovisual packages for local presentations
and use by the media. Such products are not of course exclusively
for less sophisticated users. The scientific community also has
a need for consolidated information. Entomologists, for example,
might well find useful a review of the literature on the bio-
logical control of major insect pests found in Nepal while an
evaluation of solar dryers used in Nepal and the region would
benefit food technologists and engineers.

The production of consolidated and analyzed products demands
the active collaboration of information workers and acknowledged
subject experts. The involvement of linguists and communications
specialists is also important especially for the preparation
of material for unsophisticated users. We strongly recommend
therefore that the structure of RONAST permits its own scientific
expertise to work closely with its information scientists and
that personnel from other local agencies can be contracted for
specific tasks as and when required.

It is realized that preparation of these products is neces-
sarily time consuming if they are to be useful and authoritative.
RONAST will also require a vehicle for disseminating this infor-
mation which is of importance to national development as widely
as possible. This can be achieved by preparing short popular
articles, news items and briefs for inclusion in popular science
magazines and the periodicals issued by various public and private
agencies for field level workers. Material prepared in this way
can include news on information sources and services available
in Nepal, the results of RONAST sponsored research written in the
vernacular and in a popular style, translations into Nepali of
articles and news items from diverse sources, and so on.

To support the bibliographic and information consolidation
activities, to respond to individual enquiries it receives and
to support the work of the Centre itself, RONAST will need to
offer a range of back up services. They would include document
delivery, translation and reprography.

5. Document delivery. For the provision of documents in
photocopy or microform requested by users, RONAST will avail
itself of different sources. Its own collections and those
of local S and T libraries will be of importance. Requests
which cannot be met locally can be referred to regional document
delivery systems like INSDOC or international services such as
BLLD. RONAST might also consider acting as the local 'agent'
for foreign photocopy services whereby it would order and pay
for copies of documents and journal articles for other libraries
in the network and bill them regularly in local currency. This
will remove the time consuming practice of individual libraries
having to buy foreign exchange to pay for these services.

6. Translation. Enhanced information services will bring
to the attention of users references to documents produced
in many languages. To permit their use, a translation service
is indispensable. An in-house capability would not be appropriate.
Rather, RONAST should create a register of scientists with lin-
guistic abilities who are ready to undertake translations on
contract. The translation capability needed is from major
languages including those of the region, to English and Nepali.
In addition, translation from Nepali to other languages to
satisfy overseas requests and promote the work of Nepali scientists
among a wider audience, is also desirable.

7. Reprographic services. It is to be expected that as the
Documentation Centre will have a substantial publications programme
including producing printed bibliographies, consolidated infor-
mation documents, documentation tools etc, publishing the results
of research it sponsors and production of a newsletter and possibly
a journal, a modest in-house printing capability is desirable.
It would solve the many problems associated with using local
presses particularly poor proof reading, inability to meet
delivery dates, indifferent binding, low quality paper and
the dearth of type-face associated with the sciences-the Greek
alphabet, mathematical symbols, etc.

Coordination of resources

Because the proposed network is composed of several elements
interconnected by a common purpose but with each having its own
weaknesses, strengths and characteristics an homogeneity must
be sought by the creation of tools and methodologies which guide
and contribute to its operations. They will take the form of
standards of service, mechanisms for consultation, cooperation
and rationalization of resources. It is seen as RONAST's res-
ponsibility, as the central focus of the network, to develop the
following tools and methodologies in full consultation with the
network components:

1. <u>Inventory of current research</u>. RONAST with the focal points will identify and contact institutions in Nepal who conduct scientific research and development programmes and those who sponsor them. Multidisciplinary studies which link socio-economics with science and technology will be included. A standard data collection methodology will be established by RONAST and the results will be published and updated regularly.

2. <u>Directory of scientists and technologists</u>. The directory published by the NCST in 1977 requires updating. RONAST should therefore initiate a survey of scientists and technologists which will identify their subject interests and thus contribute to the planning of network services. The directory will need to be published and updated.

3. <u>Union list of scientific and technical journals</u>. The union list compiled by the NCST Library Sub Committee and kept on cards at RECAST requires updating, expanding, publishing and disseminating to all S and T libraries in Nepal. It is an indispensable tool for locating in the network requested journal literature. A programme for filling important gaps both in terms of missing issues and journals not available in the network will be possible after the revised list has been compiled. It will also reveal the extent of duplication of subscriptions from one library to another, an observation with important implications for a cooperative acquisition programme. A mechanism for keeping the list up-to-date must be developed by RONAST.

4. <u>Directory of scientific and technical libraries</u>. A directory to identify for users the libraries and collections of their subject interest and to indicate to RONAST where its support is needed, will be compiled by surveying the S and T libraries in Nepal. The survey will acquire comprehensive data on collections, equipment, services, photocopying facilities, personnel and publications by formulating a questionnaire based on established international guidelines. The published directory should be distributed to institutions and individuals, with arrangements made for its periodic updating.

5. <u>Joint acquisition programme</u>. It is known that libraries in Nepal subscribe to the same journals thereby depriving the country of much needed foreign exchange. While some duplication of holdings is necessary for essential journals needed by the staff of individual institutions the amount of replicate subscriptions cannot be justified. A spirit of cooperation fostered by RONAST is required to rationalize current journal subscriptions enabling the monies thus conserved to be spent on journals of importance not yet available in the country. RONAST and its network colleagues must therefore decide who subscribes to which titles and each in turn will ensure that access to the journals is guaranteed either by direct consultation or through the provision of photocopies.

6. <u>Standardization of processing techniques</u>. An important
consideration of an information network is that it can exchange
data among its constituent parts to produce a variety of coope-
rative products including union lists and bibliographies and
to facilitate services among the network such as interlibrary
loans. These activities demand an agreed set of standards and
guidelines for processing bibliographic records which are
adhered to by cooperating libraries. There are a number of
international standards for creating bibliographic records,
among them those produced by the UNISIST programme and published
by UNESCO. It will be necessary, as soon as the network is
created, for RONAST to evaluate the available standards for
their utility in the envisaged cooperative programmes and to
produce a manual of processing techniques for distribution to
network members.

7. <u>Services to network libraries</u>. Librarians in Nepal have
traditionally faced a number of difficulties when purchasing
books and journals from abroad. Procuring foreign exchange is
a lengthy business and many of the major suppliers in Europe and
North America do not find it worth their while to accept supply
orders from Nepal because of the small number of titles involved.
RONAST can offer its services to overcome these difficulties by
placing consolidated orders for books and journals with reputable
suppliers on behalf of cooperating libraries. It would also
procure the foreign exchange and subsequently bill the libraries
in local currency in the some way as for procurement of photocopies.

Other areas in which RONAST could provide assistance are
by collecting the catalogues of local, regional and international
library equipment and stationery suppliers and by offering secre-
tarial and catalogue card duplication services to network members
with limited back-up staff.

International resources

Regional and international information resources have the
potential to supplement knowledge in local libraries and contribute
significantly to the proposed services of the network. Their use
at present is extremely limited for a number of reasons. Generally,
librarians are not aware of them; and if they are, most do not
have the finances to exploit them. Further the requisite tele-
communications links and equipment needed for direct access to
the computerized information systems are not yet available in
Nepal. Nevertheless, if the network is to benefit its users
by bringing to them appropriate information produced anywhere
in the world, as it must, links to external resources need to
be established.

At present AGRIS, INFOTERRA, HELLIS and NTIS are represented
in Kathmandu. Computerized searches of the AGRIS data base are
undertaken by the AGRIS Processing Unit in Vienna at the request
of NADS; the national INFOTERRA coordinating centre has just
been appointed; and some use is being made of HELLIS and NTIS.
Yet exploitation of these resources is still limited by insufficient
publicity, difficulties in obtaining copies of articles and in
some cases the payment required. Joint action between RONAST and
the concerned centres is therefore needed to overcome these
hindrances.

The four systems represented in Nepal constitute only a fraction of the specialized data bases available. In Europe and North America are large computer based information networks which provide access to many special subject data bases (bibliographic, statistical, factual, etc) of interest to the scientific community in Nepal. The Dialog system for example contains millions of references in such data bases as TROPAG, LISA, TSCA PLUS and CAB which by direct interrogation can produce for the user computer output bibliographies, some with abstracts. Rental of specialized data bases is possible but because of the huge costs involved RONAST should look to other sources possibly the use of information brokers in Europe and North America who would undertake searches, post the output to Kathmandu, and bill the Academy. When the necessary communications links are provided to Nepal, RONAST can consider undertaking the searches itself with the aid of a computer terminal.

The existence in the region of national S and T information centres and networks whose resources and services can be shared with RONAST should not be overlooked. Bangladesh, India, Pakistan and Sri Lanka all have national centres which need to be contacted with a view to sharing and exchanging information and cooperating in document delivery services. The recent initiative of South Asian Regional Cooperation (SARC) may predispose the forging of strong links among information centres within the region. The Regional Network for the Exchange of Information and Experience in Science and Technology in Asia and the Pacific (ASTINFO) recommended by the Interngovernmental Conference CASTASIA II may also provide RONAST with the means to cooperate with centres of the region.

Computerization

Recent advances in computer technology have made the micro-computer an inexpensive and attractive tool for libraries wishing to automate their operations and services. There are now numerous examples particularly in Europe and North America of documentation and information centres computerizing their day to day routines and creating special data bases. The advantages of computerization are many: existing staff can be released from dull routines for redeployment to more creative work; information services become subject to great accuracy and speed; the ability to exchange and receive large amounts of data from other centres and systems in a manageable form, the diskette, is possible. Word processing a feature of many microcomputers greatly simplifies the design of library publications and can produce camera ready copy for immediate transfer to an offset press; inventories such as union lists, current research projects and S and T personnel are easily compiled, amended and updated, and so on.

All these examples are relevant to RONAST with its aim to deliver prompt and accurate services to network users. We believe therefore that a microcomputer system should be placed at the Documentation Centre to enhance the activities of the network by creating the following data bases: union list of journals; inventories of S and T libraries, research projects and personnel; catalogue of national S and T literature; and for exploiting subsets of major data bases which may become

available on diskettes in the future; and with a view to
interrogating directly international data bases when local
conditions permit such activities. In addition, the specialized
data bases compiled by RONAST can be exchanged and shared with
regional centres and provided to those focal points of the net-
work whose parent institutions also have computer facilities.

Training

More than ninety percent of the one hundred or so professional
librarians in Nepal have acquired their library science degrees
in India, usually at bachelors'level. All of them have other
academic qualifications, mainly in the arts and humanities.
Librarians with a science background number not more than two.
Their traditional education with a heavy emphasis on theory
leaves them mostly unprepared to offer services using modern
information techniques. While little can be done formally to
improve their knowledge of science, training seminars and work-
shops organized by RONAST aimed at improving the information
handling capabilities of network librarians and hence, services
should be held. They would necessarily concentrate on indexing
and abstracting techniques, provision of user services, the
standards to be followed for bibliographic processing and
collection of data for inventories, plus an introduction to
information technology, trends and information sources in the
region and beyond.

RONAST Documentation staff will also need training in both
the methodologies of information and library science and advanced
documentation techniques. It is seen as essential that the
majority of staff are science graduates with most having practical
research experience as contemporary documentation work does
require a science background. Their proposed training would be
in information science to post graduate level allowing them to
effectively plan the services of the network; provide leadership
and innovation for the information profession in Nepal; evaluate
new information technologies and techniques for their applicability
to local needs; provide a cadre of high status personnel who
could advise RONAST and the government on information policies,
techniques, etc; and pass on their newly acquired knowledge to
other information workers and centres by offering technical advisory
services. There is also increasing discussion in Nepal of opening
a graduate course in library and information science. Should this
happen, RONAST's trained staff together with senior librarians
would form a capable nucleus of visiting lecturers. Parallel
to the development of network services there should be a continuing
public relations and awareness programme which skillfully emphasizes
the importance of S and T information to national advancement
and promotes the services of the network. In addition to preparing
brochures and material for the media, talk programmes backed up
with well designed audiovisual aids can be held in research

institutions, schools, colleges, clubs and at exhibitions,
annual meetings of professional societies, workshops, conferences
and so on. Regular meetings of network librarians if held in
different institutions can advantageously be combined with
seminars for scientists adn technologists of the locality.

     User training should be a preoccupation of RONAST and the
network. Unfamiliar aids including abstract journals and
indexes will need explanation and practical demonstration as
will the output from the network - computer printed bibliographies,
SDI printouts etc. Efforts should be made to sponsor regular
programmes, as for example, bringing together new recruits of
S and T institutions for joint instruction and training. Advan-
tage also needs to taken of events attended by potential users
from outside Kathmandu to acquaint them with the information
resources and products concentrated in the capital.

VI. INSTITUTIONAL REQUIREMENTS

RONAST Documentation Centre

It has been established that to maximize existing resources, the provision of S and T information in Nepal is best served by the establishment of a network with the RONAST Documentation Centre as its focal point. The physical and human requirements of the Centre will be determined by its functions which to summarize are as follows:

a. Organization and coordination of the network
b. Provision of financial or material support to network members
c. Maintenance of modest collections including secondary sources, books and journals which fill existing information gaps
d. Capture, processing and storage of national S and T documentation
e. Provision of bibliographic services
f. Provision of information evaluation services tailored to the needs of specific users
g. Operation of a document delivery service
h. Maintenance of a register of translators
i. Maintenance of a reprographic facility
j. Compilation of inventories of current research
k. Maintenance of a directory of scientists and technologists
l. Compilation and maintenance of a union list of scientific and technical journals
m. Preparation of a library directory
n. Coordination of a joint acquisitions programme
o. Selection of processing techniques for cooperative programmes of the network
p. Provision of support services to network libraries
q. Maintenance of links with regional and international information centres and systems
r. Development of an in-house computer capability for the creation of special data bases
s. Provision and promotion of training courses for librarians and users
t. Formulation of a national S and T information policy

It is suggested that the Documentation Centre consist of three sections between which these functions and activities will be divided. The first would concentrate on policy, coordination and management, the second with library management and the third with documentation services. The activities of each section and the professional staff requirements are detailed below.

1. Office of the Head, Documentation Centre

The Head of the Documentation Centre would be expected to have a good postgraduate degree in basic or applied science with experience in research and a background in information science

or special librarianship. He or she would be responsible for
actions towards the establishment of a national s.t.i. policy
and its implementation, determination of standards, administrative
and financial management, establishment, coordination and leader-
ship of the network and Documentation Centre. The Head would
also promote links to regional and international centres and
systems and develop and implement a plan for popularization of
science and the establishment of information consolidation
services.

2. Library

Two professional staff would be required initially for
the library. In additional to professional library qualifications
a background in science or the social sciences would be desirable.
The Chief Librarian will have managerial responsibility for and
actively contribute to the technical operations of the library.
Together with the other professional he will ensure the capture
of local documentation and select and order foreign books and
journals, process them, maintain the document delivery service
and execute the current contents programme. An enquiry service
to the preparation of bibliographies and the training of users
and network librarians will also be among the responsibilities
of this section. With the introduction of additional services
it may be necessary to strengthen this section through the provision
of two more professionals.

3. Documentation services

Two professional staff with S and T backgrounds would
be required for this section. At least one of them should have
a knowledge of computer applications in information activities.

The duties of this section will consist of maintaining
the directory, inventory and union list data bases, retrospective
searches and SDI using local and foreign sources, searches of
the RONAST data base and printed resources of the library,
preparation of user profiles and query formulations to forward
to the intermediary appointed to search foreign data bases.
As with library staff, this section will also participate in
local training programmes.

As the workload increases through the introduction of
new services and the developing interest of users, the staff of
this action may have to be increased by the appointment of one
more professional.

As the activities of each section are intrinsically
bound together it is necessary that staff from one section
contribute to the work of another. For example the preparation
of bibliographies while viewed as a library function will at times
require the documentatlist to search foreign data bases for
pertinent references. The sections therefore must be interactive
and not allowed to become isolated from each other. To support
the professional staff in their work, general service staff including
secretaries, typist-clerks able to keyboard data to the computer,
library assistants, printing assistant, technicians and messengers,
all having a working knowledge of English, will need to be
recruited.

The modalities of establishing the RONAST Documentation
Centre, formation of the network, selection of common processing
methodologies, selection and installation of the computer, and
provision of envisaged services are new concepts for Nepal. The
trained expertise required to make judgements and take decisions
during the initial phase of activities is not available locally.
We recommend therefore that steps be taken to engage some foreign
expertise to guide these initial activities and help to build
a solid base for future operations and services.

To operate its services the Documentation Centre will
require the usual range of furnishings and equipment: shelving,
tables and chairs, microfilm/fiche storage cabinets, Devnagari
and Arabic typewriters and catalogue cabinets. In addition,
equipment which provides for automation of certain functions
is also desirable. Included here are a catalogue card duplicator,
microfiche and microfilm readers and reader-printers, heavy duty
large volume photocopiers, an offset press with its own binding
capability and the microcomputer. The microcomputer while being
primarily for documentation activities will also find other
applications within RONAST itself such as the manipulation
of research data, word processing and internal housekeeping.
Taken together this dictates the acquisition of a 16 bit machine
with a minimum of 128K of internal memory, provision for mass
storage devices and with a multiuser capability of up to two
online terminals. It is essential that when selecting the
microcomputer, consideration is given to the suppliers of
computing equipment in the local market, especially the effecti-
veness of their back-up services and their willingness to provide
training and programme and system analysis support. Users of
microcomputers in Kathmandu should also be contacted to discover
the models they are using, their reliability and applications.

The space requirements of RONAST comprise the library with
its attendant reading, processing and storage areas, office space
for professional and general service staff, the printing workshop
and a room to house the computer. While libraries are traditionally
demanding of space, we feel that RONAST should adopt a modern
space saving approach by acquiring as much material as possible
on microform. The back volumes of many journals are available
in this medium as are an increasing number of current issues.
Book publishers too are making increasing use of microform
publishing. Local documentation collections also, can be filmed
by making suitable arrangements with the microfilm laboratories
in Kathmandu. If this approach is adopted, in its fourth year
of operation the library would need approximately 4,000 sq.ft
of floor area. An additional 1,500 sq. ft for offices, the micro-
computer and the press are also required. Airconditioning and
dehumidifying of the computer room and microform storage areas
is desirable. If it is impractical to house the Documentation
Centre and the other departments of RONAST under one roof, efforts
should be made to place them in close proximity to each other.

Network Focal Points

As mentioned in chapter III the special subject network centres often lack support staff and basic equipment including photocopies and typewriters. Their budgets too are often subject to financial cuts resulting in gaps in collections. Discovering the exact nature of their requirements will necessitate detailed discussions with librarians and their superiors and undertaking of surveys. This will enable RONAST to identify the most appropriate form of network support to individual centres. Training of librarians in the techniques adopted by the network and formulation of measures to popularize the use of individual centres are also necessary.

Consultation

Before, during and after the establishment of RONAST and the network, extensive consultations with proposed participating centres and representative groups of users must be held. Centres and their parent institutions ought to have a chance to express their views, ask questions and fully understand what is expected of them and the nature of their relationship with RONAST. Financial and administrative implications such as charging non-institutional users for services offered by each centre will have to be addressed as well the need for assured and adequate budgets. Users too must be invited to express their needs and the constraints they face in receiving and using information. These discussions will need to be held prior to the establishment of the Documentation Centre and during its formative months. To ensure a continuous exchange of views, it is proposed that RONAST establishes a Steering Committee comprising the Member Secretary and Head, Information Services of RONAST, librarians of the focal points and representatives of the network's user constituency. The committee numbering not more than fifteen people would meet frequently to review work in progress, plans of action, constraints, and to suggest future directions and areas of emphasis. It is also advocated that each single focal point form its own committee of users and librarians to review activities and services. The issues raised at these meetings would be presented to the Steering Committee, for their consolidation.

Evaluation

Evaluating the cost effectiveness of information systems is notoriously difficult. The relationship for example between the provision of information to a user and the ensuing economic benefits are almost impossible to estimate. Did he use the information wisely? Was his research protocol sound? Were his results implemented? There are many questions and variables which defy accurate quantification. Nevertheless a case study approach which follows through the provision of information to different categories of clients and the contribution it makes to their work will provide valuable indicators of how the services are being applied to answer specific tasks and problems. Such evaluation could make use of outside disinterested persons,

scientists and economists, to ensure objective judgements.
Evaluation and measurement of the use of the network and its
services is feasible by contrast. Services can be assessed
in terms of their use, the speed in getting the information
to the user, the appropriateness of the information, the cost
of the service, the number of unsatisfied requests, and so on.
To give an example, the document delivery service can be measured
according to the following parameters:

- the number of requests received
- the percentage for which a response was not possible
- the number satisfied from local collections
- the time taken to respond
- the efficiency of one foreign document delivery service
  over another
- the average cost per document supplied

In this case answers to these questions will not only suggest
adjustments and improvements they will also indicate, for example,
the journals not available in Nepal for which there is a demand.

The measurement of services therefore by regular analysis
of statistics kept at RONAST and the centres will indicate, sector
by sector, the use made of services which in turn will assist
in the planning and decision making processes of the network.

VII.   PLAN OF ACTION AND BUDGET

The plan of action and schedule of activities listed
below is designed to have the RONAST Documentation Centre and
the network fully functioning by the end of the fourth year
of operation. A substantial programme of work is planned
for the first two years as it is important that the system
establishes its identity and capacity to begin offering
its services within a relatively short period of time.

Year 1

- Begin recruitment of science graduates for the following
  positions: Head, Documentation Centre; Chief Librarian;
  Chief Documentalist. All will receive preliminary in
  house training from a consultant particularly the latter
  two officers as they will be deputising at various times
  for the first three officers while they are on study leave.
  General service staff will also be recruited.

- Engage consultant to assist in the formulation of a
  workplan, methodologies, training, selection of books
  and journals and equipment etc.

- Determine subject priorities needing attention by the
  network, identify focal points and negotiate for their
  participation in the system

- Survey the focal points to determine their needs in
  terms of collections and equipment and to reveal the
  information gaps to be bridged by RONAST

- Formulate bibliographic processing methodologies in
  conformity with established international methodologies

- Establish mechanisms for the capture of national published
  and unpublished documentation and acquire and process
  local and foreign books, journals and documents (continuing)

- Purchase reprographic and office equipment and furniture
  including microfiche readers, typewriters, photocopier

- With the consultant train RONAST and network staff in
  the chosen processing methodologies

- Begin updating the union list of journals (continuing)

- Begin overseas training (continuing)

Year 2

- Purchase microcomputer

- Engage consultant to install microcomputer and software
  and train RONAST staff in its use

- Recruit two Deputy Librarians, one Deputy Documentalist and support staff

- Initiate surveys with the cooperation of focal points for the compilation of directory of scientists and technologists and inventory of current research projects, to create computerized data bases (continuing)

- Begin compilation of a data base of national literature captured and reported to the Documetation Centre and computerize the union list of journals (continuing)

- Constitute the Network Steering Committee with represen- tation from focal points and information users

- Purchase equipment, books and journals etc. or provide grants as network support to selected focal points (continuing)

- Initiate public relations and publicity campaigns (continuing)

- Organize training courses for users and local librarians (continuing)

- Commence bibliographic and document delivery services (continuing)

- Contact local librarians to organize a joint acquisitions programme (continuing)

Year 3

- Survey local libraries to prepare a library directory listing major collections, equipment, services, staff, etc. (as required)

- Appoint an intermediary to search on RONAST's behalf foreign data bases for the provision of selective dissemination of information (SDI) and retrospective searches (continuing)

- Establish links with regional and international information centres, services and systems (continuing)

- Prepare the national information policy (continuing)

- Commence the information consolidation services after holding discussions with selected administrators and users of information to determine priorities (continuing)

- Engage consultant to review progress and advice on the year 3 programme

- Purchase offset press and ancillary equipment and recruit printer and assistants

- Compile register of scientist - translators (continuing)

Year 4

- With the assistance of a consultant evaluate progress
  and plan for future activities

- With the focal points establish subnetworks as required
  (continuing)

- Assess the possibility of searching foreign information
  networks and data base direct from Kathmandu

Budget

The adjacent table displays the budget required to establish
the RONAST Documentation Centre and the network over a period
of four years.

The figures, all in United States dollars, represent total
identifiable costs; no disaggregation to show RONAST and donor
inputs has been attempted.

Overseas training of professional staff has been shceduled
to have two staff back in Kathmandu by the end of the second year,
with the third arriving one year later. This ensures that qualified
staff are available to get services off the ground by the beginning
of year 3.

The budget estimate for equipment for the Documentation
Centre has included the following: a microcomputer, offset press,
photocopier, microfiche/film readers, printer-printer, office
furniture, shelving, typewriters, airconditioners.

For acquisitions, emphasis has been placed on the purchase
of journals, popular and scientific to support local research
as they contain more current information on research results,
applications and techniques than books. The book budget is
intended for the acquisition of reference works and relevant texts.

		Year 1	Year 2	Year 3	Year 4
1.	**PERSONNEL**				
	Professional (at 1800/year)	9,000(5)	14,400(8)	14,400(8)	14,400(8)
	General service (at 1200/year)	7,200(6)	12,000(10)	14,400(12)	14,400(12)
	Consultants	50,000	7,500	7,500	7,500
2.	**TRAINING**				
	Professional staff (overseas) for masters degree or post graduate diploma (1 x 2 years; 2 x 1 year)	20,000(1)	40,000(2)	20,000(1)	–
	Local workshops and seminars for professional staff and staff of other libraries (2/year x 2 weeks for 10 persons each)	3,000(2)	3,000(2)	3,000(2)	–
	User training courses (4/year x 5 days for 20 persons each	–	2,500(4)	2,500(4)	2,500(4)
3.	**EQUIPMENT**	45,000	30,000	30,000	10,000
4.	**BOOKS AND PERIODICALS**				
	Books	40,000	20,000	18,000	18,000
	Journals	80,000	45,000	50,000	55,000
5.	**DOCUMENT DELIVERY**	–	1,500	3,000	5,000
6.	**SDI AND RETROSPECTIVE SEARCHES**	–	–	5,000	8,000
7.	**LOCAL TRAVEL**	1,500	1,500	1,500	2,000
8.	**SUPPLIES AND PUBLICATIONS**	10,000	15,000	20,000	20,000
9.	**UTILITIES** (postage, electricity etc)	1,000	1,250	1,500	2,000
10.	**NETWORK SUPPORT**				
	Equipment	–	25,000	25,000	25,000
	Books and journals	–	80,000	100,000	120,000
	Total	266,700	298,650	315,800	303,800

GRAND TOTAL $1,184,950

VIII   INFORMATION POLICY AND PLANNING

Information policy

An information policy constitutes an essential part[*]
of a national policy for economic and social development[*].
The fact that information is now recognized as a national
and international resource demands that its acquisition,
processing and use should be guided by established national
policies which would enable developing countries to (a)
improve the flow of information and its utilization (b)
further develop their information handling capabilities
(c)   utilize to the best advantage the assistance available
from international sources.

The national information policy should lead to plans
which would aim at providing for the s.t.i. needs of the
society as a whole - including planners, policy makers,
implementers, researchers and professional groups in all
sectors as well as "grass-roots" level communities who also
contribute to development. Information policy should cover
all institutions, organizations, resources, systems and
services which contribute to the transfer of information to
the user.

Special attention should be given in the formulation
of national information policy to manpower development.
The appearance of new information technologies requires a
re-examination of the facilities available for the training
of manpower and the upgrading of these facilities to meet
modern requirements.

Policy objectives

Parker[**] identified the following objectives which
will determine the scope, formulation and implementation of
a national policy for information and documentation. Most
of these objectives would be relevant to the national scientific
and technological information system for which RONAST has
responsibility.

    1.   to identify the information needs of the various
          users of the s.t.i. system

    2.   to promote an awareness of the importance of
          scientific and technical information in development,
          especially to policy makers

    3.   to promote the effective use of information

    4.   to promote the generation of information

(*) UNISIST II Intergovernmental Conference on Scientific
    and Technological Information for Development Main Working
    Document (28 May - 1 June 1979) Paris, Unesco, 1979

(**) Parker, Stephen National information policy: scope
     formulation and implementation. Apr. 1982 39p. (unpublished
     draft)

5. to remove or reduce obstacles to the distribution
    of information

6. to promote the effective coordination of information
    provision

7. to ensure that appropriate new technologies are
    introduced to assist the attainment of the above
    objectives

8. to ensure that the necessary facilities, manpower,
    equipment and finance are available.

Focal point

UNISIST has suggested that it would be desirable to
designate a national information coordinating agency (national
focal point) where one does not exist. It should be located
high in the government structure and assigned responsibility
for the harmonized planning, co-ordinating and management
of the national information system. The agency would among
other things: advise the government on the formulation of
the national information policy and its implementation; ensure
that the national information policy and plan form an integral
part of the national development policy and plan; advise on
the constitution of information committees; advise on the
criteria, guidelines and standards for planning, development,
financing and assessing performance of the components of the
information system; establish mechanisms to ensure adequate
input to the system in terms of manpower, finance, facilities;
advise on and interact with international and regional infor-
mation programmes and the coordination of their activities
in the country.

Until such time as Nepal establishes such a focal
point to cover all information activities in the country,
RONAST might consider the establishment of a focal point
and the initiation of its designated functions with respect
to the national s.t.i. infrastructure.

Information Policy for RONAST

It may be recalled that RONAST in article 5(a) of its
statutes has the responsibility "to formulate a national policy
on science and technology" (unofficial translation). While
it will undoubtedly include statements on research directions
and priorities, establishment of S and T institutions, trained
manpower requirements and development of the S and T education
sector, it must necessarily be accompanied by a clear statement
of national information concerns at the local and international
levels. Such a statement will guide the development of infor-
mation resources services and infrastructures to support national
S and T activities and provide a framework to underpin Nepal's
reactions to regional and international information initiatives.

The components of the information policy will reflect
the wide ranging discussions which RONAST holds with decision
makers, politicians, administrators, librarians and other
interested groups. Established guidelines such as those
formulated by Unesco under its UNISIST programme will be of
value in directing these discussions which could gainfully
cover: trained manpower requirements including the need to
establish library and information science courses in the
country's standards of service, bibliographic data processing
and transliteration of Devnagari; protection of intellectual
property including written, statistical and audio-visual;
deposit of published and unpublished writings in designated
centres; parameters for evaluating the effectiveness and
efficiency of information services; the promotion of coope-
ration among libraries to rationalize services, collections
and acquisitions; the introduction of new information tech-
nologies and the appropriateness of international information
initiatives. The policy which evolves will require continuous
review which takes into account the results of evaluation
studies and of local and international developments.

Science and technology, as we have mentioned, cannot
be considered in isolation from the social sciences if tech-
nological programmes and projects are to be appropriate for
the society they are designed to benefit. A science and
technology information policy must recognize the clear rela-
tionship between science and society by bringing into its
purview socio-economic information. The considerations for
s and t information policy suggested above are therefore
equally applicable to the socio-economic component of the
policy.

Finally, the consultants wish to bring to the attention
of RONAST the   recommendations made by the United
Nations Conference on Science and Technology for Development
on Scientific and Technological Information Systems.

At its 16th Plenary Meeting on 31 August 1979, the
United Nations Conference on Science and Technology for
Development adopted the Vienna Programme of Action on Science
and Technology for Development. In the Programme of Action, a
series of recommendations for implementation, in the area of
scientific and technological information were made. These
recommendations are reproduced in Annex IV.

PART C
ANNEX I

Persons consulted during the preparation of this report

Mr Purna P. Amatya, Head, Documentation Centre; Research Center for
                 Applied Science and Technology (RECAST),
                 Kirtipur

Ms Subarna K. Bajracharya, Head, National Agricultural Documentation
                 Centre (NADC), Kathmandu

Mr Chris Cunningham, VSO Librarian, Forest Research Library,
                 Kathmandu·

Mrs Lila Dahal, Librarian, Bir Hospital, Kathmandu

Mr Dahal, Librarian, Royal Nepal Academy of Science and Technology
                 (RONAST), Lalitpur

Dr M.K. Giri, Officer, Royal Nepal Academy of Science and
                 Technology (RONAST), Lalitpur

Ms A. Kelly, VSO Librarian, Khumultar Research Complex, Khumultar

Mrs Shanti Mishra, Chief Librarian, Tribhuvan University, Kirtipur

Ms Joan Radcliffe, VSO Librarian, Institute of Engineering, Lalitpur

Dr Kamal K. Shrestha, Member Secretary, Royal Nepal Academy of
                 Science and Technology, Lalitpur

Mr Shyam K. Tandukar, Librarian, National Planning Commission,
                 Kathmandu ·

Mrs Prabha Thacker, Head, Information, Education and Communication
                 Division, National Commission on Population,
                 Kathmandu.

ANNEX II

Important Science and Technology Information Centres and
Libraries in Nepal

1. Industrial Services Centre Library, Kathmandu

    The Library supports the industrial consultancy services
of the ISC which concentrates on the economic feasibility and
technologies for medium and small scale industry. Support has
been received from UNIDO for books, journals, establishment of
information services and overseas training. ISC is a member
of TECHNONET.

2. Bir Hospital Library, Kathmandu

    With a considerable number of books and medical journals,
this library primarily serves the staff of the hospital. It
is the HELLIS Centre for Nepal and has trained staff.

3. Khumultar Complex, Khumultar

    This complex is the main research centre of the Department
of Agriculture. Each of its eight specialized divisions,
including plant pathology, engineering, botany and soil chemistry,
has a modest library. The collections are being catalogued at
the present time. One unqualified librarian and a typist are
responsible for all these libraries. A VSO librarian has also
arrived recently.

4. Forest Research Library, Kathmandu

    With ODA funds and the services of a VSO librarian, this
library of some 3,000 books has recently been catalogued. A
special collection of national forestry documentation is being
built up and back numbers of key forestry journals on microfilm
have been purchased. An ODA forestry information specialist is
due to arrive this year to organize information services.

5. National Agricultural Documentation Centre, Kathmandu

    As the AGRIS input centre for Nepal, NADC has established
a solid collection of national agricultural documentation
including some 2,500 unpublished reports which have been
microfiched in its own laboratory. The Nepal Agricultural
Bibliography containing 2,400 references up to 1981, Nepal
Agricultural Abstracts and Nepal Thesis Abstracts are published
regularly. Over 15 special subject bibliographies dealing with
Nepal have also been published. A union list of journals found
in 18 agricultural libraries throughout the country has been
compiled. NADC has over 5,000 books and receives more than
100 current journals. Six staff including three professionals
have received training overseas. NADC is assisted by the
International Development Research Centre (IDRC) Canada.

6. Tribhuvan University Central Library, Kirtipur.

This is the largest organized library in Nepal with several hundred thousand volumes of books and journals. Covering all disciplines it has the biggest collection of pure science books and journals in the country including extensive runs of biological and chemical abstracts. Unfortunately recurrent budget cuts have resulted in cancellation of subscriptions causing gaps in journal holdings. Extensive special collections include theses produced at the unviersity, Nepal documentation and UN publications. A number of ad hoc bibliographies have been published.

7. Research Centre for Applied Science and Technology (RECAST) Kirtipur

The RECAST library has more than 3,000 books and over one hundred subscriptions to S and T journals and abstract services. It has a modest collection of national S and T documentation and a good selection of NTIS reports for which it is the local agent. Three qualified staff man the library. A current awareness bulletin listing journal articles received at the centre of interest to local scientists is issued regularly. Union catalogues of S and T books and journals produced by the NCST Library Sub-Committee are maintained in a card index. Financial support has been received from Unesco.

8. Institute of Engineering, Lalitpur

With funds from a World Bank project, the Institute's library is rapidly expanding in terms of physical facilities and its collections of books and journals. The staff of the library consists of one qualified librarian and several semi-professional assistants supplemented by a VSO librarian.

9. Institute of Agriculture and Animal Science (IAAS), Rampur

With technical assistance from MUCIA and funding from USAID, the IAAS library is one of the best equipped in Nepal. It has a new purpose-designed building, qualified staff and many thousand volumes of new books and extensive subscriptions to pure and applied agricultural journals.

10. Agricultural Research Stations, Bhairahawa, Parwanipur, Rampur

Housing commodity research programmes for wheat, rice and maize respectively, each station has fair size collections of books and journals, for the most part uncatalogued. Manned by para-professionals, staff have been trained at NADC in simple library methodologies. Panwanipur library, the largest of the three with some 6,000 volumes, receives all IRRI publications.

Although some of the S and T libraries do have collections
of books on socio-economics relating to their disciplines
(NADC for example and Tribhuvan University Central Library)
these three specialist institutions together account for the
major sources of socio-economic information in Nepal.

11. Centre for Economic Development and Administration (CEDA)
    Kirtipur

With some 5,000 books and 50 journal subscriptions subject
concentration is on economic development and the socio-economics
of other disciplines. A small collection of local documentation
has been formed together with a deposit of the considerable
report output of CEDA. The library is staffed by one qualified
librarian. CEDA is the Nepal focal point of the CSCD (Committee
on Studies for Cooperation in Development in South Asia) and in
this capacity participated in the Pre-Project on Development of
a South Asian Information Network on Economic and Social Develop-
ment, Colombo, 1982.

12. National Planning Commission Library, Kathmandu

This lrge library of books and reports has no qualified
librarians although its chief has received short term training
in India. Cataloguing of its collections is being undertaken.

13. National Commission on Population (NCP) Kathmandu

The library of the NCP falls under its Information, Education
and Communication Division and received funding from USAID and
UNFPA. In a short space of time it has catalogued some 800 books,
established a Nepal population documentation collection and
begun indexing of serials. Specialist staff, including qualified
librarians, produce various publications relating to population
issues. A population bibliography containing 150 references is
in the press and a motivators' kit comprising messages in pictures
connecting population with development is being produced. A
glossary in Nepali of population and development is being
produced. A glossary in Nepali of population terms will be
published as will translations of ESCAP publications. The NCP
also has plans to join the International Population Information
Network, POPIN.

Other libraries of importance for which no current information
is available are those serving the Department of Medicinal Plants;
Royal Drug Research Laboratory; Bureau of Mines; Institute of
Medicine; all in Kathmandu, the Institute of Education at
Kirtipur and the Institute of Applied Science and Technology
in Dharan.

ANNEX III

LIST OF ABBREVIATIONS AND ACRONYMS

AGRIS	International Information System for the Agricultural Sciences and Technology
BLLD	British Lending Library Division (UK)
CEDA	Centre for Economic Development and Administration
IDRC	International Development Research Centre, Canada
INFOTERRA	International Referral System for Services of Environment Information (UNEP)
INSDOC	Indian Scientific and Technological Documentation Centre
ISC	Industrial Services Centre
ITC	International Trade Centre
MAB	Man and the Biosphere Programme (Unesco)
NCST	National Council for Science and Technology
NTIS	National Technical Information Service, USA
POPIN	International Population Information Network
RCNAS	Research Centre for Nepal and Asian Studies
RECAST	Research Centre for Applied Science and Technology
RONAST	Royal Nepal Academy of Science and Technology
SDI	Selective Dissemination of Information
TECHNONET	Regional Technological Information Network Singapore
UNCSTD	United Nations Conference on Science and Technology for Development
UNDP	United Nations Development Programme
UNFPA	United Nations Fund for Population Activities
UNIDO	United Nations Industrial Development Organization
UNICEF	United Nations Children Fund
USAID	United States AID Programme
VSO	Voluntary Service Organization (UK)

ANNEX IV

UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT(x)

Recommendations on Scientific and Technological Information

A. National level

I. Developing Countries

30. National scientific and technological information systems
should be formulated as an integral part of the over-all national
development plans. This should include responsibilities such as
planning, programme development, co-ordination and stimulation of
information activities. Such systems should also include among
their functions the appropriate co-ordination with the international
information networks.

31. Developing countries, in order to improve and intensify the
exchange of information through person-to-person contacts should
promote and support scientific and professional associations.

32. Developing countries should strengthen and co-ordinate their
agricultural and industrial extension services in order to achieve
a more effective and more efficient transfer of information to the
end-users, particularly in the rural areas, and to allow feedback
to the research and development institutions concerned.

33. Special attention should also be paid to the establishment of
comprehensive mechanisms to utilize mass media for bringing about a
scientific temper and awareness of scientific knowledge as well as
the promotion of creativity and innovation among the population.
These should include, inter alia:

    (a) Setting up of science museums, science and technology
fairs and hobby centres, and releasing publications for children;
all sectors of society should benefit from these activities;

    (b) Publication and release of scientific and technological
journals and books for the public and students at all levels;

    (c) Public broadcast programmes, with the active partici-
pation of the scientific community.

II. Developed Countries

69. Developed countries should:

    (a) In view of the accumulation of scientific and techno-
logical knowledge in these countries, make those information
resources which are readily accessible to their own nationals
also readily accessible to users from developing countries;

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* Extracts from the Report of the UN Conference on Science and Tech.
  For easy cross-checking, the same paragraph numbering used in
  the report of the Conference (A/CONF.81/16) is also used here.

(b) In regard to commercially available information, adopt measures and arrangements allowing developing countries to use their specialized information systems and acquire their publications at reasonable cost and, whenever possible, in local currency or free of charge;

(b) Provide the fullest possible access to available information on technologies, terms and conditions of supply, local technical and management requirements, and activities of transnational corporations and enterprises in the fields of science and technology.

B. Subregional, regional and interregional levels

44. (a) Measures should be adopted with a view, inter alia, to organizing appropriate forms of awareness, on the part of the public, of the role of science and technology in the development process on the basis of, for instance, achievements of other developing countries as well as promoting sub-regional and regional scientific and technical publications;

(b) Measures should also be taken by developing countries to raise the awareness of the public at large in the developed countries of the problems experienced by developing countries in the process of achieving scientific and technological development.

45. In accordance with national laws and regulations, developing countries should establish suitable interlinked information networks and data banks which would, inter alia, enable exchanges of information on science and technology and on training and education programmes, conditions for the transfer of technology, terms of foreign investment, and activities of national and transnational corporations and enterprises in the field of science and technology. Such networks should provide for adequate co-ordination with international information networks.

46. Developing countries should share among themselves information and experience in the most relevant fields, such as agriculture, health, communications, industrialization and the like. They should establish co-operative arrangements and technical and managerial skills for sharing this information.

C. International level

58. Information systems and networks to be established at sub-regional, regional, and international levels should ensure close linkages with the national information systems to provide all support for strengthening the national science and technology information capacity, including systems to facilitate access to technology information contained in patent documents, through training, institution building and intergovernmental co-operation in classifying, publishing and exchanging such documents.

70. The scientific and technological international information network should include the following features:

(a) The network should be designed to meet particularly the needs of the developing countries and to provide access to information for users who contribute to problem-solving activities and decisions relating to development;

(b) The network should operate, inter alia as a channelling mechanism facilitating contact between users and suppliers of information;

:   B.   <u>Subregional, regional and interregional levels</u>

44. (a) Measures should be adopted with a view, <u>inter alia</u>, to organizing appropriate forms of awareness, on the part of the public, of the role of science and technology in the develop- ment process on the basis of, for instance, achievements of other developing countries as well as promoting sub-regional and regional scientific and technical publications;

(b) Measures should also be taken by developing countries to raise the awareness of the public at large in the developed countries of the problems experienced by developing countries in the process of achieving scientific and technological development.

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(b) The network should operate, <u>inter alia</u> as a channelling mechanism facilitating contact between users and suppliers of information;

(c)   In each country there should exist one national
focal point for its different subnetworks while at the same
time there should be, at the world level, under the auspices
of the Untied Nations, a global centre focal point;

(d)   Each national focal point should have the information-
on-information for its country; the global central focal point
should have the same for the world;

(e)   The global central focal point will provide information-
on-information to all national focal points. Users should be
able to obtain the needed information, or information-on-infor-
mation, normally from their national focal point and from other
national focal points either directly or through their own
national focal point;

(f)   In cases of difficulty of obtaining a response from
any other national point, the global central focal point should
take measures to ensure the required information is provided;

(g)   The global central focal point and individual country
focal points should be managed by qualified personnel capable
of easily, promptly and clearly understanding the requests
for information and of directing the requests to the appropriate
source;

(h)   Each focal point should have the appropriate commu-
nication facilities so as to be able to receive or supply
information as fast as needed, either directly through the
individual national focal point or through the global one.

71.   In establishing the international information network
outlined above, all countries drawing up national scientific
and technological policies and plans should include in them
the development of programmes and activities for national
information systems and networks.

72.   National information systems and networks should aim to
ensure access to and facilitate utilization of national and
international sources of information on science and technology
in order to stimulate endogenous development and national for
innovation and to support the assessment, transfer and adaptation
of technology. This requires _inter_ _alia_ :

(a)   The training of specialized manpower;

(b)   The development of infrastructures, including
communication facilities, data banks, libraries, documentation
centres, archives, back-up literature, hardware and software;

(c)   The development of the necessary information-handling
procedures and techniques, tools, methods, norms and standards;

(d)   The improvement of the stock of primary documents
in developing countries, taking into account the establishment,
when this proves necessary, of central libraries or documentation
centres;

(e)   That care should be taken that all countries should have access to the information systems of developed countries permitting research "on line".

73.   Taking into account the urgency of the task, the scientific and technological international information network should be developed sequentially and in an evolutionary fashion so as to meet particularly the needs of the developing countries ensuring the maximum availability of information such as:

(a)   Information required for development of science and technology;

(b)   Information regarding the national capacity in science and technology;

(c)   Technological information contained in patent documents;

(d)   National programmes in science and technology.

74.   The global and international information network should be so developed as to meet particularly the needs of the developing countries. Priority should be given to covering scientific, technical, socio-economic, legal and other aspects needed for decision-making in the selection and transfer of technology. The existing information systems within the United Nations and other international bodies set up for the exchange of scientific and technological information and which are also serving as industrial technology data banks should form an integral part of the proposed global network. Data from the developed and the developing countries on available tech- nologies, conditions of licensing, identification of suitable experts, engineering and consultancy services and the like should be widely available so as to promote their effective utilization, thereby strengthening the concept of the global international network.

75.   The developing and the developed countries should parti- cipate in, and make better use of, the existing scientific and technical information systems and take such steps as would enable their own information systems to be coupled to the global information network and ensure that all support is provided for the effective use of this global network.

D.   United Nations System

96.   There is a need for strenghening the existing and developing new information centres and networks in developing countries. These activities could be effectively pursued within the organs, organizations and bodies of the United Nations system. The establishment of a global network of scientific and technological information should be carried out as specified in paragraphs 70 to 75 as previously mentioned.

97. The organs, organizations and bodies of the United
Nations system should improve the existing information services
and provide measures to co-ordinate their effective utilization
in the field of science and technology.

98. The organs, organizations and bodies of the United Nations
system should further develop and co-ordinate their scientific
and technological publications services in order to make available
the most important world publications in the various scientific
and technological disciplines, including publications for the
popularization of science and technology, in all the official
languages of the United Nations.