



General Assembly

Distr.
GENERAL

A/CONF.100/PC/31
4 March 1981

ORIGINAL: ENGLISH

UN LIBRARY
MAR 18 1981
UN COLLECTION

PREPARATORY COMMITTEE FOR THE UNITED
NATIONS CONFERENCE ON NEW AND
RENEWABLE SOURCES OF ENERGY
Third session
30 March-17 April 1981
Item 2 of the provisional agenda*

SUBSTANTIVE PREPARATIONS FOR THE CONFERENCE

FINAL REPORT OF THE AD HOC EXPERT GROUP ON INFORMATION FLOWS

* A/35/43 (Part II), para. 67

CONTENTS

	<u>Paragraphs</u>	<u>Page</u>
BACKGROUND	1 - 5	5
INTRODUCTION	6 - 20	6
I. PRESENT SITUATION	21 - 46	9
A. Information users and their requirements	21 - 22	9
B. Scope, type and nature of information	23 - 24	9
C. Current information-exchange-and-dissemination activities	25 - 34	11
1. Information systems and services	28 - 30	11
2. Seminars, conferences, invisible colleges and other means of information dissemination and exchange activities	31 - 34	12
D. Costs and financing mechanisms for information access and delivery	35 - 46	13
1. Costs of information access and delivery	35 - 38	13
2. Existing financial and institutional arrangements to supply required information	39 - 46	14
II. ASSESSMENT OF INFORMATION-USE AND INFORMATION-SUPPLY CAPABILITIES	47 - 65	16
A. Information use	47 - 50	16
B. Information collection and generation	51 - 56	16
C. Vehicles or mechanisms for information transfer	57 - 62	17
D. Areas where information does not exist or new information should be found	63 - 65	19
III. MEASURES TO IMPROVE THE EXISTING CONDITION	66 - 98	20
A. Information	66 - 72	20
1. Identification of priority information	66 - 68	20
2. Acquisition of priority information not presently available	69	20

CONTENTS (continued)

	<u>Paragraphs</u>	<u>Page</u>
3. Improvement of information resources	70 - 72	20
B. Access to information	73 - 81	21
1. Enhancement of existing information systems and services	73 - 75	21
2. Diffusion and strategic allocation of information- dissemination-and-sharing activities	76 - 77	21
3. Accelerating training programme for information specialists	78 - 79	22
4. Establishment of efficient linkages between users and suppliers	80 - 81	22
C. Use of information	82 - 86	23
1. Improvement of user education	82 - 83	23
2. Increased availability of customized information .	84 - 86	23
D. International exchange and transfer of information . .	87 - 98	23
1. Establishment of mechanisms for information exchange	87 - 91	23
2. Increasing opportunity for information exchange . .	92 - 94	24
3. Promotion of co-ordinated approach to information-sharing-and-dissemination activities .	95 - 98	25
IV. CONCLUSIONS AND RECOMMENDATIONS	99 - 120	26
A. Summary of the discussion	99 - 109	26
1. National level	106	27
2. Regional level	107 - 108	27
3. Global level	109	27

CONTENTS (continued)

	<u>Paragraphs</u>	<u>Page</u>
B. Suggested lines of action	110 - 120	28
1. National level	111	28
2. Regional level	112 - 114	30
3. Global level	115 - 120	31
C. Conclusion	121 - 125	33

Annexes

I. TERMS OF REFERENCE

II. PROVISIONAL ANNOTATED AGENDA

III. LIST OF PARTICIPANTS

BACKGROUND

1. In deciding to convene the United Nations Conference on New and Renewable Sources of Energy, the General Assembly at its thirty-third session recognized the important role played by substantive information in promoting the development and utilization of new and renewable sources of energy. Among the key issues to be considered at the Conference, which will be held at Nairobi from 10 to 21 August 1981, are the ways and means of facilitating effective flows of information dealing with new and renewable sources of energy, especially to developing countries. 1/
2. Consequently, at its thirty-fourth session, the Assembly decided that one of the ad hoc expert groups which would meet prior to the Conference would address issues concerning information flows. Particular attention was to be paid to the ways in which the United Nations system could effectively assist Member States, in particular developing countries, in the area of new and renewable sources of energy by promoting the exchange and dissemination of research results and information on the latest developments and experiences in the practical application of these energy sources. 2/
3. Information is a resource which, when utilized, leads to knowledge. Like other resources, it must be discovered, assessed and processed to become useful. In the case of science and technology, information is the product of research and application. Current progress in science builds on the information of the past. As a result, well-defined and practiced procedures have been developed for publishing, assessing, disseminating and indexing scientific information. In the case of economic, social and political information, these procedures are not as well advanced. Further, the conjunction of computer and telecommunications technologies have revolutionized the problem of access to information resources from remote locations and these technologies are advancing rapidly. It is possible to predict with some certainty that the introduction of user-friendly and effectual systems covering the widest range of information is imminent.
4. Without question, an effective information-support system is vital for policy and administrative decisions, for research and development, for education and training, for transfer and development of technology and for feedback into the operational activities of the development process in the field of new and renewable sources of energy. (It could be said that information is an integral part of new and renewable sources of energy and that the outcome of any plans to rapidly introduce this new resource to the international community will depend, in part, on the development of ways and means of exploiting the relevant information resources. In the case of conventional energy, this process has taken several hundred years.)
5. The meeting of the Ad Hoc Expert Group on Information Flows was convened at the United Nations Office at Geneva, from 8 to 12 December 1980 to examine the present

1/ General Assembly resolution 33/148, para. 4 (f).

2/ General Assembly resolution 34/190.

situation, assess the current information use and supply capabilities and consider measures to improve the existing condition. The terms of reference of the expert group are set forth in annex I of the present report. Annex II contains the provisional annotated agenda. The list of participants is contained in annex III.

INTRODUCTION

6. The significance of the role played by information in all aspects of developmental processes has begun to be fully appreciated by the Member States of the United Nations. As a result, among the central issues discussed and negotiated by Governments at recent international conferences are the ways and means of making information more readily accessible to those who require it. For example, during Habitat: the United Nations Conference on Human Settlements held at Vancouver in 1976, the Governments recognized the need for improved access to substantive information essential for effectively carrying out human settlements policies and programmes and pressed for an active human settlements information exchange programme.

7. This need has also been recognized by many organizations both within and outside the United Nations system. A background study conducted in preparation for the United Nations Conference on Science and Technology for Development on behalf of the Secretary-General of the United Nations dealt with the establishment of a network for the exchange of scientific and technological information.

8. The study recommended the establishment of an information network, and suggested that a pilot network be established in one or more priority areas such as energy. The immediate objective of the network was to link information seekers with knowledge resources, particularly those relating to transfer, adaptation and development of science and technology. The establishment of the capability to respond to the practical technological information needs of problem solvers was another objective of the proposed network.

9. As a result, among the priority programmes identified for the newly established United Nations Centre for Science and Technology for Development is the establishment of a network for exchange of scientific and technological information.

10. For the fiscal year 1980, the United Nations Educational, Scientific and Cultural Organization (UNESCO) allocated approximately \$US 200,000 for the investigation of the feasibility of establishing an international information system on new and renewable sources of energy. The UNESCO study, which was completed in mid-1980 in response to a request made by its Executive Board, recommended the establishment of an international information network on new and renewable sources of energy. The study also recognized the fact that efficient accessibility and effective utilization of both technical and administrative information on new and renewable sources of energy are the basic ingredients for solving problems relating to the global shortage of energy sources.

11. At the national level, Governments have also begun to provide for information delivery infrastructure by establishing research institutes, documentation centres

and information clearing-houses charged with supplying information necessary for planning and implementing effective programmes in the national priority areas. The Solar Energy Research Institute (SERI) of Golden, Colorado, the Data Bank of the Centre for Non-conventional Energy Development in Manila, the Kuwait Institute for Scientific Research, the Renewable Energy Resources Information Centre (RERIC) at the Asian Institute of Technology (AIT) of Bangkok, the Commonwealth Regional Renewable Energy Resources Information System (CRRERIS) in Australia covering Commonwealth countries in Asia and the South Pacific, to name a few, reflect policy decisions which recognize the significant role played by information in facilitating desired change.

12. Individuals in key positions also insist that all relevant information must be available at the right time in the appropriate form whenever policy and administrative decisions are to be made and research and development or education and training activities are to be undertaken. They also point out that the need for improved access to information is becoming quite acute as the volume of information generated by individuals, institutions and organizations, governmental and non-governmental, is rapidly increasing in proportion to the weight of priority assigned to areas such as alternative sources of energy.

13. In addition, since the fields of interest of those who are engaged in policy and planning for the development and use of new and renewable sources of energy are multidisciplinary, the body of knowledge from which they draw information is correspondingly large. A cursory survey of the files maintained by the Department of Energy of the United States (US/DOE) for solar, wind and geothermal energy, for example, yielded 26,500 items, 2,000 items and 11,700 items of information respectively, representing material collected during the past four years. A more recent estimate made by SERI indicates as much as 400,000 known bibliographic sources on hydro power, 100,000 items each on solar energy and oil shale and tar sands, 50,000 items each on wind and geothermal energy, 30,000 items on bioconversion, 25,000 items for ocean energy and 10,000 items for biomass energy.

14. However, despite the fact that large files of pre-selected and systematized information are maintained by many organizations and sophisticated information processing and telecommunication technology, which facilitates the rapid flow of information from its vast storage to its potential users, are available today, the requirements of most seekers of information on new and renewable sources of energy are not yet fully satisfied.

15. Some of the reasons for this are:

- (a) The diverse nature and type of information required;
- (b) The nature of requirements which change according to frequently shifting national goals and priorities;
- (c) The fact that most existing information systems and service modules that are not maintained to accommodate the variety of new user requirements;
- (d) The high costs of customized systems development coupled with the scarcity of highly experienced systems designers who understand the complex requirements of a variety of information users; and

/...

(e) Most importantly, a scarcity of useful factual (non-bibliographic), numerical and statistical data collected and stored in anticipation of future requirements.

16. Quantitative data or survey results often do not lend themselves well to pre-selection before the need for them arises, making it difficult to satisfy the requirements of those who seek current and customized quantitative data and analytical and evaluative information. Further, not enough specialists skilled in survey techniques are available or are being trained in the newly developed priority areas such as management and use of new and renewable energy sources.

17. Most individuals also have difficulty in identifying the types of information that are suitable for their needs without a full knowledge of the possible options they may have. They frequently find that the information they require is scattered and difficult to obtain, despite the fact that the body of knowledge containing the specific information required is sufficiently large enough to meet their requirements. In areas such as solar energy, in which at least 25,000 studies have been conducted during the past four years, the problem becomes compounded as the mere task of identifying the results of these studies and distributing them widely becomes a massive undertaking.

18. Even if the existence of a given study is known, it often cannot be obtained, especially when it is available only from a source located abroad and currency exchange is under government control. This is an experience often cited by researchers and technicians in developing countries.

19. To meet this escalating demand for and generation of information, a more co-ordinated and systematic approach to collection, exchange and dissemination of information and experience dealing with new and renewable sources of energy must be adopted.

20. The foregoing paragraphs summarize general observations of the present need for and availability of information on new and renewable sources of energy. Against this background, the present situation, its assessment and measures for its improvement as summarized below were considered by the expert group.

I. PRESENT SITUATION

A. Information users and their requirements

21. As in the case of other substantive areas such as environment and human settlements, those who occupy the critical positions to effect rapid changes in the areas of public policy, advancement of knowledge and promotion of the development and use of new and renewable sources of energy are:

- (a) Policy-makers, planners, legislators and government administrators;
- (b) Research and development professionals and students and educators;
- (c) Engineers, technicians and others concerned with applications;
- (d) Manufacturers and entrepreneurs;
- (e) General public.

22. Their information requirements are scattered in many fields of specializations in the spectrum of science and technology.

B. Scope, type and nature of information

23. Subject areas covered by new and renewable sources of energy as identified by members of technical panels include:

- (a) Engineering
 - (i) Agricultural engineering;
 - (ii) Architecture;
 - (iii) Chemical engineering;
 - (iv) Civil engineering;
 - (v) Electrical and electronic engineering;
 - (vi) Forest engineering;
 - (vii) Industrial engineering;
 - (viii) Mechanical engineering;
 - (ix) Metallurgy;
 - (x) Ocean engineering;
 - (xi) Petroleum engineering;
 - (xii) Other types of engineering;

(b) Science

- (i) Agriculture;
- (ii) Atmospheric science and meteorology;
- (iii) Biology;
- (iv) Chemistry;
- (v) Computer science;
- (vi) Earth science/geology;
- (vii) Forestry;
- (viii) Marine science;
- (ix) Oceanography;
- (x) Mathematics;
- (xi) Statistics;
- (xii) Physics/Astronomy;
- (xiii) Other sciences;

(c) Social sciences and others

- (i) Economics;
- (ii) Geography;
- (iii) Urban and regional planning;
- (iv) Management science;
- (v) Education;
- (vi) Public administration;
- (vii) Law.

24. The type of materials containing information most frequently used by those identified as priority users in paragraph 20 above include:

- (a) Research reports;
- (b) Case studies;
- (c) Textbooks;
- (d) Statistical data;
- (e) Summary of projects and research in progress;
- (f) Design blueprints - products, pilot plants, demonstration, and commercial facilities;
- (g) Equipment catalogues - description and costs;

- (h) Directories of manufacturers and vendors;
- (i) Directories of specialists and experts;
- (j) Directories of training and research institutions;
- (k) Assessments of systems, products and their costs;
- (l) Patent files, licences and other know-how agreements;
- (m) Professional and technical journals;
- (n) Standards, government regulations and by-laws.

C. Current information-exchange-and-dissemination activities

25. Research and development activities for various alternative or non-conventional sources of energy have been carried out for many years now and much is already known about them, particularly in industrialized countries. Like many other multidisciplinary subject areas, information concerning new and renewable sources of energy is disseminated and used mostly through conventional conduits such as seminars, workshops and conferences; indexing and abstracting services; libraries, documentation centres and information clearing-houses; and review journals and professional publications most of which are intended for experts in one or more areas of specialization.

26. However, the use of the descriptive term "new and renewable sources of energy" is relatively recent and most of the existing information systems and services were not established with the subject orientation to these energy sources from the point of view of their being "new and renewable". As a result, users must often find a way of describing information they require through the use of conventional terms. This has caused some difficulty in accessing information that might otherwise be readily located through these existing mechanisms.

27. Specialized monthly abstract journals such as Solar Energy Update by the United States Department of Energy or Abstracts of Selected Solar Energy Technology (ASSET) of the United Nations University (UNU) are still relatively new and have not been given wider exposures among potential user communities by which they deserved to be recognized. Similarly, the publishing and distribution systems of the industrialized countries have not yet been modified to achieve more efficient and economically feasible results in distributing publications dealing with new and renewable sources of energy in developing countries.

1. Information systems and services

28. When most of the existing information systems and services including libraries, documentation centres, information clearing-houses as well as publishing enterprises were established, the urgent information needs of those who are presently engaged in promoting the development and use of new and renewable sources of energy were little known.

29. Further, by design these systems and services were not intended to meet the requirements for specific and timely information in a form needed by users, particularly non-technical policy-oriented users. These mechanisms are maintained to provide general services to the scientific and technological community who "know what they want to know". These services are not as useful to users in a new field seeking information and they are even less useful for non-technical users who have not the support of library and information infrastructures. Further much of the information required in the renewable energy field is not new; it needs to be gleaned from all sources by information experts operating close to users.

30. The following are some examples that have been identified by the members of the technical panels as tools most frequently used in locating the information they require:

- (a) Directories and referral systems, such as INRES and INFOTERRA;
- (b) Specialized indexes, such as Engineering Index and Current Contents;
- (c) Abstract services, such as Chemical Abstracts, ASSET and Solar Update;
- (d) Documentation centres such as NTIS;
- (e) Information systems such as INIS and ENERGYLINE;
- (f) Citation systems and review literature;
- (g) Professional journals such as Renewable Energy Review Journal;
- (h) Conferences, seminars and their announcements and proceedings.

2. Seminars, conferences, invisible colleges and other means of information dissemination and exchange activities

31. One of the most effective means of exchanging or disseminating new information is through seminars or conferences designed to invite those who are active specialists in a given field. However, in the absence of a comprehensive information clearing-house service on seminars and conferences dealing with various aspects of new and renewable energy sources, potential users of information have difficulty knowing or deciding which seminar or conference is suitable for them to attend.

32. Various attempts by organizations such as SERI, AIT and UNU to announce forthcoming events relevant to new and renewable sources of energy are reaching a limited number of people who are on their distribution lists presently. Moreover, the proceedings of the meetings seldom reach those who can benefit from the information contained in them, as they are usually distributed only to participants; also, they are often expensive and haphazardly disseminated.

33. The problem is compounded for those in developing countries as few seminars and conferences are held in developing countries. Furthermore, not enough participants from these countries are invited to take advantage of the seminars and workshops where new ideas and up-to-date information are often disseminated. In many cases, only a select few who managed to be recognized by the organizers of international meetings are invited repeatedly to these meetings to the exclusion of others who may equally benefit from attending.

34. Another commonly used means of quickly communicating newly formulated thoughts or ideas is through their originator's personal communication network. This personal communication network which forms a basis for "invisible colleges" is usually established through meeting colleagues in the same field at universities, research institutes, conferences, seminars and workshops. Many researchers and practitioners in developing countries are often left out of "invisible colleges" and similar personal communication networks and, therefore, are not receiving the latest technical or scientific information generated by their counterparts outside their region. Even when visits are made to a country by an overseas expert, frequently only a small number of those who are potentially interested will be aware of the visit.

D. Costs and financing mechanisms for information access and delivery

1. Costs of information access and delivery

35. Making a realistic assessment of the cost associated with the access to and use of information is one of the most difficult tasks. It is nearly impossible to standardize steps for acquisition, processing, storing, retrieving and utilization of information, particularly in the global context. In the absence of a standard to calculate a unit cost for each information-handling process, a realistic cost estimate for information access or use cannot be easily made.

36. Unfortunately, the value of information delivery services often goes unappreciated since the real cost cannot easily be assigned to them. Only some rough estimates of costs involved in information processing and handling can be obtained for the purpose of planning and budgeting. The figures often cited by consulting firms specializing in establishing information systems and distributing information pertain mostly to the following areas:

- (a) Cost for indexing and abstracting technical literature;
- (b) Cost for creating machine-readable files;
- (c) Cost of hardware and software;
- (d) Cost for printing and distributing reading materials;
- (e) Cost for producing audio-visual material;
- (f) Cost for creating computer outputs;
- (g) Cost for reproduction of materials, etc.

37. These do not include the costs for generating information through research or experiment which cannot readily be standardized, nor do they take into account the costs of educating and training professionals required for setting up information-processing and delivery mechanisms.

38. An important aspect rarely considered by potential users of information is the real cost suffered from not having the right information at the right time. Failure to appreciate the economic significance of the availability of timely and accurate information contributes also to the lax management of information-delivery or support activities by many government and private

/...

organizations. The cost of research and development which generates information that is not disseminated is an economic loss.

2. Existing financial and institutional arrangements to supply required information

39. Although much is known about the "economics of information access" among professionals in the field of information sciences, it has not been widely taken into account in the planning and budgetary processes of public and private organizations. Seldom is it the case when the funds allocated for the operation of the documentation centre, data bank or information centre of an organization are calculated with the full knowledge of the volume and the costs of services expected to be rendered.

40. Traditionally, most libraries and documentation centres with the specific mandates to collect and disseminate information were established and supported largely by public funds. The notion that information must be free to those who are in need of it also provided impetus to the establishment of large national or international information systems, such as AGRIS, INIS or MEDLINE, which are supported by public funds.

41. As the price of not having the required information began to be appreciated by cost/benefit conscious users, information vendors began to flourish. This commercial viability of information services designed to accommodate the users involved in the area where financial stakes and returns are high is encouraging the private sector to initiate commercial information systems and services, such as EUROPOLITIQUE, LEXIS and Reuter's Information Services.

42. Realizing the economic advantages of having an efficient information-delivery mechanism, some Governments are also establishing information-delivery infrastructure within their department or ministry dealing with energy to ensure ready access to information necessary to implement their policy. The Databank of the Centre for Non-conventional Energy Development (the Philippines) and the Technical Information Centre of the United States Department of Energy are two such examples.

43. The economic advantages of co-operative ventures among organizations are also encouraging the establishment of information-sharing networks, such as CRRERIS and EURONET. Co-operative activities are also not limited to systems and services, but extending to regional seminars and training institutes where public or private funds are pooled to meet needs that are common to these organizations.

44. While many non-profit organizations and professional societies often do subsidize workshops, seminars and conferences, a portion of the costs of most technical meetings and seminars still has to be paid by individual participants, making it difficult for those in developing countries to participate frequently. International seminars and conferences that are financed chiefly by Governments or educational and charitable foundations are often closed to the general public, thus limiting the size or type of participants.

45. Much useful information can be obtained from attending international meetings and seminars and having access to their proceedings. However, the high cost of attending often precludes participation by many who would benefit and thus, the information generated for these meetings is not available to the widest possible audience, further increasing the unit cost of the information generated.

46. Financing for publishing and printing ventures is another area in which co-operation between public and private sectors is attempted in order to increase the flow of published information to developing countries.

II. ASSESSMENT OF INFORMATION-USE AND INFORMATION-SUPPLY CAPABILITIES

A. Information use

47. Although the body of knowledge dealing with the scientific and technical aspects of alternative energy sources is enormous, economic and policy-oriented information concerning the development and use of new sources of energy is still limited and does not come in the form useful for policy-makers and planners. This may be a result of the fact that these non-technical users seldom generate the information that might also be useful to their counterparts elsewhere.

48. This scarcity of economic and policy-oriented information may be owing to the fact that the information requirements of priority users span scientific, technical, industrial, manufacturing, social and economic fields, all of which have specialized systems and services oriented towards serving professionals who are familiar with the information resource in their areas of specialization. Consequently, these users more often than not have to cull out whatever information they need from multiple sources rather than obtain it from a single source.

49. In some scientific and technological information systems which may be described as source-oriented, for example, standards and patent information relevant to new and renewable sources of energy, cannot be readily identified or grouped under one homogeneous category.

50. Since most information on different energy sources has not been collected for the purpose of comparative analysis, difficulty also arises when comparative information is required for policy or planning purposes.

B. Information collection and generation

51. Today, a large body of knowledge pertaining to new and renewable sources of energy has already been collected in scattered places to be accessed by many public and private organizations concerned with overseeing energy-related policies and programmes and supplying basic energy requirements of various countries. These organizations also have long been engaged in research and development activities on energy, contributing to their sizable information output as well as consumption in the past.

52. Basically, these scattered files have been created as a part of various information-collection activities in scientific and technical fields not necessarily oriented exclusively towards "new and renewable sources of energy". For example, the Smithsonian Science Information Exchange (SSIE) has been routinely collecting and organizing information on research-in-progress in all scientific and technical fields. Its machine-readable data bases created as a result serve those who are interested in identifying ongoing research activities in scientific and technical fields including energy. Similar files on research-in-progress do exist in many places throughout the world where provision of ready access to information concerning ongoing research is considered important.

53. Similarly, the National Scientific and Technical Information Services (NTIS) of the United States regularly updates and maintains a machine-readable file of report literature produced for or by the United States Government. The data base thus created can produce bibliographies as the need or demand arises on many energy-related subjects including new and renewable sources of energy. One of its regular outputs is the Weekly Government Abstracts - Energy which is widely disseminated on a regular basis to interested users.

54. Information on new and renewable sources of energy will continue to be scattered in almost all areas of science and technology. Users and producers of information who are engaged in the development of new and renewable sources of energy do not form a homogeneous community, bound together by a common field of interest or expertise as those who are engaged in the development and application of nuclear energy. The information requirements of those who are working on the development of biomass-based energy are quite different from those who are engaged in the development of ocean energy. Their educational background and training experience are also quite dissimilar. Equally different are the education and information requirements of technical experts on wind energy and those of geothermal energy. This can be said of other experts specializing in various other new and renewable sources of energy. These factors account for the absence of composite files containing information exclusively dealing with all types and aspects of new and renewable sources of energy.

55. As organizations are being established to continue research and development activities to generate or collect more technical and experimental information, some efforts are being made, however, to identify ways of making better use of existing information. For example, the thesaurus of retrieval terms maintained by US/DOE has now been updated to provide ready access to information on new and renewable sources of energy. However, only limited efforts are being made to make existing information readily available to users in developing countries. The small amount of funds allocated for such undertakings by RERIC and by UNU for ASSET, for example, could not have produced the results currently being enjoyed by their users had they not had the dedication of the already overworked staff presently assigned to their operation.

56. As for the information requirements of those who are engaged in development efforts, some measures have been taken in recent months to collect comparative information useful for planning, technology selection and evaluation of new and renewable sources of energy projects. However, no information has yet been collected for an operational system or service to meet their needs. Information on the methodologies associated with the assessment of energy systems and their costs is of particular importance.

C. Vehicles or mechanisms for information transfer

57. Presently available information-flows mechanisms identified by the experts in technical panels by each energy type were found to be useful to specialists who know how to use them effectively. However, most of these information-access or delivery mechanisms are static and oriented towards specialists mostly located in

industrialized countries. Therefore, generalists, non-technical policy-makers and other users, particularly in developing countries, are finding them to be less than helpful.

58. These mechanisms have also been established for general scientific and technological information and not especially for new and renewable sources of energy per se. Most of them are also designed for specialists who seek specific information in their specialized areas. Only a limited effort seems to be made to evaluate and pre-select items on the basis of their quality for use by non-specialists who, nevertheless, must have an overview of the present and future status of technology for the purpose of policy and planning decisions.

59. Most of the existing tools for accessing information are also oriented towards locating or obtaining "documented" or published information and not for locating up-to-date "grey" literature or non-print materials that are difficult to find. However, in the absence of an easily accessible document-distribution network, even if the existence of literature can be readily identified by those who are specialists in a particular source of energy, primary literature itself would still be difficult to obtain.

60. The method currently in use for distribution of primary literature itself is still traditional and costly. Although the micrographic technology has drastically reduced the cost of reproduction and distribution of information-in-print in recent years to the rate of at least 1 to 50 or more, the distribution of costly books and report literature, for example, in hard copy persists as the acceptable method. Additionally, the heavy concentration of publishing and printing operations in industrialized countries contributes further to the difficulty of obtaining information in developing countries.

61. Another problem area which is critical to the dissemination of the most current information is the lack of routine and comprehensive mechanisms which announce forthcoming seminars and conferences as well as availability of the proceedings of these meetings. Even when the information is known about the sources from which copies of these proceedings can be obtained, suppliers of copies often fail to allocate adequate funds for their continuous distribution.

62. However, in a smaller scale at the regional level, instances of user satisfaction through the use of networks can be cited. One such example is TECHNUNET, an information-delivery network through which customized information can be prepared and disseminated on demand. TECHNUNET, located in Singapore, is now in its eighth year and is engaged in dissemination of technical information, industrial extension services and technology transfer identifying and linking individual expertise, lead organizations and information sources in a multifaceted network.

D. Areas where information does not exist or new information should be found

63. The scarcity of information concerning case studies and chronicles of operating systems or facilities as well as comparative information of commercial products has been identified by the members of the technical panels as critical.

64. Among the information required by policy-makers and planners, public policy and regulatory information dealing with the development and use of new and renewable sources of energy has also been found to be difficult to obtain or not readily available. Equally difficult to obtain is the location or existence of reliable forecasting models useful for planning purposes. Even when the existence of these models is known, evaluative information concerning their performance is found to be extremely scarce.

65. It was also found that very little systematic effort is being made to identify priority information and to generate or collect it in anticipation of future demand.

III. MEASURES TO IMPROVE THE EXISTING CONDITION

A. Information

1. Identification of priority information

66. Priority information can only be made readily accessible to its potential users when it is identified clearly and the information identified as non-existent or scarce is generated or collected. When information is buried among the vast storage of knowledge, it must be made readily retrievable also. When the policy concerning the development of alternative sources of energy shifts from time to time, it is also necessary to identify and monitor the type and nature of priority information on a continuing basis.

67. Presently, very little effort is made to routinely identify and monitor the nature and type of priority information. In institutionalizing the technical and scientific information-gathering efforts concerning alternative sources of energy, a mechanism should be provided which routinely identifies and monitors shifting priority from both technical as well as policy points of view and systematically provide for ready access to the information which reflects new priorities. This type of mechanism could only be effectively instituted at the national level, probably within the lead government agency responsible for energy policy and planning.

68. The experience pertaining to selecting the methodology and applying the technique suitable and efficient for such a monitoring mechanism can be shared through regional and international seminars. Quantitative and comparative information on various energy sources and their application is another type of information which can be shared once the data collection and analyses are completed and kept up to date with an efficient retrieval facility. This is another area where international co-operation may be possible.

2. Acquisition of priority information not presently available

69. Among the information identified by the technical panels as a priority need is evaluative information concerning existing and new demonstration and commercial facilities. This type of information is essential for deciding which type of new energy sources is suitable for exploitation in the near future and which type for the distant future. If information clearing-houses which routinely identify, collect and disseminate priority information could be established within key organizations, almost any type of priority information could be accessed with relative ease.

3. Improvement of information resources

70. In order to broaden the information base which would be useful for policy-makers and planners who, by nature of their responsibility, do not, as a rule, generate information concerning their policy and planning-oriented experience, special impetus and opportunities should be provided for them to share their knowledge with their counterparts. Workshops, seminars and conferences pertaining to policy and planning processes for the development and use of energy could contribute toward increasing information resources in this area.

/...

71. In addition, technical or scientific information generated by specialists often needs to be repackaged or interpreted for non-technical users whose responsibility it is to formulate policy and regulations as well as to provide plans for the implementation of alternative energy-supply systems.

72. Planners and policy-makers also require the support of information-analyses centres which provide analytic and comparative information compiled from the primary data frequently generated as a result of experiments and surveys.

B. Access to information

1. Enhancement of existing information systems and services

73. Although they contain a fair amount of information on new and renewable energy sources, many well-established systems such as INIS, AGRIS and others do not use up-to-date retrieval vocabulary reflecting today's alternative energy-oriented priority. If the thesauri used for these systems were modified with additional new terms, the responsiveness of the system to the new energy related information seekers would improve considerably.

74. New information being disseminated through conferences and seminars could achieve maximum exposure if the conference and meeting sponsors made an extra effort to plan and announce forthcoming meetings in a co-ordinated fashion and the proceedings of meetings were made available systematically through the establishment of a register of forthcoming meetings and their proceedings on new and renewable sources of energy.

75. Special efforts should be made to increase the printing and publishing capabilities of developing countries so that information generated within these countries would be published and distributed widely through the use of their own publishing facilities.

2. Diffusion and strategic allocation of information-dissemination-and-sharing activities

76. In order to improve the accessibility of information contained in existing national, regional and international information systems, specialized local service centres need to be established in locations and organizational settings most accessible to potential users. Many information systems and services are still perceived to be far removed from their potential users who are often discouraged by the difficulty they encounter in obtaining information. Much improvement could be made by simplifying the rule for users and providing more personalized and readily accessible service points that are diffused widely around the world in information centres, libraries and clearing-houses located within and outside government agencies, research institutions and universities and are effectively linking information and its potential users.

77. Mass media expertise should also be utilized not only to encourage wider use of the available information, but to disseminate knowledge and experience about new and renewable sources of energy among the general public. Existing mass communication media and networks are often available as a form of public service for use to disseminate prepared information intended for the general public. Video tapes of all significant conferences, seminars and workshops should be made as a routine and copies of the tapes distributed widely along with the proceedings of the meetings. Regional or international co-operation in preparing and sharing pre-packaged media material could produce immediate results economically.

3. Accelerating training programme for information specialists

78. A large number of information specialists with the capacity to link the users with existing systems and services such as AGRIS, INIS and others must be trained to assist "lay users". These specialists should be trained to maximize the usefulness of the existing information resources that are rapidly expanding as the growing interest in new and renewable energy sources promotes the use as well as generation of information. Well-trained information specialists who are familiar with the modern information-processing technology and the existing systems and services could also alleviate unnecessary duplication of research and development efforts and accelerate the rate of advancement in the field of new and renewable sources of energy.

79. The availability of well-trained intermediaries who provide linkages between seekers of information with information itself must be accelerated globally but in developing countries in particular, through strengthening ongoing programmes for education and training of information-processing professionals at the national level.

4. Establishment of efficient linkages between users and suppliers

80. Although many data bases and information clearing-houses and dissemination services exist, their locations or existence are known mostly to specialists. Directories of information sources by energy type, as well as type of activity should be compiled and widely disseminated to provide direct linkages between users and information sources or suppliers.

81. Application of new telecommunication facilities, where possible, must be encouraged so that no individual or organization in a key position is left without access to available information resources. Particularly useful is the newly emerging teleconference facilities which provide immediate access, through the use of a simple telecommunication device and video-screening equipment, to the scene where information is being generated. The use of inexpensive but effective new technology should be made mandatory in all international and regional meetings so that the information being shared could be widely and immediately disseminated.

C. Use of information

1. Improvement of user education

82. Various instruments intended for user education must be readily available to both specialists and non-specialists. A handbook for information access on new and renewable sources of energy prepared for each homogeneous user group along with directories of information sources and resources could greatly increase the knowledge of available information bases to most potential users. As inexpensive equipment for information processing and use, such as the microfiche reader, computer terminal and teleconferencing equipment, are rapidly becoming available, potential seekers of information must be trained in their use.

83. Both national and international organizations responsible for dissemination of information pertaining to new and renewable sources of energy should ensure that their programmes include user education in the application of modern techniques and technology for accessing information by seeking the co-operation and the expertise of other organizations specializing in information processing.

2. Increased availability of customized information

84. There is a dearth of transferrable information useful for the implementation of intermediate or alternative technology on new and renewable energy sources among developing countries. Translating and interpreting technical information for adoption by villagers and consumers should also be the task of local information clearing-houses or information-dissemination centres dedicated to the development and use of new and renewable energy sources.

85. The costs of customizing information for specialized users are still high and could only be justified when the size of the potential user audience is expected to be proportionately high. Improvement of the literacy level, encouragement of the reading habit along with the installation of innovative information-dissemination methods are keys to advancing the knowledge and understanding among the general public about the way new and renewable sources of energy can be applied at every level in our society.

86. Existing information systems and services should increase their capability to provide customized services on demand. Through the formation of co-operatives, at national and regional levels, much could be accomplished economically, in disseminating customized information uniquely applicable to a given country or region.

D. International exchange and transfer of information

1. Establishment of mechanisms for information exchange

87. When a widespread international programme for exchange of information on a heterogeneous body of knowledge is proposed, the formation of an information network is usually suggested as the most efficient solution to the problem. As is the case for scientific and technological information, a network can provide

linkages among users and systems and services, allowing for variances in their designs and contents. The establishment of a formalized arrangement such as a network provides linkages between information centres located among interested organizations or countries so that collection, dissemination and exchange of information are carried out regularly without interruption or unnecessary duplication.

88. A network can also provide means of efficiently connecting systems and services of homogeneous designs and contents. If one unit is established in each country to be responsible for collection, dissemination and exchange of locally produced information on one type of energy source such as wind energy, it can serve as a switching point for exchanging information among its counterparts in the countries within and outside its region. Such an arrangement can provide the most comprehensive access with minimum duplication to information currently available through a single access point in each country or region. In smaller developing countries, one unit could be the national focal point for all or several types of new and renewable sources of energy as well as for other international information exchange mechanisms such as INIS, AGRIS, and INFOTERRA.

89. While an informal information network which links various organizations on an ad hoc basis has the capacity to fill enormous information gaps, it cannot clearly define its capabilities or limitations. Therefore, if an assurance of comprehensive access to existing information is considered important, a formalized network with an efficient switching mechanism providing instant access to all network members needs to be established on a world-wide basis.

90. Alternatively, several formalized mechanisms may also be considered as part of the over-all network design for all types of new and renewable sources of energy. For example, specialized information analyses centres on one or more priority topics could be established in selected centres of excellence to collect, analyse and repackage or translate information in a form useful to its prospective users. A centralized file of research-in-progress might also be established within a leading institution to which information is contributed each time a new research project dealing with a given energy source is initiated. According to the nature of priority information, types of mechanisms suitable for international information exchange should then be selected and instituted.

91. In order to stimulate interest in the development and application of new and renewable sources of energy throughout the world, the highest priority should be assigned to the development of mechanisms for information transfer, be they seminars, news-letters, data bases or network.

2. Increasing opportunity for information exchange

92. While seminars and conferences provide excellent opportunities for information exchange, a more systematic approach to planning international meetings should be encouraged, the circle of participants enlarged and the proceedings of the meetings disseminated widely.

93. The use of modern teleconference technology should be made mandatory at international seminars and conferences so that new information being presented at the meetings could be immediately communicated to those observing the conference proceedings through remote-access facilities.

94. Seminars and workshops on information exchange and networking would also be helpful in alerting the individuals, who are responsible for the information support systems and services, about the existing and planned systems and services dealing with new and renewable sources of energy. Directories of information systems and services on each energy type, application, etc. could be extremely useful not only in encouraging information exchange but also in co-ordinating information service activities.

3. Promotion of co-ordinated approach to information-sharing-and-dissemination activities

95. Channels of communication among relevant information systems and services for new and renewable sources of energy must be improved. Through the establishment of an international register of information systems and services by energy type, the capability and limitation of each information delivery mechanism could be made known to all its potential users. At the same time, the register could serve as the instrument of co-ordination as well as co-operation among like systems and services. Compatibility between systems and services providing similar information should be encouraged in order to achieve economy and to facilitate close co-operation among them as well.

96. The existing instruments for co-ordination such as the Inter-Organization Board for Information Systems (IOB) within the United Nations system should be fully utilized to encourage co-operation among information systems and services relevant to new and renewable sources of energy. One way of promoting such a co-operative effort would be to ensure that every staff member engaged in information systems and services programmes is fully familiar with all relevant ongoing and planned activities.

97. Ongoing international programmes for information systems and services, such as those of UNESCO, should also be designed to increase the capability of international organizations to co-operate closely with each other towards improving the access and use of information essential for promoting the development and use of new and renewable sources of energy.

98. Another way of promoting co-ordination would be to encourage the establishment of a mechanism at every level of activity - national, regional and international - which would monitor every new and planned information-delivery activity, as to its content and methodology.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Summary of the discussion

99. The experts concluded that information is one of the essential ingredients for development planning. A realistic appreciation of the value of information is the sine qua non for the management of the scarce financial and human resources of developing countries and for the most efficient utilization of funds available for development. Therefore, information has special significance in the development of new and renewable energy sources and this should be acknowledged in relevant policy statements.

100. Although linked very closely to traditional energy sources, new and renewable sources of energy are very heterogeneous, encompassing sources as different as photovoltaic cells, wind and cow-dung. The scientific disciplines that underlie the application of renewable energy are varied as the sources themselves. In addition, valuable information on renewable energy sources has existed in the literature for many years but has remained unused because of the availability of low cost liquid fuel. Hence, it is not reasonable to force all the relevant information into a single new information system.

101. Clearly then, the mechanism to be developed for the transfer of information in such a highly heterogeneous field must be different in style and structure to those already established. Such a mechanism will be costly, requiring funds, human resources, organization, management skills and participation at the highest level. The group of experts recommended that funds be specifically allocated to support activities dedicated to making information readily accessible to users. They further recommended that a flexible network based on existing information facilities be established with the following features:

(a) At global, regional and national levels with the national units forming the basis of regional and international networks;

(b) Cost-effective involvement with all relevant existing systems - international, regional, national and commercial - thereby eliminating duplication;

(c) Accessibility to well-organized information in the social, economic, political and environmental fields, relevant to the needs of government decision makers;

(d) Information analysis units for each major field of new and renewable energy attached to centres of excellence;

(e) Improved channels of communication among developing countries and between them and industrialized countries;

(f) Networking, collaboration and mutual support among relevant information systems and services;

(g) Provision of the whole spectrum of relevant information, that is, bibliographic, factual, numerical and referral.

/...

102. Information users will often need to make comparisons across many energy sources, and it does not make sense to single out one particular subset for integrated action in the information field. Nevertheless, it is opportune to respond to the world-wide interest in new and renewable sources of energy and to establish an international programme that will promote a series of actions to ensure a better information service in respect of each of the significant separate energy sources that will be studied at the Conference.

103. Since the activities identified by the experts will be costly to both users and suppliers of information whether carried out by national or international organizations or by arrangement with other bodies, the member states are urged to formulate ways of financing these activities and establishing the financing mechanism to ensure that necessary resources are made available at the national, regional and global levels.

104. Therefore, a specified percentage of funds earmarked for developing new and renewable sources of energy should be allocated to information flows. This is particularly crucial in this field whose importance is just beginning to emerge and which is expected to increase with time.

105. The following is a summary of the recommendations made by experts for possible resolution at the Conference to be held at Nairobi. These recommendations are further elaborated below in paragraphs 111 to 120.

1. National level

106. A detailed analysis should be prepared of the national information resources infrastructures and their capabilities for supplying information on new and renewable sources of energy.

2. Regional level

107. A critical comprehensive review of current activities and institutions involved in information on new and renewable energy sources in the region should be undertaken, preferably by intergovernmental regional organizations with a view towards strengthening existing activities and establishing new information-supply facilities where gaps exist.

108. Funds required to promote effective information flows should be allocated within the budget of regional intergovernmental bodies, such as regional economic commissions, so that national and regional information activities would receive sufficient financial support.

3. Global level

109. International organizations entrusted with the responsibility of formulating and implementing the over-all programme of work for new and renewable sources of energy should in the first instance:

(a) Compile and maintain an inventory of currently available information systems and services on new and renewable sources of energy taking into consideration the compilations at regional and national levels;

(b) Convene consultative meetings at which representatives of organizations which are responsible for providing access to information on new and renewable sources of energy may devise ways and means of improving co-operation and rationalizing their separate responsibilities. In this connexion, a suggestion was made that UNESCO, which had already completed a preliminary study on the feasibility of an international information system on new and renewable energy sources, might convene a series of task forces, each composed of individuals from the key international, regional and national institutions that are already active in scientific and technical information work on a particular energy source;

(c) Undertake highly focused feasibility studies with the co-operation of the members of the task forces mentioned above for the creation of specialized information analysis centres in association with "centres of excellence" in specific fields within new and renewable sources of energy and develop a proposal for the better articulation of the relevant information service. Sufficient resources should be made available to one or more specialized-information-analysis centres located in "centres of excellence" for research, development and training in relation to a specific energy source. These specialized-information-analysis centres should eventually be linked to the network of national and regional institutions that will be responsible for disseminating information to the various levels and types of users.

B. Suggested lines of action

110. The following lines of action for improvement of access to information on new and renewable sources of energy to be taken at national, regional and global levels were adopted by the Expert Group based on the draft recommendations prepared by three subgroups. In reviewing these recommendations, the Group was mindful of both the needs of the forthcoming Conference on New and Renewable Sources of Energy, to be held at Nairobi in August 1981, and of the possible actions that may emerge from the Conference.

1. National level

111. Based on the premise that the effective flows of information both at regional and global levels depend heavily upon the information handling capability at the national level, the experts agreed that efforts should be concentrated to provide support at this level. Therefore, it was suggested that a detailed analysis of the national information infrastructures and their capabilities be prepared. This analysis would then be used in preparing a development plan and an action programme on new and renewable sources of energy which take into account the following requirements:

(a) Development of national and specialized information centres either independent or attached to organizations engaged in research and development or technology transfer for new and renewable sources of energy and ensuring that they:

- (i) Identify indigenous information resources covering bibliographic, factual and numerical information on new and renewable sources of energy to be acquired, stored and disseminated in a co-ordinated manner by co-operating with indigenous institutions such as special libraries, technological institutions and engineering and other professional organizations;
 - (ii) Promote and provide appropriate local and national input to the regional and global centres and other agencies and services so as to actively co-operate and share resources;
 - (iii) Make effective use of the services, facilities and programmes of the regional and global centres and other sources and systems in providing information to its national clientele;
- (b) Strengthening of the basic components of the national information system by developing or modifying existing capabilities, or by establishing new information facilities or both in the following fields:
- (i) Analysis, evaluation and assessment of information by information-analysis centres;
 - (ii) Extension services, consulting services and similar person-to-person communication links acting as intermediaries and transmission facilities between information centres and end users;
- (c) Studies of the information requirements of user groups and their programmes in new and renewable sources of energy;
- (d) Planning and implementing an education and training programme for information personnel and users in the fields of new and renewable energy sources, for example:
- (i) Subject specialists engaged in information analysis, evaluation and assessment;
 - (ii) Information specialists in information repackaging and consolidation;
 - (iii) Information specialists in the methodology and technology of modern information handling; and
 - (iv) Engineers and other subject specialists as end users, university students as prospective end users in the uses of information and the application of information technology;
- (e) Organizing seminars, and meetings on information on new and renewable sources of energy for user groups in addition to the general public, including rural populations.

2. Regional level

112. In reviewing the suggested lines of action formulated by the subgroup on regional activities, the Expert Group noted the existence of a number of regional information-exchange mechanisms such as the Commonwealth Regional Renewable Energy Resources Information System (CRRERIS), Asian Institute of Technology (AIT) etc. which have been instituted through intergovernmental co-operation. The Expert Group recognized the fact that regional activity is possibly the only viable means of involving small developing countries which stand to benefit greatly from the introduction of new and renewable energy applications and which have technological resources below the threshold of effective or even viable national action.

113. The following specific measures suggested are expected to interface without much difficulty with global and national measures. Preferably, they should be carried out under an intergovernmental, regional organization:

(a) To ensure effective backward and forward linkages with national and global measures;

(b) To mobilize governmental will and funds behind the regional activities; and

(c) To effect follow-up mechanisms for monitoring implementation.

114. It is believed that whatever form of follow-up measures is recommended at the forthcoming Conference at Nairobi, regional activities have the capacity to respond quickly and effectively and interact constructively. Some of the suggested measures to be undertaken are:

(a) Allocation of special funds within the budget of regional commissions and other regional agencies for:

(i) Financing training programmes;

(ii) Intraregional visits among appropriate organizations;

(iii) Evaluation of information according to region-specific criteria;

(iv) Gathering, processing and exchange of information within and between candidate institutions in the region;

(v) Printing and publishing of periodicals, reports, proceedings, monographs and directories; and

(vi) Organization and servicing of meetings on new and renewable sources of energy;

(b) A critical, comprehensive review of activities relating to information on new and renewable energy sources in the region and the institutions involved. This would take into consideration previous surveys and studies and would identify the gaps and immediate needs in the region;

(c) Identification of candidate institutions or organizations, as focal points for specific sources of energy, or type of information activity, as well as focal points for programming and linking the candidate organizations;

(d) Elaborating a programme of action on the regional level based on the results of the above-mentioned review, the identified gaps, the resources required by the candidate institutions in phases according to the specific priorities and needs in the region. This would identify the material and human resources needed and provide the basis for financing these activities from regional and outside resources, thus rationalizing and optimizing the impact of external assistance from a variety of sources;

(e) Systematic compilation and dissemination of data specific to a region on physical phenomena and characteristics, socio-economic data relating to energy consumption and potential new sources of energy;

(f) Tackling regional language problems that are hindering easy flow of information particularly by preparing and disseminating standard terminologies on local languages, translation and the use of local languages in electronic data processing systems.

3. Global level

115. In considering the measures to be undertaken at the global level, the experts suggested that a programme be established for international organizations responsible for various aspects of new and renewable sources of energy to ensure that the activities enumerated below are carried out. The experts also recognized the importance of instituting effective co-ordination among these activities.

116. Because of the varied nature of the sources of new and renewable energy, experts recognized that activities may best be carried out separately for each type of energy - perhaps even in different institutions according to the availability of relevant substantive expertise, capabilities and support.

117. The majority of the more operational activities could also be carried out by arrangement with other institutions - regional or national. For example, by enlarging the circle of participating countries, existing specialized information services, such as the Biomass Conversion Technical Information Service which is presently provided by the Institute for Industrial Research and Standard in Dublin, Ireland, under the sponsorship of the International Energy Agency, could be strengthened and made the international information centre specializing in one or more sources of energy. Conversely, some of the proposed individual activities might best be carried out within systems whose subject coverage, while including new and renewable sources of energy, is in fact more broadly defined in scientific or technological areas.

118. The experts noted that the majority of the items recommended below figure in the programme adopted by the General Conference of UNESCO at its 1980 session held at Belgrade. They could also be implemented in association with the information-network programme recommended by the United Nations Conference on Science and Technology for Development held at Vienna in 1979. The current

Annex I

TERMS OF REFERENCE

1. The main task of the Ad Hoc Expert Group on Information Flows is to recommend measures to improve the availability and use of information essential for the development and utilization of new and renewable sources of energy.

2. The key issues concerning information on new and renewable sources of energy could best be addressed by a group of experts from the field of information-science and from representative user communities consisting of both private and public sectors directly involved with the development and use of new and renewable sources of energy. Accordingly, in addition to information science experts, individuals with in-depth knowledge and understanding of the key elements in the process of policy decisions, in the fields of finance, commercial and industrial development, research and development, education and training and technology transfer, all of whom are involved with some aspects of the development and use of new and renewable sources of energy, have been invited to participate in the work of the Ad Hoc Group.

3. The Group will examine a discussion paper and relevant background materials prepared for its consideration, review the present situation and consider measures for its improvement, including costs, financing and institutional mechanisms. Finally, the Group will recommend ways and means to increase the effective use of information and to make it more readily available. The experts in their discussions are expected also to pay particular attention to the following, with special regard for the conditions and requirements of the developing countries:

I. Present situation

- A. Information users and their requirements;
- B. Scope, nature and type of information;
 - 1. Subject areas covered;
 - 2. Types of materials containing information;
- C. Current information-exchange-and-dissemination activities;
 - 1. Information systems and services;
 - 2. Seminars, conferences, invisible colleges and other means of information-dissemination-and-exchange activities;
- D. Costs and financing mechanisms for information access and delivery;
 - 1. Costs of information access and delivery;
 - 2. Existing financial and institutional arrangements to supply required information;

/...

II. Assessment of information-use and information-supply capabilities

- A. Information use;
- B. Information collection and generation;
- C. Vehicles and mechanisms for information transfer;
- D. Areas where information does not exist or new information should be found;

III. Measures to improve the present condition

A. Information

- 1. Identification of priority information;
- 2. Acquisition of priority information not presently available;
- 3. Improvement of information resources;

B. Access to information

- 1. Enhancement of information-delivery mechanisms;
- 2. Diffusion and strategic allocation of information;
- 3. Acceleration of training programmes for information specialists;
- 4. Establishment of linkages between users and suppliers;

C. Use of information

- 1. Improvement of user education programmes;
- 2. Increasing availability of customized or repackaged information;

D. International exchange and transfer of information

- 1. Establishment of formalized mechanisms for information exchange;
- 2. Increasing opportunity for information exchange;
- 3. Promotion of co-ordinated approach to information sharing and dissemination activities.

IV. Conclusions and recommendations

- 4. The concrete plan of action for implementation at national, regional and international levels to be formulated by the experts may include:

A. National programmes for establishment or enhancement of the existing information collection and dissemination infrastructure;

B. Establishment of regional information clearing-houses and information-exchange mechanisms; and

C. Establishment of an international information network for exchange and dissemination of information on new and renewable sources of energy in the context of the proposed network for exchange of scientific and technological information.

Background materials to be considered

1. "Report of the Director General on the results of the preliminary study on an international information system relating to new and renewable energy sources", UNESCO, September 1980 (21 C/91);
2. "Preliminary study on an international information system relating to new and renewable energy sources", UNESCO, October 1980 (21 C/INF, 10);
3. "Information availability and needs for the promotion of the use of new and renewable sources of energy in developing nations", Tata Energy Research Institute, November 1980;
4. "Costs and financing mechanisms for promoting the utilization, exchange and dissemination of information dealing with new and renewable sources of energy", Centre for Integrative Development, December 1980;
5. "A Review of relevant information systems and services: aspects of information resources for new and renewable energy users in developing countries. "United States Agency for International Development, December 1980;
6. The recommendations of UNCSTD Programme of Action on Information;
7. Studies on the establishment of a network for the exchange of technological information undertaken by the Secretary-General with the assistance of the Inter-Agency Task Force on Information Exchange and Transfer of Technology as requested by the General Assembly in resolutions 3507 (XXX), 31/183 and 32/178;
8. Directory of United Nations Information Systems, vols. I and II (IOB 1980).

Annex II

PROVISIONAL ANNOTATED AGENDA

INTRODUCTION

1. Adoption of agenda and organization of work:

(1) Selection of officers

Nomination of the chair and the rapporteur will be invited from the floor

(2) The Expert Group's Terms of Reference:

The experts are requested to review the present situation, assess information-use and information-supply capabilities, identify the measures to improve the situation concerning the availability and flows of information dealing with new and renewable sources of energy and recommend plans of action.

2. Consideration and discussion of issues concerning availability and use of substantive or technical information on new and renewable sources of energy:

A. Present situation

(1) Information users and their information requirements

(2) Scope, type and nature of information on new and renewable sources of energy

(3) Current information exchange and dissemination activities

(4) Costs and financing mechanisms for information delivery and access

B. Assessment of information use and supply capabilities

(1) Information use

(2) Information collection and generation

(3) Vehicles and mechanisms for information transfer

(4) Areas where information does not exist or new information should be found

3. Identification of various measures to improve the existing conditions pertaining to:
 - A. Information
 - B. Access to information
 - C. Use of information
 - D. International exchange and dissemination of information
4. Conclusions and recommendations:
 - A. Expert Group summary opinion
 - B. Recommendations for plan of action
 - (1) National level
 - (2) Regional level
 - (3) International level
5. Other business
6. Adoption of the report

Annex III

LIST OF PARTICIPANTS

Members of the Group

Lida ALLEN	Director, Office of Development Information and Utilization, AID/State Department, Washington, DC, United States of America
Jin Zhang BAO	Energy Information Specialist, Information Research Division, Institute of Scientific and Technical Information of China Beijing, China
Ousama EL KHOLY	c/o UNDP Field Office, Cairo, Egypt
Clyde GARROW (Rapporteur)	Manager, Central Information Service, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia
Stephen M. LAWANI	International Institute for Tropical Agriculture, Ibadan, Nigeria
Peter LAZAR	Chairman, Committee on Engineering Information, World Federation of Engineering Organizations Budapest, Hungary
Safwat MOUSTAFA	Head, Solar Energy Department, Kuwait Institute for Scientific Research, Kuwait, Kuwait
Jose R. ORTIZ	Bogotá, Colombia
Delia TORRIJOS	Project Director, National Scientific Information Center, National Science Development Board, Manila, the Philippines
J. Israel VARGAS	Secretaria de Tecnologia Industrial, Brasilia, Brazil
Ines WESLEY-TANASCOVIC, (Chairman)	Director, Documentation Institute, Belgrade, Yugoslavia
John WOOLSTON	Director, Information Sciences, International Development Research Centre, Ottawa, Canada

Observers

Miko CARINEO	Sava Centre, Belgrade, Yugoslavia
Giuseppe FURLAN	Professor, International Centre for Theoretical Physics, Trieste, Italy
N. K. GOPALAKRISHNAN	Documentation Officer, Documentation Centre, Tata Energy Research Institute, Bombay, India
F. E. HURTADO DE MENDOZA	Organization of American States, Geneva, Switzerland
Beat JENNY	IFDA, Nyon, Switzerland
G. R. PIPE	Adviser to the Director General, Inter-governmental Bureau on Informatics, Rome, Italy
C. A. PRYOR	Executive Co-Director, Center for Integrative Development, New York, NY, United States of America
Jacques VALLS	Director, Library and Regional Documentation Centre, Asian Institute of Technology, Bangkok, Thailand

United Nations

United Nations Conference on New and Renewable Sources of Energy	Morris Miller, Louis A. Wiltshire, Elizabeth K. Miller
Economic Commission for Latin America (Caribbean)	Wilma Primus
United Nations Conference on Trade and Development	J. D'Oliveira e Sousa
United Nations Industrial Development Organization	Roch T. de Mautort
United Nations Centre for Human Settlements (HABITAT)	O. Constantin
United Nations Development Programme	Guelfo Pozzi
United Nations University	Walter Shearer
Inter-Organization Board for Information Systems	Nathalie Dusoulhier

Specialized agencies

Food and Agriculture Organization
of the United Nations

Emile Samaha

United Nations Educational, Scientific,
and Cultural Organization

Charles Gottschalk

World Intellectual Property
Organization

R. Harben, R. Blumstengel

Other United Nations organizations

International Atomic Energy Agency

Merle Opelz
