



**WORKSHOP ON INFORMATION MANAGEMENT & EXCHANGE
IN RELATION TO BIODIVERSITY**

16 February 2006

National Science Foundation, Colombo - 07

Thematic Component on Biodiversity

**National Capacity Needs Self Assessment (NCSA) for Global
Environment Management Project**

Ministry of Environment

WORKSHOP ON INFORMATION MANAGEMENT & EXCHANGE

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1.0 Introduction

Sri Lanka ratified the Convention on Biological Diversity (CBD) in 1994. The focal point for this Convention is the Ministry of Environment. The National Capacity Needs Self-Assessment For Global Environmental Management (NCSA) Project carried out currently by the Ministry of Environment attempts to address priorities and needs for capacity development to fulfil national obligations in terms of the Convention on Biological Diversity (CBD) as relevant to protect biodiversity in Sri Lanka.

The CBD takes particular note of the importance of organising and managing information derived from identification and monitoring of various components of biodiversity as required for conservation and sustainable use (Article 7(d)). This also requires that parties extend their scope for disseminating information derived from data collection and storage for use by categories of persons that are engaged in biodiversity conservation and sustainable use and those who need to plan for biodiversity conservation as required under Article 6).

The CBD also places emphasis on Exchange of Information in Article 17 by requesting Contracting Parties to facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries. The information to be exchanged includes results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information. These two dual needs were the focus of the workshop on Information management and exchange planned by the NCSA project.

It is also well known that many Sri Lankans, as in other developing countries, find it difficult to access information on research findings and technological development that is vital for conservation and sustainable use of biological resources. Most scientific journals are out of reach of individual researchers due to high prices of these commodities and poor access to the internet party due to the high cost of surfing the net.

Managing information and dissemination at in - country level, as well as enhancing access for Sri Lankan scientists and the public to external information sources to be used in biodiversity conservation and sustainable use, requires capacity building at systemic , institutional and individual levels to collect, supply and ultimately use biodiversity related information. This requires staff training, providing equipment, and enhancing coordination at national and sub-national levels of biological inventories, collections of specimens, ex-

situ conservation facilities, etc; and creating and managing databases and meta-data bases. It also requires disseminating information derived from databases in a usable form (i.e. customised information) to scientists, policy makers, general public, and national or sub-national biodiversity information monitoring/coordinating centres. Enhancing capacity for information exchange may also require development of policies, programmes and mechanisms to create meta-databases on national (and sub-national) biological inventories, information on collections of specimens, *ex-situ* conservation facilities, etc.

2.0 The Programme:

The meeting commenced with an introduction to the NCSA Project by Mr Mahen Watson, National Project Manager. This was followed by a presentation on Information Management & Exchange by Dr Jinie Dela, Biodiversity Consultant, where she discussed the requirements of information in relation to the CBD. Sunethra Perera, Head, National Science Library & Resource Centre, then made a presentation on Information Exchange & Dissemination facilities provided by the NSF at present in relation to Biodiversity.

The workshop had two Groups discussing information needs under Article 7(d) and Article 17 of the CBD. Group (1) discussed needs under Article 7(d) to promote in-country biodiversity information management and exchange. Group (2) discussed priority needs under Article 17 to enhance access to biodiversity related information from external sources. This is also relevant to fulfill all the other Articles of the CBD (6-20).

Capacity gaps at the systemic level:

- There is no national policy on biodiversity information management, and no national policy for access to GIS information in the country.
- Accessing biodiversity information in custodial institutions is difficult. This is because officials in custodial institutions are reluctant to provide information as they are not sure whether the information is publicly held and could be given out freely. There should be clear guidelines, laws and regulations at systemic and institutional level on access to information.
- Information safety and IPR issues are poorly known and not adequately addressed at the national level.
- There is no central meta-database which provides information on where biodiversity data can be accessed.
- All publications and journals should even now be customarily sent to the national archives and the national library. However, compliance is low as there is no law or policy to send information to the national archives.
- There is no central national body responsible to provide and distribute biodiversity information (particularly information from COP to the CBD).

3.0 Outcome of the Workshop

3.1 Main Capacity Constraints

Capacity gaps at the institutional level:

- Most custodial institutions lack human resources (in terms of numbers and personnel with skills), and funds to establish and maintain computerised databases, and have very limited means to collect information from original data sources/repositories.
- Some institutions lack relevant IT facilities (e.g. LAN).
- Databases developed through projects funds are not regularly updated and managed after the projects end due to insufficient funds and staffing (i.e. databases are set up and managed by protect staff, who may not be absorbed into the permanent cadre). Databases are setup through special projects, but financial resources and staff for maintaining and updating the databases are not given due consideration in the project proposals.
- Custodial institutions have data in various forms. For example, the National Herbarium has data as herbarium sheets which are not yet digitised (this is to be addressed). The National Museums has data in the form of specimens.
- NGOs lack funds to obtain up-to- date publications on biodiversity. They also lack funds, equipment and infrastructure for easy internet access. Many rely on telephone calls for networking.
- Often there is no transparency for information sharing between the different divisions of a single institution. This is partly due to poor research ethics and the threat of data plagiarisation.
- There is no regular mechanism or institutional policy for sharing published information within custodial institutions.
- Many published and unpublished reports/research papers are not mentioned in the institutional annual reports. Reports on university annual conferences and sessions are often not accessible for reference by scientists and resource managers.
- Setting up databases is generally not difficult and the software is easily accessible. However sound procedures for database designing, management and upgrading are absent in many institutions. Accepted procedures for data inflow which facilitate database updating are particularly deficient in most institutions.
- Capacity building through partnerships between organisations (between both inter and cross-sectoral institutions) is greatly under-utilised for dissemination of biodiversity information.

Capacity gaps at the individual level:

- Database managers in custodial institutions often do not get the required support from the top institutional management, partly because databases management is under-valued.

- The staff managing databases require training on data collation, management and dissemination in customised formats (including communication and writing skills).
- Database managers have little knowledge of the legal aspects of information dissemination (patent rights, disclosed and undisclosed information, etc.).
- Officers in custodial Institutions lack capacity to identify information that is in the public domain, and what is not.

Summary of main capacity building interventions:

Systemic

- There should be a national policy on biodiversity information management and a national policy for access to GIS information in the country.
- There should be institutionalized systems to coordinating monitoring of biodiversity in forests, wetlands and coastal and marine areas and for associated collation of information. *(see section below on identification and monitoring)* .
- Special projects which set up databases should allocate financial resources and funds for staff to maintaining and update databases.
- There should be an in-built mechanism during project formulation to specify that staff trained through projects to develop and manage databases should be absorbed into the permanent cadre of relevant departments; or existing departmental staff should be released to work on database development through projects, to ensure that the training is not wasted and database management can continue as desired after the project ceases.

Institutional

- It is expensive to maintain and update individual databases in state agencies on all aspects of coastal/wetland/or forest biodiversity. Hence there should be a mechanism to link up sectoral databases to make the relevant data accessible for state departments within the sector for informed decision-making. However, custodial institutions could maintain data ownership. This should be addressed in a biodiversity information policy. A mechanism that has consensus of all stakeholders should be identified and established.
- Sectoral data should be gathered on a common format (if possible this should be extended to other related sectors).
- All biodiversity related databases should be linked to a central biodiversity meta-database to be set up at the Biodiversity Secretariat of the MOE. *[This needs funds and human resources]*.
- Centres of Excellence to be identified could disseminate information on the biodiversity data available in the country, the custodial institutions that own the data, and how they can be accessed according to institutional policy. This could be made available through a special website. Institutional such as the NSF and other centres of excellence

for biodiversity could link with the BDS to make the meta -database accessible through their web portals which can be accessed with greater ease by relevant information seekers.

3.2 Enabling environment for information management and exchange

Status of databases and information networks

BDS: A comprehensive survey and requirements for a meta -database was carried out by the USIAD/NAREPP project during preparation of the BCAP in the mid 1990s. This could be used as a base to establish the biodiversity meta -database. The National Biosafety Framework Project carried out by the MOE has undertaken a comprehensive survey of biotechnology capability in Sri Lanka (amongst other actions) and this information is available in a database.

The BionetAsia information network has been established for harmonizing biosafety activities.

FD has a comprehensive database (EIMs), and data management system (with GIS). Forest areas have been mapped through various projects using GIS. This information is available in the FD database. EIMS database contains comprehensive data on woody plants gathered through the National Conservation Review of natural forests (NCR). The NCR data also covers (though less comprehensively than the woody plants) some vertebrate and invertebrate groups. This database has recently been made more user-friendly through the FRMP project. This FRMP project has also provided equipment and facilities for database development.

DWLC is developing a National Biodiversity Database (with GIS) and carrying out baseline surveys and habitat mapping through the PAM&WC project. Data from this will be incorporated into a database. This project has also strengthened the GIS unit of the DWLC to help strategic planning and improvement of park management.

The CEA library is the focal point for Envinet (Environmental Information Network). LAN facilities re available here. This is linked to the various divisions of the CEA for information exchange. The CEA also has GIS facilities and a digital database on wetlands with digitised maps.

MPPA has a database on environmentally sensitive marine areas (mapped using GIS) via the INSCOM (Institutional Strengthening of Oil Spill Contingency Management Project - Phase 1). However, critical areas such as coral reefs, sea grass beds have not been mapped (Source: MPPA), and this is perceived as a major deficiency by the MPPA.

NARA has several databases set up on various aspects of coastal biodiversity. There is specifically a meta-database for coral reefs, developed by GCRMN and NARA. The publication is made available in CD form and can be accessed through the NARA website.

CCD has set up a GIS unit with a database on coastal habitats (with GIS/GPS facilities/equipment) to help the department's functions and the decision making process for integrated Special Area Management (SAM) Planning in the coastal areas; conservation and mapping of coastal habitats and sites of archaeological, historical and scenic value; erosion management; controlling coastal water pollution and identification of coastal land use patterns' and identification of sites for future development. CCD has a problem of getting information from other institutions because of the cost involved in accessing information, although this is relevant for coastal zone management.

MFAR: Database development and a system of information sharing and networking has been set up for institutions under this Ministry through the IS component of the CRMP.

PGRC: A central database on genetic resources for food and agriculture (including

Status of databases and information networks

medicinal plants) is being established at the Plant Genetic Resources Centre (PGRC), under an FAO project. The software has been provided on the basis of providing the information to the donor. The database will be shared with the DOA and its network of institutions. Through the GEF funded 'In-situ Conservation of Crop Wild Relatives through Enhanced Information Management and Field Application (endorsed) is envisaged to have linkages with 11 stakeholder institutions (including the DWLC, FD CE DOA Dept. of Ayurveda, NBG, universities, etc.). The stakeholders should discuss and decide as to what data they have and formulate their individual data sharing policies.

SCPPC under the DOA: Online facilities are very inadequate.

Open University has network facilities with four regional centres and 18 study centres. The OU library is digitised and can be accessed through the website. Educational materials for reference are available for a membership fee of Rs 100/= per month. OU has Intranet facilities.

CARP is the national focal point for Agrinet, but the facilities. While much work is being done to disseminate information, the available facilities are inadequate for the varied functions of this database. The library has several databases and abstracts as well as full articles from specific journals. This is made available for the NARS system and for university students. The CARP database is updated annually with current research projects and fields of specialisation by collecting data from NARS institutions. This is done through nominated focal points in each of these institutions who are responsible to provide the relevant information to the 'information coordinator' at CARP. CARP provides training on coordination to the focal points via two training sessions annually and the required software is installed in the member libraries. CARP also carries out awareness programmes for the scientists in the NARS system on the data available on agriculture, carrying out internet searches, etc. on an annual basis. The absence of LAN facilities at CARP (which was available earlier) is a serious constraint.

ITI has a LAN database to collect all research carried out within the institution, and a website, but has no data-sharing links with other institutions.

NSF has a National Science Library and Resource Centre (formerly the Sri Lanka Scientific and Technical Information Centre (SLISTIC). This is the focal point for the dissemination of information on science and technology. At the national level an information exchange system has been setup via the Sri Lanka Scientific and Technical Information Network (SLISTINET) which now has a membership of over 100 libraries including universities, research and development institutions and NGOs. SLISTINET members have access to the internet and CD-ROM databases through the NSF. Science direct (WWW.sciencedirect.com) can be used to access databases on scientific publications such as Blackwells, Emerald, etc., through NSLRC. NSF also conducts courses for SLISTINET members on more general topics such as information management, time management, etc. conducted by local and foreign resource persons, but this is not done on a regular basis. NSLRC also offers database development and training on library management systems using CDS/ISIS library software developed by UNESCO. NSLRC has several databases: SLISTICAT (on scientific books, reprints, reports, periodicals etc.), SLSI (scientific articles in local journals), RGR A (final reports of research projects supported by the NSF). The NSLRC/NSF has access to internet through a lease line, and this resource is offered to the scientific community through a membership scheme. NSLRC has web-hosting facilities for S&T institutions and acts as a nodal point for the Lanka Education, Academic and Research Network (LEARN) established by the Universities.

3.3 Specific capacity development needs to promote in-country biodiversity information management and exchange

Group (1)- discussion group on priority capacity needs to fulfill Article 7(d) of the CBD

This deals with data collection for database entry, and data organisation and dissemination to promote biodiversity conservation and sustainable use. Due to liberalised policies of information exchange, and strong bilateral and multilateral links with regard to funding for environmental conservation, Sri Lanka has good possibilities of collaborating with other countries to improve access to environmental information. These capabilities need strengthening further.

Systemic

- A National Policy on access to biodiversity information is a critical need. This should:
 - address specific guidelines on action against misuse and penalty for misuse;
 - specify accessible information and restricted information (to be determined at the institutional level);
 - identify criteria for collection, management and storage of biodiversity information.
 - give guidelines to assist custodial institutions to formulate individual information access policies for in-country and external would-be users;
 - specify that all state institutions send published information relating to biodiversity to the national archives as well as to the NSF which is the national repository for science and technology;
 - promote measures to enhance technical capacity for collation of information on Sri Lanka's biodiversity;
 - help expand the operational language of databases to cover Sinhala and Tamil as well as English where possible and relevant ;
- BDS should link with NSF and CEA, and CARP [*the NSF could coordinate this activity of policy formation for the BDS on request*].
- There should be a policy to ensure that research data gathered in government departments by officers as part of their official duties are published within a specified time frame, either in institutional, other local publications or in international journals.

Institutional

- Establish a central meta database on biodiversity information at the MOE/BDS with a mechanism for regularly maintaining and updating the meta-database. (*A comprehensive survey and requirements for a meta database carried out by the USIAD/NAREPP project during preparation of the BCAP could be used as a base to establish the meta-database*). Note: *A guide to national institutional survey and networking in the context of the CBD has been prepared by WCMC*
- The meta-database should specify accessible information and restricted information at the institutional level.

- Develop the 'Centers of Excellence' for biodiversity information to help make the BDS meta-database accessible for users (through their web portals).
- The BDS/MOE (hosting the meta-database) should develop a system to facilitate the updating of the allied databases and have documented procedures for data collation and updating [*The procedure to be followed by the PGRC and the procedures followed currently by CARP should be reviewed and adapted in this regard*].
- Build capacity within individual custodial institutions to collate, manage and disseminate biodiversity data as required for planning and managing biodiversity in the most appropriate form, using current computer technology and software.
- Individual custodial institutions could have their own databases, but link up with the central meta-database.
- Review institutional staff requirements in all major custodial institutions and relevant staff training provided.
- Key custodial institutions should be identified as centres for various types of data (e.g. FD, DWLC, CCD, PGRC, CEA, CARP, NSF, CEA should have database on information relevant to environmental Acts/ laws etc).
- Custodial institutions should:
 - formulate criteria to provide access to information for different categories of users.
 - setup online nominal payment systems (there could be limited access to information according to different categories of users).
 - have an Institutional policy for data sharing, based on client categories.
 - have a monitoring mechanism for database management.
- Custodial institutions should have a specific IT unit capable of efficient information management serviced by trained staff. These IT units should have access to a legal officer in the institution for advice on legal aspects of information sharing.
- Custodial institutions should develop and establish intra-net systems whereby each division within the institution can update their information and provide this to the main web-page/database of the institution.
- Custodial institutions should provide opportunities for publication of institutional data.

Individual

- Conduct awareness programmes to make stakeholders aware of the availability of information available at the national level and the possibilities to access biodiversity information from external sources [*i.e. NSF, CARP, in collaboration with the BDS*]
- BDS staff need capacity building to set-up the meta-database on biodiversity.
- Staff training is required in custodial and center of excellence information institutional level:
 - data collation techniques,
 - developing questionnaires to extract specific information,
 - entering different kinds of data that are specific to the individual institution (e.g. certain types of data are highly specialised and need special skills for entering into the database. e.g. herbarium sheets, specimens, etc).
- Managers of data management units should have training in:
 - public relations and communication skills
 - negotiation skills for benefit sharing, and

- IPR and legal aspects of information (patent rights - on information, disclosed and undisclosed information, etc.)
- Data entry operators/ managers should have:
 - correct attitudes to learn application of different software for different data bases.
 - educational qualifications in science (a science degree with science background) and basic computer knowledge
 - enhance communication skills (reporting, providing customised data, etc)
 - training in special software operating systems.

3.4 Specific capacity development needs to enhance access to biodiversity related information from external sources

Group (2) discussion group on priority needs to fulfill Article 17

This deals with information required to promote conservation and sustainable use of biodiversity and relevant environmentally sound technologies from external country sources.

- Article 17 of the CBD requests contracting parties to facilitate information exchange from all publicly available sources. However, for Sri Lankans the difficulty of accessing biodiversity information in the public domain is a secondary problem, whereas the main problem is for accessing information that is not available in the public domain from external country sources. Examples are reports/articles in international journal which are not available free of charge online; these journals/publications are also very costly to purchase and the cost of surfing the net is prohibitive (due to telephone charges) for the average scientist or student in the country.
- Infrastructure facilities and funds are also not adequate in most institutions (especially for NGOs) and for individual scientists to access information from external sources through the internet.
- The issue of restricted access to information is also not very well understood among institutions and individuals.
- Many of the gaps identified for in-country database management are applicable for this aspect as well (and *vice versa*).
- **Specific capacity development interventions to access biodiversity information from external country sources**

Systemic

- Establish a Steering Committee on Biodiversity information at the Biodiversity Secretariat to cover biodiversity data management, facilitate the CBD clearing house mechanism and improve access to biodiversity information from external country

sources. This should have adequate mandate and power to address information retrieval from international databases. A legal expert should be part of this Committee. *[Suggested: appoint a legal experts and nominee from ILD of NSF and Natural Resources Management Division of CEA for this committee, amongst others]*

Institutional

- Develop the 'Centres of Excellence' identified for biodiversity information [at NSF/CEA/CARP] as web portals/gateways for biodiversity information so that anyone in the country could access information through them. These 'Centres ' should access information on behalf of local researchers/scientists.
- Enhance capacity of these 'Centres' through development of infrastructure/human resource trainings for specified needs and through the provision of financial support.
- There is a need for an institutionalised programme to:
 - Publicise data available at, and accessible from, these Centres for biodiversity researchers and resources managers.
 - make researchers aware of IPR issues.
- The BDS should establish links with the "Vidatha programme" and the CEA Regional and Sub-regional centres to form a network to enhance access to external (and internal) biodiversity related information at the remote regional levels. (this could be used to disseminate information on biosafety and other relevant biodiversity information of national interest to remote areas).
- Develop institutional links between the 'Centres of Excellence' and external / International agencies such as IWMI, American Centre, etc. to access external biodiversity information through them.

Individual

- Provide training for staff at the 'Centres of Excellence 'to access broader information from external sources for local research scientist s.
- Provide training for staff at the Vidatha Centers by the 'Centres of Excellence' to access information. If not, the Centres can give them (Vidatha Centers) the relevant information in a CD.

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AGENDA

9.00 am-9.30 am	Registration
9.30 am-10.00 am	Welcome address Dr. N. Jayasuriya <i>Director, NSF</i>
	Introduction to Project <i>Mr. M. Watson</i> <i>National Project Manager, NCSA Project</i>
10.00 am-10.20 am	Information Management & Exchange - Requirements in relation to the CBD <i>Dr. Jinie Dela</i> <i>Consultant on Biodiversity/NCSA Project</i>
10.20 am-10.50 am	Information Exchange & Dissemination Facilities Provided by the NSF at present in relation to Biodiversity <i>Ms Sunethra Perera</i> <i>Head, National Science Library & Resource Centre, NSF</i>
10.50 am-11.20 am	TEA
11.20 am-11.30 am	Objectives of the Workshop <i>Dr Jinie Dela</i>
11.30 am- 12.45pm	Discussion on Capacity Development Needs <i>Group 1</i> Promoting in-country biodiversity information management and exchange <i>Group 2</i> Enhancing access to biodiversity related information from external sources
12.45pm -1.30pm	LUNCH
1.30pm-2.45 pm	Continuation of Group Discussions
2.45 pm - 3.15 pm	Presentations by Groups
3.15 pm - 3.30 pm	Closing Remarks
3.30pm	TEA

Information note on Information Management & Exchange in relation to Biodiversity

Sri Lanka ratified the Convention on Biological Diversity (CBD) in 1994. The focal point for this Convention is the Ministry of Environment. The National Capacity Needs Self-Assessment For Global Environmental Management (NCSA) carried out currently by the Ministry of Environment attempts to address priorities and needs for capacity development to fulfil national obligations in terms of the Convention on Biological Diversity (CBD) as relevant to protect biodiversity in Sri Lanka.

Article 7

The CBD takes particular note of the importance of organising and managing information derived from identification and monitoring of various components of biodiversity as required for conservation and sustainable use (Article 7(d)). This also requires that parties extend their scope for disseminating information derived from data collection and storage for use by categories of persons engaged in biodiversity conservation and sustainable use, including use of genetic resources and those who need to plan for biodiversity conservation as decreed under Article 6.

Article 17

The CBD also places emphasis on Exchange of Information in Article 17 by requesting Contracting Parties to facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries. The information to be exchanged includes results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized know ledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information

These two dual needs will be the focus of the workshop on Information management and exchange planned by the NCSA project.

(1) Identification of capacity to manage biodiversity information

Managing information and dissemination at in country level as well as enhancing access for Sri Lankan scientists and the public to external information sources, requires capacity at systemic, institutional and individual levels to collect, supply and ultimately use information on the conservation of biological diversity and the sustainable use of its components. This may require staff training, providing equipment, and enhancing coordination at national and sub-national levels of biological inventories, collections of specimens, *ex-situ* conservation facilities, etc; creating and managing databases and meta-data bases. It will also require disseminating information derived from data in a usable form (customised information) to scientists, policy makers, general public, national or sub -

national biodiversity information monitoring/coordinating centres. Enhancing capacity for information exchange may also require development of policies, programmes and mechanisms to create meta-databases on national (and sub-national) biological inventories, information on collections of specimens, ex-situ conservation facilities, etc.

(2) Identification of capacity needs to access to information from external sources

It is also well known that as a developing country many Sri Lankans find it difficult to access information on research findings and technological development that is vital for conservation and sustainable use of biological resources. Most scientific journals are out of reach of individual researchers due to a high price of these commodities and poor access to the internet as well as the high cost of surfing the internet. How can this problem be bridged? What capacities should be developed at national and institutional level to meet this need?

These are the questions that we wish to discuss at the workshop on information exchange. As this is very much within the made of NSF and as an institution that can help build this capacity through its continuous programmes we would like to collaborate with NSF in holding this workshop.

Biodiversity Information - Issues

Extracted from the National Biodiversity Conservation Action Plan (1999)

Although there is a sizeable volume of information on Sri Lanka's biodiversity - in the form of bibliographic collections, specimen lists, maps, reports, GIS holdings, and digital databases - much of it is scattered in governmental, semi-governmental, non-governmental, project, and academic institutions, or is in the custody of individual scientists. Its existence, however, remains largely unknown to would-be users, including policy makers. A good deal of information on Sri Lanka's species is also found in institutions abroad where types specimens are lodged and where the scientific papers are published. Among local scientists, only a few have the means of getting access to this information. A user's inability to obtain specific information may either be due to its non-existence or to difficulties of access, the latter because of the lack of established measures to classify and provide information to different categories of users which is a constraint that is applicable mainly to state institutions.

A national survey of biodiversity information was conducted in 1996 as part of the BCAP preparation process revealed that about a quarter of the "information management specialists" have post graduate training, but very few have had any training in computer hardware maintenance, analysis of computerized spatial data, or systems analysis. By contrast, library science is the most common area of training within this group.

A large number of institutions possess specialised data-sets on various subjects, but the custodians of the information do not readily make it known that such information is available.

B CAP Objectives on information:

1. To ensure that the sources of all the information on Sri Lanka's biodiversity are centrally documented.
2. To formalize and regulate access to information on biodiversity.
3. To strengthen the information base on biodiversity, and to ensure that major gaps in biodiversity information are identified and addressed through targeted investments.
4. To archive indigenous knowledge and legalize mechanisms to protect it.

Recommended action in the BCAP of 1999 to be considered at the workshop:

1. Formulate a national policy on information management that includes the identification of criteria for collection, management and storage of biodiversity information and guidelines to assist custodial institutions to formulate individual information access policies for in-country and external would-be users.

Institutional

2. Establish mechanisms at MFE for regularly maintaining and updating the meta-databases on biodiversity now being established, and for setting up of a meta-database on indigenous biodiversity information held outside Sri Lanka.
3. Identify a state institution to deal with biodiversity information management and access issues and to facilitate the continued maintenance of biodiversity meta-databases.
4. Increase capacity of individual custodial institutions to collate and analyse biodiversity data using current computer technology and software through training and review of staff requirements; and increase capacity for the operational language of databases to be expanded to cover Sinhala and Tamil where relevant.
5. Promote measures to enhance technical capacity for information exchange and establish mechanisms for the collation of information on Sri Lanka's biodiversity available within and outside the country and store such data in the relevant custodial institutions.
10. Gather information on the benefits as well as risks associated with the application of modern biotechnology in the conservation and use of biodiversity.
11. Launch a special programme for the collection and archiving of data on indigenous knowledge pertaining to biodiversity and institutionalize the process giving due regard to the need for controlling and regulating access to this information.
12. Identify and provide support to selected "centres of excellence" for collating and managing data-sets on aspects of biodiversity.
13. Provide support to identified NGOs for assisting in research and collection of field data on biodiversity.

Main state institutions involved in implementing:

MFE, MAL, Ministry in charge of ayurvedic medicine, Ayurveda Department, DOA, DWLC, FD, NARA, NARESA, CEA, universities.

Priority recommendation in the addendum to the BCAP - 2006

The Ministry dealing with environment to implement computerised networking and establishment of a meta-database on:

- Protected areas and forests (data required for management)
- Threatened animal species
- Herbarium and museum inventories to biodiversity
- Invasive species
- Traditional knowledge

Presentation on Legal Aspects of Information Exchange

Jagath Gunawardena

- **Information in the Public domain**

There is a misconception that any information that a person can access is in the public domain. (Databases/internet etc.) However, all the information that a person can access is not the information he can use. For example, information that is in the patents and IPR may be accessed, where use is restricted by relevant laws. At the same time certain types of information access is prohibited by law. So there is difference between information a person can read/view and the information he can make use of.

- **Article 7, 16 and 17 in the CBD**

Two types of information available;

Developing countries - information relevant to CBD is the information that derives from indigenous knowledge/traditional knowledge. (TK)

Developed countries - Information pertaining to R & D activities

According to article 7, 15, 16 and 17, one can argue that we should make our TK freely available to other parties. But, TK is not held by a particular individual, it may be common to the whole country/community/ a group etc. So there arises the question on ownership.

In the CBD - sharing information means we can share information which is only in the public domain. So attention should be paid as to whether we can share the TK considering it as in the public domain.

- **Creation of a "Traditional Knowledge Digital Database"**

- to make all the indigenous knowledge of developing countries freely available to everyone.

The proponents argue that this could prevent others taking intellectual property rights on information.

However it will give rise to certain issues.

- This information may be used as a basis for a series of IPR specifically patents. We should consider very carefully the need to restrict the access to this type of information or whether to put it in the public domain.

- The second problem arises with regard to benefit sharing. - Who owns the information once it is given to public domain? This is a tricky problem because same knowledge can be held by diverse groups and one group may be willing to share the

knowledge while the other group doesn't. If that is the case the group/individual who gave away information may claim the ownership.

- **Developed Countries - types of knowledge**

- Knowledge based on R and D activities
- Knowledge stored in patents (can be accessed, but can't be used in commercial purpose)
- Undisclosed information
- any knowledge of commercial value held not by the public but by few people or individuals and not accessible to the public. The group who hold the information cannot be forced to be part with / share it.

- **Protection of Information**

The CBD does not provide guidelines as to what information we should share and what we should keep to ourselves.

Databases cannot be legally protected while the 'Copy rights' only protects the form of expression of ideas but not the information within the work. This information can be used for education purpose with due credit to author as a moral satisfaction.

Bilateral agreements provide some ruling on what information to be shared and the measures for benefit sharing.

When TK is considered, serious thought should be given to

- what should be made freely available
- what should be made available by an Agreement
- what to be kept confidentially

- **Restricted Access**

The best way to prevent TK being stolen is to have a restricted access system where access is provided only under certain conditions.

Restricted access should not be limited to genetic and biological material, but also should cover the knowledge pertaining to them. It means to ensure that the person does not set his eyes on that piece of data/information.

The best way to restrict access is to have a classification system for databases

However, we should have a comprehensive system to protect our TK considering all the aspects such as undisclosed information, patents, copy rights, bilateral agreements and a series of classification.

Information Exchange & Dissemination Services of the National Science Library & Resource Centre

Sunethra Perera

The main objectives of the National Science Library & Resource Centre are to:

- Carry out necessary programmes to foster the interchange of scientific information among scientists in Sri Lanka and foreign countries.
- Provide an efficient information dissemination service to the scientific community using Information Communication Technology through strengthening of linkages and networks.
- Serve as the National Repository of Science & Technology literature.

➤ **Information Dissemination**

- a) Resources generated locally
- b) Resources available locally
- c) Resources available internationally

a) **Locally generated resources**

▪ **National repository**

Local Science & Technology literature collection includes periodical articles, conference papers, theses, Biodiversity (106 records) and technical reports (18,000 records).

web: <http://thakshana.nsf.ac.lk/wwwisis/slsi/form.htm>

▪ **NSF Research Grants**

Final Reports, theses, (2400 records), Biodiversity (07 Records)

web: <http://thakshana.nsf.ac.lk/wwwisis/rgra/form.htm>

b) **Locally available resources**

▪ **National level - databases**

▪ **Books, AV & multimedia resources**

• UCAT - Union catalogue of all libraries (Integrated) includes a total of nearly 400,000 records with 681 records dealing with biodiversity.

web: <http://www.natlib.lk/>

• UCAT- PURNA users

web: <http://thakshana.nsf.ac.lk/wwwisis/purna/form.htm>

• Database on Natural Resources

web: [http://thakshana.nsf.ac.lk/scripts/wwwi32.exe/\[in=natural.txt\]/](http://thakshana.nsf.ac.lk/scripts/wwwi32.exe/[in=natural.txt]/)

• Local library on-line catalogues/databases

web: <http://www.nsf.ac.lk/links/links2.htm#lib>

- National Network databases (AGRINET, HELLIS)
web: <http://www.hellis.org/modules.php?op=modload&name=websis&file=imlk>
- Gateways to Local S & T Institutions/Associations
web: <http://www.nsf.ac.lk/instit/instit.htm>
- NSF General collection (*limited in scope*) 99 items
web: <http://thakshana.nsf.ac.lk/winisis/slstic.shtm>

▪ **Periodicals**

Over 7000 titles of Periodicals are available. They include:

- Consortium of printed periodicals ULIST (Union List of Scientific Periodicals in member libraries - holdings)
- One title under Biodiversity and Conservation - IWMI
- 38 Environment related titles
web: <http://thakshana.nsf.ac.lk/wwwisis/ulist/form.htm>

c) International Search Tools

- **SCOPUS** -
 - 15,000 periodicals, web contents, patents (abstracts + citations)
web: <http://www.scopus.com>
- **ScienceDirect**
 - 1,800 periodicals (abstract & full text up-to December 2005)
web: <http://www.sciencedirect.com>
- **Directory of Open Access Journals**
 - Over 1000 periodicals (full text)
web: <http://www.doaj.org/>
- **EBSCOhost**
 - 6,000 plus periodicals (full text)
- **WileyInterscience**
 - Over 675 periodicals (full text), databases
- **Blackwell-synergy**
 - 608 periodicals (full text)
- **Search Engines**
 - Scirus <http://www.scirus.com/>
 - Google Scholar <http://www.google.com/>
- **Search Directories**
 - Research Index <http://www.researchindex.com/>
 - Direct Search <http://www.freepint.com/gary/direct.htm>
- **Web Window - web sites useful to scientists**

- Sri Lanka sites
<http://www.nsf.ac.lk/links/links.htm>

➤ Services

- Personalised Information Services
- Current Awareness Service (new items are added to the National Repository of S & T Literature as a biweekly service)
- Literature Search Service is available on request
- Literature alert service (direct service from publishers)

➤ Based on International Publishers

Keeps the researcher informed of the current work published within their subject disciplines:

- Table of Contents service - e-mail account
- Literature alert service - screening against subject profiles
- Blackwells - <http://www.blackwellpublishing.com/ealerts/>
- CABI - <http://www.cabi-publishing.org/EmailAlerts.asp>
- Kluwer - <http://www.kluweralert.nl/>
- Taylor & Francis Journals - <http://www.ingentaselect.com/titles.htm>
- Brunner & Routledge - <http://www.brunner-routledge.co.uk/opal>
- Elsevier - Science Direct / - <http://www.sciencedirect.com/science/alerts>
- Wiley Interscience - <http://www.wileyeurope.com/legacy/utility/maillinglist/wileyeurope>

➤ Document Exchange/Delivery

- Inter Library Loans
- Copy duplication

- Copies of documents are supplied from the NSLRC collection
- Infrastructure & the mechanism to exchange copies of documents among SLSTINET member libraries is provided
- Copies of documents are supplied from other on-line full text sources (Sciencedirect, DOAJ, INASP/PERI etc)
- Copies of documents are supplied from International Information Centres (British Library Document Supply Centre (on-line quick delivery)

➤ Search Directories

- Research Index (<http://www.researchindex.com/>)
 - Scientific Literature - digital Library
 - Categorized sets of web sites
 - Searchable
 - References to documents with citations (similar to Science Citation Index)
 - Creates an autonomous Index

- Full text of articles - FREE
- Direct search <http://www.freepint.com/gary/direct.htm>
- Invisible Web directory - <http://www.invisibleweb.net/>

Index of Useful Web Links

News and Information Sources, Action Alerts, etc.

The Science of Biodiversity

Advocacy and Policy Organizations Engaged in Biodiversity Outreach Science, Academic and

Professional Organizations Engaged in Biodiversity Outreach

Environmental Education Organizations Engaged in Biodiversity Outreach

Zoos, Museums, Aquaria, and Botanical Gardens

Organizations with Experience Reaching Specific Audiences

Pathways to the Public

Communications Consultants and Grantmakers

NEWS AND INFORMATION SOURCES, ACTION ALERTS, ETC

Canadian Biodiversity Information Network <http://www.cbin.ec.gc.ca/>

Climate Ark www.ClimateArk.org/

The Center for Environmental Citizenship <http://www.envirocitizen.org/>

Econet www.igc.org/igc/econet/

Eco-Portal (a search engine) www.eco-portal.com/

EnviroLink <http://www.envirolink.org/>

Grassroots Environmental Effectiveness Network (GREEN)

www.defenders.org/grnhome.html

High Country News <http://www.hcn.org/>

Island Press <http://www.islandpress.com/>

National Environmental Wire for Students www.envirocitizen.org/news

WorldWatch Institute <http://www.worldwatch.org/>

THE SCIENCE OF BIODIVERSITY

American Association for the Advancement of Science <http://www.aaas.org/>

American Museum of Natural History <http://www.amnh.org/>

Center for Applied Biodiversity Science <http://www.biodiversityscience.org/>

Ecological Society of America <http://www.esa.org/>

National Academy of Sciences www.nationalacademies.org/nas

National Geographic www.nationalgeographic.com/media/ngm/9607/index.html

Society for Conservation Biology <http://www.conbio.net/scb/>

The Virtual Library of Ecology, Biodiversity and the Environment <http://conbio.org/vl/>

Tree of Life <http://www.phylogeny.arizona.edu/tree>

UNEP World Conservation Monitoring Centre <http://www.unep-wcmc.org/>

ADVOCACY AND POLICY ORGANIZATIONS ENGAGED IN BIODIVERSITY OUTREACH

BIODIVERSITY, GENERAL

Conservation International <http://www.conservation.org/>

Defenders of Wildlife <http://www.defenders.org/>

National Audubon Society <http://www.audubon.org/>

National Wildlife Federation <http://www.nwf.org/>

The Nature Conservancy <http://www.nature.org/>

Sierra Club <http://www.sierraclub.org/>

Wildlands Project <http://www.twp.org/>

World Resources Institute <http://www.wri.org/>

World Wildlife Fund <http://www.wwf.org/>

INTERNATIONAL

Biodiversity Support Program <http://www.bcnet.org/bsp.htm>

IUCN - US www.iucn.org/places/usa/index.html

World Resources Institute <http://www.wri.org/>

World Wildlife Fund <http://www.wwf.org/>

WETLANDS

Clean Water Network <http://www.cwn.org/>

Coast Alliance <http://www.coastalliance.org/>

National Audubon Society <http://www.audubon.org/>

River Network <http://www.rivernetwork.org/>

South Carolina Coastal Conservation League <http://www.scccl.org/>

Tip of the Mitt Watershed Council <http://www.watershedcouncil.org/>

FRESHWATER SYSTEMS

American Rivers <http://www.americanrivers.org/>
Anacostia Watershed Society <http://www.anacostia.org/>
Clean Water Action <http://www.cleanwateraction.org/>
Clean Water Network <http://www.cwn.org/>
Great Lakes Information Network <http://www.great-lakes.net/>
Mississippi River Basin Alliance <http://www.mrba.org/>
River Network <http://www.rivernet.org/>
Trout Unlimited <http://www.tu.org/>
C.S. Mott Foundation <http://www.mott.org/>

MARINE

The Ocean Conservancy <http://www.oceanconservancy.org/>
Coast Alliance <http://www.coastalliance.org/>
Coral Reef Alliance <http://www.coralreefalliance.org/>
National Audubon Society <http://www.audubon.org/>
ReefBase Project <http://www.reefbase.org/>
SeaWeb <http://www.seaweb.org/>
South Carolina Coastal Conservation League <http://www.scccl.org/>
Surfrider Foundation <http://www.surfrider.org/>

SPRAWL

1000 Friends of Minnesota <http://www.1000fom.org/>
1000 Friends of Wisconsin <http://www.1kfriends.org/>
1000 Friends of Florida <http://www.1000friendsofflorida.org/>
1000 Friends of New Mexico <http://www.1000friends-nm.org/>
1000 Friends of Washington <http://www.1000friends.org/>
American Farmland Trust <http://www.farmland.org/>
Chesapeake Bay Foundation <http://www.cbf.org/>
Michigan Environmental Council <http://www.mecprotects.org/>
National Trust for Historic Preservation <http://www.nthp.org/>
New Jersey Future www.njfuture.org/index.html
Piedmont Environmental Council <http://www.pec-va.org/>
Planning and Conservation League <http://www.pcl.org/>
Sierra Club <http://www.sierraclub.org/>
Smart Growth America <http://www.smartgrowthamerica.com/>
Smart Growth Network <http://www.smartgrowth.org/>
South Carolina Coastal Conservation League <http://www.scccl.org/>
Sprawl Watch Clearinghouse <http://www.sprawlwatch.org/>
Surface Transportation Policy Project <http://www.transact.org/> or <http://www.istea.org/>

FORESTS AND PUBLIC LANDS

American Forests <http://www.amfor.org/>
American Lands <http://www.americanlands.org/>
Canadian Parks and Wilderness <http://www.cpaws.org/>
Earth Justice Legal Defense Fund <http://www.earthjustice.org/>
Forest Guardians <http://www.fguardians.org/>
Forest Conservation Portal <http://www.forests.org/>
Greenpeace <http://www.greenpeace.org/>
Idaho Conservation League <http://www.wildidaho.org/>
Northern Forest Alliance <http://www.northernforestalliance.org/>
Northern Forest Center <http://www.northernforest.org/>
Oregon Natural Resources Council <http://www.onrc.org/>
Public Lands Information Center <http://www.publiclands.org/>
Rainforest Action Network <http://www.ran.org/>
Sierra Club <http://www.sierraclub.org/>
Southern Appalachian Forest Coalition <http://www.safc.org/>
Washington Environmental Council <http://www.wecprotects.org/>
Wilderness Society <http://www.wilderness.org/>
Wildlands Project <http://www.twp.org/>
Yellowstone to Yukon <http://www.rockies.ca/y2y/>

ENDANGERED SPECIES

Defenders of Wildlife (Endangered Species Coalition) <http://www.defenders.org/>
Environmental Defense <http://www.edf.org/>
Monarch Watch <http://www.monarchwatch.org/>
National Audubon Society <http://www.audubon.org/>
National Wildlife Federation <http://www.nwf.org/>

Sierra Club <http://www.sierraclub.org/>
The Nature Conservancy <http://www.nature.org/>
World Wildlife Fund <http://www.wwf.org/>

SCIENCE, ACADEMIC & PROFESSIONAL ORGANIZATIONS ENGAGED IN BIODIVERSITY OUTREACH

ActionBioscience.org <http://www.actionbioscience.org/>
American Society of International Law - Wildlife Interest Group www.eelink.net/~asilwildlife
Center for Plant Conservation www.mobot.org/CPC
Ecological Society of America <http://www.esa.org/>
Journal of International Wildlife Law and Policy <http://www.jiwlp.com/>
Society for Environmental Journalists <http://www.sej.org/>
Union of Concerned Scientists <http://www.ucsusa.org/>
University Leaders for a Sustainable Future www.ulsf.org

ENVIRONMENTAL EDUCATION ORGANIZATIONS ENGAGED IN BIODIVERSITY OUTREACH

Adopt a Watershed <http://www.adopt-a-watershed.org/>
Biodiversity Education Network <http://www.bioednet.org/>
Hawaiian Ecosystems at Risk <http://www.hear.org/>
Investigate Biodiversity investigate.conservation.org
National Environmental Education and Training Foundation <http://www.neetf.org/>
North American Association for Environmental Education <http://www.naaee.org/>
Oregon State University-Extension Service <http://oregonfuture.oregonstate.edu/>
Pennsylvania Center for Environmental Education <http://www.pcee.state.pa.us/>
Project WET www.montana.edu/wwwwet
Project WILD <http://www.projectwild.org/>
World Wildlife Fund <http://www.wwf.org/>

ZOOS, MUSEUMS, AQUARIA, AND BOTANICAL GARDENS

American Museum of Natural History <http://www.amnh.org/>
American Zoo and Aquarium Association <http://www.aza.org/>
Brookfield Zoo www.brookfieldzoo.org
Cleveland Museum of Natural History <http://www.cmnh.org/>
Field Museum of Natural History www.fnmh.org/default.htm
Missouri Botanical Gardens <http://www.mobot.org/>
Monterey Bay Aquarium <http://www.mbayaq.org/>
National Museum of Natural History/Smithsonian Institution <http://www.mnh.si.edu/>
New England Aquarium <http://www.neaq.org/>
Tennessee Aquarium <http://www.tennesseeaquarium.org/>

ORGANIZATIONS WITH EXPERIENCE REACHING SPECIFIC AUDIENCES

BUSINESS

GreenBiz.com <http://www.greenbiz.com/>

YOUNG ADULTS

Center for Environmental Citizenship <http://www.envirocitizen.org/>
Earthforce <http://www.earthforce.org/>
ECONference 2001 www.econference2001.org
Free the Planet <http://www.freetheplanet.org/>
National Wildlife Federation Campus Ecology Program <http://www.nwf.org/campusecology/index.html>

Sierra Student Coalition <http://www.ssc.org/>
Student Environmental Action Coalition <http://www.seac.org/>
Surfrider Foundation <http://www.surfrider.org/>
US Public Interest Research Group <http://www.pirg.org/>

FAITH BASED

Center for Respect of Life and the Environment <http://www.crle.org/>
Coalition on the Environment and Jewish Life <http://www.coejl.org/>
Earth Charter USA Campaign <http://www.earthcharterusa.org/>
Forum on Religion & Ecology www.environment.harvard.edu/religion
National Religious Partnership for the Environment <http://www.nrpe.org/>
North American Conference on Christianity and Ecology <http://www.nacce.org/>
Target Earth <http://www.targetearth.org/>
Web of Creation <http://www.webofcreation.org/>

URBAN AMERICANS

National Wildlife Federation, Backyard Habitat Program <http://www.nwf.org/habitats>

PATHWAYS TO THE PUBLIC

NEWS MEDIA CAMPAIGNS

Environmental Media Services <http://www.ems.org/>

National Environmental Trust www.environmentpolicy.net/

Public Media Center <http://www.publicmediacenter.org/>

COMMUNITY ORGANIZING

Clean Water Action <http://www.cleanwateraction.org/>

Sierra Club <http://www.sierraclub.org/>

Western Organization of Resource Councils <http://www.worc.org/>

CONSUMER & LIFESTYLE EDUCATION

American Community Gardening Association <http://www.communitygarden.org/>

Organic Consumers Association <http://www.purefood.org/>

Center for the New American Dream <http://www.newdream.org/>

Certified Wood Products Market <http://www.certwdmkt.com/>

Coop America <http://www.coopamerica.org/>

Ecofuture <http://www.ecofuture.org/>

EnviroLink <http://www.envirolink.org/>

Equal Exchange <http://www.equalexchange.com/>

Fair Trade Federation <http://www.fairtradefederation.com/>

For My World <http://www.formyworld.org/>

Global Stewards <http://www.globalstewards.org/>

Green Marketplace at Gaim <http://www.greenmarketplace.com/>

Green Seal <http://www.greenseal.org/>

Natural Step <http://www.naturalstep.org/>

Power Scorecard <http://www.powerscorecard.org/>

Simple Living Network <http://www.simpleliving.net/>

POPULAR CULTURE

Earth Communications Office <http://www.oneearth.org/>

Environmental Media Association <http://www.ema-online.org/>

The Suzuki Foundation <http://www.davidsuzuki.org/>

COMMUNICATIONS CONSULTANTS & GRANTMAKERS

PUBLIC OPINION RESEARCH

National Opinion Research Center <http://www.norc.org/>

Roper Center for Public Opinion Research <http://www.ropercenter.uconn.edu/>

Viewpoints Research Ltd. (Canada) <http://www.viewpointsresearch.com/>

COMMUNICATIONS CONSULTING & TRAINING ORGANIZATIONS

Communications Consortium Media Center www.ccmc.org/main.htm

Institute for Conservation Leadership <http://www.icl.org/>

Institute for Media, Policy, & Civil Society <http://www.impacs.org/>

Safe Energy Communication Council <http://www.safeenergy.org/>

Training Resources for the Environmental Community <http://www.trecnw.org/>

MEDIA FIRMS

AdBusters Media Foundation <http://www.adbusters.org/>

Douglas Gould & Company <http://www.douglasgould.com/>

Earth Communications Office <http://www.oneearth.org/>

Environmental Media Services <http://www.ems.org/>

Green Team Advertising <http://www.greenteamusa.com/>

Pyramid Communications <http://www.pyramidcom.com/>

Sheehan & Associates <http://www.sheehanassociates.com/>

Sustain: The Environmental Information Group <http://www.sustainusa.org/>

ENVIRONMENTAL GRANTMAKERS

Consultative Group on Biological Diversity <http://www.ccbd.org/>

Environmental Grantmakers Association <http://www.ega.org/>

Jenifer Altman Foundation <http://www.jaf.org/>

Brainerd Foundation <http://www.brainerd.org/>
Bullitt Foundation <http://www.bullitt.org/>
Conservation Food & Health Foundation www.grantsmanagement.com/cfhguide.html
Nathan Cummings Foundation <http://www.ncf.org/>
Ford Foundation <http://fordfound.org/>
Gaylord and Dorothy Donnelley Foundation <http://www.gddf.org/>
George Gund Foundation <http://www.gundfdn.org/>
Vira I. Heinz Endowment <http://www.heinz.org/>
James Irvine Foundation <http://www.irvine.org/>
Joyce Foundation <http://www.joycefdn.org/>
John D. & Catherine T. MacArthur Foundation <http://www.macfdn.org/>
C.S. Mott Foundation <http://www.mott.org/>
David & Lucile Packard Foundation <http://www.packfound.org/>
Pew Charitable Trusts <http://www.pewtrusts.com/>
Rockefeller Brothers <http://www.rbf.org/>
Surdna Foundation <http://www.surdna.org/>
Turner Foundation <http://turnerfoundation.org/turner>
Weeden Foundation <http://www.weedenfdn.org/>
Wilburforce Foundation <http://www.wilburforce.org/>

Publications

1. Asphalt Strawberry Magazine - Formerly called Change Magazine. An Internet-only publication about environmental issues and other topics.
2. Coastal Conservancy Publications - California Coast & Ocean magazine's on-line edition covers coastal protection, restoration, public access, and other issues for the entire coast of California.
3. E / The Environmental Magazine - Covering environmental issues such as global warming, ozone depletion, acid rain, green living, ecology, alternative energy, biodiversity, endangered species, the non-profit community... and from the personal to the political - always with a 'what you can do' emphasis. You can read it online or subscribe.
4. Earth First! The Radical Environmental Journal - Sample news from Earth First! and the radical environmental movement; informative articles, debate, analysis.
5. EarthLight Magazine - The magazine of spiritual ecology. Includes subscription information, articles from the current issue and a library of articles.
6. Eco-logic Online - Online version of environmental journal supporting property rights and critical of government intervention and public land ownership.
7. The Ecologist - Website of The Ecologist magazine. Provides resources, archives, campaign and event information.
8. Éléments Online Environmental Magazine - Online environmental magazine offers a wide spectrum of environmental information including articles, poetry, audio interviews, children's stories and "Pick-your-own Eco-adventures". Published by the New Brunswick (Canada) Environmental Network. In English and French.
9. Environment Archive of Independent Review - Features a wide variety of essays published in Independent Review which explore free market environmentalism and its policy suggestions.
10. Green at Work Magazine - Pro-business and positive publication, whose goal is to reinforce sustainable initiatives by sharing success stories and profiling the individuals who are making it happen.
11. Green Earth Journal - Environmental news report with information from many sources. Archives and free subscription information.
12. Grist Magazine - A smart, witty environmental news magazine. Daily international news, investigative reporting, columnists, books, cartoons. Concrete actions to fix environmental problems. Gloom and doom with a sense of humor.
13. Heron Dance - Nonprofit literary organization with a publication which has a theme of works of beauty and the beauty of the natural world.
14. International Wildlife Magazine - Graphic images and text educate readers about conservation issues and compel them to explore the latest discoveries affecting the natural world.
15. Jewish Vegetarian - Magazine of the Jewish Vegetarian and Ecological Society.
16. Mother Earth News - US magazine about sustainable, self-reliant living. Provides current online articles and resources. Topics include building, gardening, homesteading, do-it-yourself, kitchen, energy and health.
17. The New Environmentalist - Online magazine and website designed to educate and support average people as they work to reduce resource waste, saving them money while improving the quality of the environment

18. The New Environmentalist Magazine - Online magazine featuring articles and links on a wide range of environmental topics and developments, including new technologies for reducing resource waste and improving the quality of our environment.
19. On Earth - Natural Resources Defense Council quarterly journal. Covers a broad range of environmental issues. Some articles from current and back issues available on line.
20. Orion Online - Online magazine which promotes sustainable living and nature. Investigates topics from many perspectives.
21. The Planet Magazine - Online edition and recent archives of a quarterly environmental magazine published by Huxley College at Western Washington University.
22. Resurgence Magazine - An international forum of radical thought on environmental and social issues - ecology, human scale education, sacred art, the economics of wellbeing, sustainability and a holistic philosophy infused with spirituality and creativity. In print and online.
23. San Diego Earth Times - Monthly e-zine presents articles covering a wide variety of local, national and international environmental topics.
24. SchNEWS - Diverse weekly activist newsletter, from Brighton, England.
25. Science and the Environment Bulletin - A bi-monthly e-zine on environmental science and technology from Environment Canada.
26. Sierra Magazine - Online version of Sierra Magazine, published monthly by the Sierra Club
27. The Trumpeter - Journal of the Deep Ecology movement. Seeks to develop the understanding of ecosophy, "wisdom born of ecological understanding and insight." Includes subscription information, submission guidelines, announcements, current issue and archives.
28. Welcome to Our Planet - Our Planet is the United Nations Environment Programme's flagship magazine, reporting on environmentally sustainable development around the world for people concerned about our common future.
29. Wildlife Rehabilitation Today Magazine - Web version of the international magazine dedicated to the rescue, care and release back to the wild of orphaned and injured wild animals. Provides online articles, news, book reviews and resources.
30. YES A Journal of Positive Futures - Magazine published by the nonprofit Positive Futures Network concerned with ideas for building a just and compassionate future.

http://europa.eu.int/comm/environment/pubs_en.htm - Europa environment resources

http://europa.eu.int/comm/dgs/environment/index_en.htm - Europa environment

<http://www.environment.gov.au/> - Australian environment resources

<http://www.h-net.org/~environ/> - American Society and the European Society for Environmental History

<http://nature.org/tncscience/docs/> - The diversity of life on earth

<http://www.worldbank.org/reference/> - Worldbank publications

<http://www.awesomelibrary.org/Classroom/Science/Ecology/Ecology.html> - Awesome library resources

<http://www.usgs.gov/pubprod/> - USGS publications and other products

<http://dep.state.ct.us/> - State of Connecticut Department of Environmental Protection

<http://www.epa.state.oh.us/> - Ohio Environmental Protection Agency

<http://www.epa.ie/> - Environmental Protection Agency, Ireland

<http://www.state.nj.us/dep/> - New Jersey Department of Environmental Protection

<http://www.defra.gov.uk/environment/> - defra Environmental Protection, UK

<http://www.mass.gov/dep/dephome.htm> - Massachusetts Department of Environmental Protection

Projects

<http://dmoz.org/Society/Issues/Environment/> - Open directory project

<http://www.epa.state.il.us/> - Illinois Environmental Protection Agency

Books

<http://dmoz.org/Science/Environment/Publications/Books/> - Open directory project

http://search.ebay.com/environmental_W0QQfkrZ1QQfnuZ1QQxpufuZx - Ebay list of environmental books

<http://www.questia.com/PM.qst?a=refresh&docId=27952063&type=book> - *Biotechnology can help reduce the loss of biodiversity*

http://www.dealtime.com/xGS-biodiversity-NS-1-linkin_id-7000959 - Dealtime biodiversity

Dealtime biodiversity

<http://plato.stanford.edu/entries/biodiversity/> - Stanford Encyclopedia of Philosophy

Journals

<http://dmoz.org/Science/Environment/Publications/Journals/> - Environmental Publications

http://dmoz.org/Society/Issues/Environment/Magazines_and_E-zines/ - Environmental Magazines

Conservation

<http://biogate.lub.lu.se/subject-listing/00600.html> - Lund University Bio Science

<http://www.epa.gov/> - US Environmental Protection Agency (can't link)

Biodiversity

General

<http://www.teriin.org/biodiv/biodiv.htm> - BIODIVERSITY

On-line Alerts

<http://www.bioone.org/pertserv/?request=index-html> - On-line issue alert

World Map

<http://www.nhm.ac.uk/research-curation/projects/worldmap/> - [Natural History Museum](#)

Publications

<http://www.geocities.com/darthdusan/favorite.htm> - El Salvador's Biological Diversity

Guides

<http://www.eldis.org/biodiversity/> - [Biodiversity Resource Guide](#)

Projects

<http://www.biodiversityproject.org/> - [Biodiversity Project](#)

Books

<http://darwin.bio.uci.edu/~sustain/bio65/Titlepage.htm> - Biodiversity & conservation - Hypertext book

Bibliographies

WORLD WIDE WEB

<http://www.apec.umn.edu/faculty/spolasky/Biobib.html> - [Biodiversity and Biological Collections Web Server](#) (This bibliography contains approximately 4000 references on various aspects of biodiversity and conservation).

<http://biodiversity.uno.edu/> - [Biodiversity Maps Library](#) (The Biodiversity and Biological Collections Web Server is devoted to information of interest to scientists studying systematics and other life sciences)

http://www.wcmc.org.uk/information_services/bml/ - [Canada's Biodiversity Convention Office](#) (The UNEP-WCMC Biodiversity Map Library (or BML) is a library of mapped information related to the conservation of the world's biological diversity)

<http://www.bco.ec.gc.ca/> - [Canadian Biodiversity Information Network](#) (The Biodiversity Convention Office was established by Environment Canada in September 1991 to coordinate Canadian involvement in the negotiations leading up to the United Nations Convention on Biological Diversity).

http://www.cbin.ec.gc.ca/default_e.cfm - [Center for Conservation Biology Network](#) (The site contains biodiversity information from around Canada, including a searchable database and biodiversity discussion groups).

<http://conbio.net/> - [Conservation Biology Institute](#) (Projects, resources, information on conservation biology programs, access to virtual libraries, and more are available at this site).

<http://www.consbio.org/> - [IUCN: The World Conservation Union](#) (Databases of forest intactness and protected areas are just two of the many features available from the Conservation Biology Institute).

<http://www.iucn.org/> - [IUCN Redlist of Threatened Species](#) (This is the official site for The World Conservation Union).

<http://www.redlist.org/> - [Internet Biodiversity Service](#) (Which plants and animals in the world are threatened? What countries have the most endangered species? Using the IUCN Redlists, you can search by biome, species, country, and more)

<http://www.biodiversity.org.uk/ibs/> - [National Biological Information Infrastructure \(NBII\)](#) (A searchable database, maps, links, and more are available from this web site, online since 1989)

<http://www.nbii.gov/> - [NatureServe](#) (Biodiversity is just one of the current biological issues highlighted by NBII. Teacher resources and more are provided).

<http://www.redlist.org/> - [Internet Biodiversity Service](#)

<http://www.natureserve.org/> - [Program in Conservation Biology, University of California, Riverside](#). (Formerly known as the Association for Biodiversity Information, NatureServe is "an international network of biological inventories-known as natural heritage programs or conservation data centers-operating in all 50 U.S. states, Canada, Latin America and the Caribbean)

<http://cnas.ucr.edu/consbio/CBioHP.html> - [The Virtual Library of Ecology and Biodiversity](#) (The home page for the University of California, Riverside Program in Conservation Biology contains a variety of links and maps).

<http://conbio.net/vl/> - [biodiversity on the internet](#) (online since '89) (A table of contents and a searchable database are the highlights of this valuable site).

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Environment

News

<http://www.ens-newswire.com/> - Environmental News Service

<http://www.natureserve.org/> - Nature reserve

Policies

<http://www.newsbatch.com/environment.htm> - Guide to an understanding policy issues

Publications

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,menuPK:176751-pagePK:149018-piPK:149093-theSitePK:244381,00.html>

Environmental upgrading in the developing world

http://europa.eu.int/comm/environment/pubs_en.htm - Europa environment resources

http://europa.eu.int/comm/dgs/environment/index_en.htm - Europa environment

<http://www.usgs.gov/pubprod/> - USGS publications and other products

<http://www.environment.gov.au/> - Australian environment resources

<http://www.h-net.org/~environ/> - American Society and the European Society for Environmental History.

<http://nature.org/tncscience/docs/> - The diversity of life on earth

<http://www.worldbank.org/reference/> - Worldbank publications

<http://www.awesomelibrary.org/Classroom/Science/Ecology/Ecology.html> - Awesome library resources

<http://dep.state.ct.us/> - State of Connecticut Department of Environmental Protection

<http://www.epa.state.oh.us/> - Ohio Environmental Protection Agency

Subject area index

<http://www.epa.ie/> - Environmental Protection Agency, Ireland

<http://www.state.nj.us/dep/> - New Jersey Department of Environmental Protection

<http://www.defra.gov.uk/environment/> - defra Environmental Protection, UK

<http://www.mass.gov/dep/dephome.htm> - Massachusetts Department of Environmental Protection

Projects

<http://dmoz.org/Society/Issues/Environment/> - Open directory project

<http://www.epa.state.il.us/> - Illinois Environmental Protection Agency

Books

<http://dmoz.org/Science/Environment/Publications/Books/> - Open directory project

http://search.ebay.com/environmental_W0QQfkrZ1QQfnuZ1QQxpufuZx - Ebay list of environmental books

<http://www.questia.com/PM.qst?a=refresh&docId=27952063&type=book> -

Biotechnology can help reduce the loss of biodiversity

http://www.dealtime.com/xGS-biodiversity-NS-1-linkin_id-7000959 -

Dealtime biodiversity

<http://plato.stanford.edu/entries/biodiversity/> - Stanford Encyclopedia of Philosophy

Journals

<http://dmoz.org/Science/Environment/Publications/Journals/> - Environmental Publications

http://dmoz.org/Society/Issues/Environment/Magazines_and_E-zines/ - Environmental Magazines

Conservation

<http://biogate.lub.lu.se/subject-listing/00600.html> - Lund University Bio Science

<http://www.epa.gov/> - US Environmental Protection Agency (can't link)

- **Agrobiodiversity**

Sri Lanka's traditional agro-biodiversity - Genetic resources, agro-biodiversity and traditional knowledge

Virtual Library - Sri Lanka: ENVIRONMENT, NATURAL RESOURCES - traditional agro -biodiversity

- **Animal Biodiversity**

Over 100 Frog Species Discover ed in Sri Lanka

Animal Information - Sri Lanka -Biodiversity/Ecosystems

- **Biodiversity Projects**

IUCN Sri Lanka : biodiversity of Madu ganga project

Biodiversity for Development CD-ROM : Kurulukele Forest Reserve

Virtual Library - Sri Lanka - WILD LIFE, FAUNA & FLORA

- **Biodiversity Protected areas**

- Sri Lanka - Biodiversity and Protected Areas - Country Profile
- Biodiversity Hotspots - Western Ghats & Sri Lanka - Overview
- Western Ghats Hotspot - Forest fragmentation in the Western Ghats and Sri Lanka is a key issue.
- Biodiversity Hotspots - Western Ghats & Sri Lanka - Conservation: 92 Key Biodiversity Areas
- Biodiversity in Sri Lanka and the Western Ghats -- Helgen et al ...
- Wetlands & Biodiversity - Water, Health and Environment Research
- Tsunami Sri Lanka Lay out : Biodiversity and Protected Areas.

Professional Associations

Sri Lanka Wildlife Conservation Society volunteer research travel ...

Biodiversity Education

Environment Sri Lanka - Biodiversity, Natu re Tourism, Education

Participants at the Workshop on Information Management and Exchange to promote Biodiversity Conservation

Dr. Mayuri Wijesinghe (Department of Zoology, Faculty of Science, University of Colombo), Dr. A. Wijesekara (Horticultural Research & Development Institute), Mr. Douglas Ranasinghe (Wildlife and Nature Protection Society), Ms. A. Amarasinghe, (Director, Scientific Affairs, National Science Foundation), Ms. A. Pitadeniya (Scientific Officer, National Science Foundation), Ms Sunethra Perera, (Director information, NSF), Ms. Nanda Perera (National Science Foundation), Mr. Jagath Gunawardena (Attorney at Law), Dr. R.M.C.S. Ratnayake (Senior Lecturer, Department of Plant Science, Faculty of Science, University of Colombo), Ms. P.M. Jayasinghe (Industrial Technology Institute), Ms. Thashara Abeysekara (Industrial Technology Institute), Ms. Mihiri Gunawardena (PILF), Mr. Niroshani Liyanagae (SLEJF), Mr. Nimal Rajarathna (Coastal Conservation Department), Ms. I. Peiris (CARP), Ms. S. Disanayake (Plant Genetic Resource Center), Mr. Kapila Perera (National Science and Technology Commission), Mr. S.A.N.S. Subasinghe (Central Environmental Authority), Dr. U.K.G. Padmalal (Senior Lecturer, Department of Botany, Open University), Dr. Vindya Amarasinghe (Biotechnology Consultant), Ms. A.C.P. Dabare (Librarian, Central Environmental Authority), Ms. A. Jayaweera (Librarian, Environmental Foundation Ltd), Ms. N.S.A. Edirisinghe (Librarian, National Library), Ms. Chandrasekera (Librarian, University of Colombo), Ms. I. Mudannayake (Librarian, Post Graduate Institute of Agriculture, University of Peradeniya), Ms. H.P.S.S. Gunasekera (Senior Assistant Librarian, Open University), Ms. Chandima Gunadasa (Librarian, IWMI), Ms. S.C.D. Fernando (EDB), Ms. D. Talagala (Librarian, American Center), Mr. B. Dayananda (Librarian, IUCN), Mr. M. Watson (National Project Manager, NCSA Project), Dr. D. Dela (Thematic Consultant Biodiversity, NCSA Project), Mr. T.H. Karunathilaka (Capacity Development Expert, NCSA Project), Mr. Jagath Gunawardana (Environmental Lawyer),

Document 1: Relevant Articles of the CBD

Article 7. Identification and Monitoring

Each Contracting Party shall, as far as possible and as appropriate, in particular for the purposes of Articles 8 to 10:

- (a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I;
- (b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use;
- (c) Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques; and

What will be discussed at this workshop

- (d) Maintain and organize, by any mechanism data, derived from identification and monitoring activities pursuant to subparagraphs (a), (b) and (c) above.

Articles 7(d)		
<p>CBD Requirements</p>	<p>Article 7(d): Maintain and organize, by any mechanism data, derived from identification and monitoring activities pursuant to subparagraphs (a), (b) and (c) above. While this calls for maintaining and organizing data derived from identification and monitoring activities, the references to sub-articles 7(a), (b) and (c) implies that: Maintaining storing and organising data are not all that is required, as there is need for: disseminating information derived from data collection and storage for use by categories of persons that need to identify and monitor key components of biodiversity for conservation and sustainable use (especially those requiring urgent conservation action) and threats to biodiversity (for action under Article 8) and those who need to plan for biodiversity conservation (Article 6).</p>	<p>Capacity requirements Article 7(d):</p> <p>Institutional</p> <ul style="list-style-type: none"> • coordinate national (and sub-national) biological inventories, collections of specimens, <i>ex-situ</i> conservation facilities, etc. <p>Institutional/individual</p> <ul style="list-style-type: none"> • create and manage databases and meta-data bases. • <u>disseminate information derived from data in a usable form (customised information) to scientists, policy makers, general public, national or sub-national biodiversity information monitoring/coordinating centres.</u> <p>Systemic:</p> <p>Policy/programmes/mechanisms to</p> <ul style="list-style-type: none"> • create matadatabases on national (and sub-national) biological inventories, information on collections of specimens, <i>ex-situ</i> conservation facilities, etc.

Article 17. Exchange of Information

1. The Contracting Parties shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries.
2. Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information.

Article 17. Exchange of Information		
<p>CBD Requirements</p>	<p>This Article addresses the fact that there is an information gap between developed and developing countries, which must be bridged. Article 17 is a general provision which stands on its own or can be considered in conjunction with other Convention provisions, in particular,</p> <p>Article 7 (Identification and Monitoring),</p> <p>Article 12 (Research and Training)</p> <p>Article 13 (public education)</p> <p>Article 16 (Access to and Transfer of Technology).</p> <p>Article 17 (l):</p> <ul style="list-style-type: none"> • creates an obligation to facilitate the exchange of information, that is: publicly available (hence parties are not required to provide confidential information held by a Contracting Party's public or private sectors. (the question of publicly held information sources has to be clarified legally). ◦ relevant to the conservation and sustainable use of biological diversity. • requires consideration of the "special needs" of developing countries, highlighting the particular needs of developing countries to obtain information to help them achieve the Convention's goals. <i>But information to be provided is not limited to that from developed countries, though Glowka, et al. (1994) interprets that the words "special needs" may mean requiring preferential treatment for developing countries.</i> (Glowka, et al. (1994) interprets acceptable means of information exchange as ranging 	<p>What capacity is required for Sri Lanka to make available publicly held information to other institutions?</p> <p>Institutional</p> <ul style="list-style-type: none"> • capacity to collect, supply and ultimately use information on the conservation of biological diversity and the sustainable use of its components/ • training staff • providing equipment. <p>(Same as Article 7, but more funds may be required to access information from over seas)</p> <p>(Not clear whether this means</p>

Article 17. Exchange of Information		
	<p>from:</p> <ul style="list-style-type: none"> √ newsletters, publication of research results, scientific exchanges to on-line electronic data communications. √ national, clearing-houses mechanisms could be set-up as biodiversity information and monitoring centres article 7(d) and 18(3). <p>Article 17 (2): This lists what the exchange of information shall include. It re-emphasizes that information relevant to conservation of biological diversity in the form of:</p> <ul style="list-style-type: none"> • Results of technical, scientific and socio-economic research, • Information on training and surveying programmes specialised knowledge, • indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16 (1) for transfer of technologies. <p>Under Article 16(1) required provision of information with technology to be transferred to recipient, on technologies</p> <ul style="list-style-type: none"> o relevant to the sustainable use of components of biodiversity o about the relevant technologies that make use of genetic resources <p>The paragraph recognizes the need to combine information exchange with technology transfer, which include</p> <ul style="list-style-type: none"> o both operational information and also information to assess the environmental implications of the technology provided, to enable assessment of the appropriateness of the technology to the recipient Party. <ul style="list-style-type: none"> • Article 17(2) also provides for exchange of information which includes repatriation where feasible. But there is no concrete obligation on Parties to do this 	<p>information in relation to use of genetic resources and traditional knowledge connected with it OR s whether these are separate issues.</p>

DEFINITIONS from Article 2

Access to genetic resources is not defined in the CBD. The many aspects of this are discussed (page 28, Glowka,1998).

Country of origin means only the countries that have the genetic resources *in-situ*

Genetic material means any plants, animal, microbial or other origins containing functional units of heredity.

Genetic resources means genetic material of actual or potential value.

(i.e. any plants, animal, microbial or *other origins* containing functional units of heredity (all genetic elements containing DNA and in some cases RNA) of functional or potential value). This includes the promoter region of a gene.

The term "*other origin*" in the definition of genetic material is not defined, but may be interpreted as soil, sediments or liquids with plant, animal or microbial genetic material, or naked functional units of heredity (Glowka, 1998).

The CBD does not cover access to human genetic resources (COP, 1996), although State practice may differ. Potentially valuable material such as biochemical extracts that do not contain functional units of heredity are not covered by the CBD and its benefit sharing provisions or technology transfer provisions.

Glowka (1998) specifically mentions that States may, however, wish to bring into the scope of framework legislation relevant to access, biomolecules (which are expressions of a gene or a group of genes) and some times called derivatives, which can be used directly or modified and synthesised. Especially if they are proteins, they can be used to reverse engineer or synthesise a gene sequence.

EXPLANATORY NOTE:

There are two contexts in which derivatives can be defined Glowka (1998):.

(1) Unimproved or unmodified chemical compounds, other than DNA or RNA, that are merely associated with targeted biological (genetic) material, and are formed by the metabolic processes of the organism. derivatives exist in a sample of biological material when it is obtained from an *in-situ* or *ex-situ* source. along with DNA and RNA. Derivatives in this context might be biologically active chemical compounds found within plant material collected, which are yet to be extracted, modified, and used in technological application.

(2) Derivatives can be DNA or RNA or chemical compounds modified created or synthesised from materials originally obtained from *in-situ* or *ex-situ* sources. The resulting end-product will be a breeder's hybrid seed, a traditional healers medicine, or a pharmaceutical company's synthetic version of an extracted biochemical. These are end products derived or synthesised from genetic or biochemical resources through human intervention.

Genetic material covers not only resources used for productive use, but specimens that are sent out of the country for taxonomic identification may also be used as genetic resources, so that PIC and MAT under which these are sent should be looked into. i.e. What is our position if any specimens sent out are used for producing a commercial product - if this is used illegally we are not liable for benefits. However if we have stated that any other use of this material than for the purpose sent (presumably for identification) should be notified for further negotiation - then we can benefit.

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2. R. Hitzengerger, A. Berner, Z. Galambos, W. Maenhaut, J. Cafmeyer, J.

Schwarz, K. Müller, G. Spindler, W. Wiprecht, K. Acker et al.

"Intercomparison of methods to measure the mass concentration of the atmospheric aerosol during INTERCOMP2000—influence of instrumentation and size cuts"

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