CHAPTER 25

National and Regional Biodiversity Databases

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INTRODUCTION

Basic definitions

In simple language, A *Data Bank* could be defined as any repository for data (the term *'data'* is defined below). The repository can take any form ranging from simple filing systems to more complex electronic systems such as computer databases, sometimes interactively linked with other forms of electronic media.

Biodiversity has been broadly defined as the *'variability among living organisms from all sources including*, inter alia, *terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems'*. (UNEP, 1992).

While this paper will not attempt to examine the deep meaning of the term, it is worth emphasising that the study and the conservation of biological diversity focus on three levels:

- *genetic* level – variability within species;
- *species* level – variety of species within a region;
- *ecosystem* level – variability among habitats.

Biodiversity Data Banks therefore, whether national, regional or international aim at storing knowledge about the world's biodiversity. Though usually limited in scope by the spatial and time-scales on which they focus, they are generally concerned with the *compilation, processing, retrieval* and *dissemination* of biodiversity data and information.

At this stage, a basic distinction between *data* and *information* should be made.

- *Data* refers to observations, measurements or facts referenced to some kind of accepted standard. Data are subsequently integrated, processed, interpreted or manipulated in any other way to produce information.

An example of this can be recordings of plant species in a given plot through a given time-scale, e.g. number of species, the abundance, heights of trees, etc.

- *Information* on the other hand, is the knowledge (product) derived from analysis and interpretation of data. It is highly specific and designed to support decision-making. It subsequently has a shorter 'shelf-life'.

From the example given above, one can analyse the data to find out the rate at which plant species have been decreasing or increasing in a given time, which would give an idea on species loss or on the habitat's re-colonisation. It should be understood that the information so produced should be of value towards the decision-making process (as to how the area in question should be managed so as to achieve the optimal resource use and conservation-oriented goals). Information is usually accompanied by option analyses.

Most biodiversity data banks therefore store the data necessary for incorporation into the planning process in the conservation of biological diversity. Worth noting is that a thorough analysis should be done prior to the establishment of the data bank, such that the data collected and subsequently stored will be useful in supporting decision-making. This avoids such unfortunate situations like finding out that the data one has been compiling are of no value after huge amounts of time and resources have been spent.

BIODIVERSITY DATA-BANKS

I will examine some of the main types of biodiversity data banks and how they relate to each other. The classification so presented here is in no way standard, but has been done for convenience. In some cases, a single data bank may cover scales ranging from local to global. The commonest types are:

(i) sub-national and national biodiversity data banks;
(ii) regional and international BDBs;
(iii) meta-databases.

Sub-national and national biodiversity data-banks

The term *'sub-national databases'* will be used here to denote those databases that focus on part of the country's biodiversity, either a *geo-political* part, e.g. a county; or that relate to a specific departmental sector of the country, e.g. the wildlife areas. In both cases, these may ultimately feed into a national data-set, or may stand on their own. In some cases, the databases can feed into a central 'clearing house'

which then helps to co-ordinate the activities at the feeder ends and also helps to disseminate the information (WCMC, 1994).

Figure 1 shows the concept:

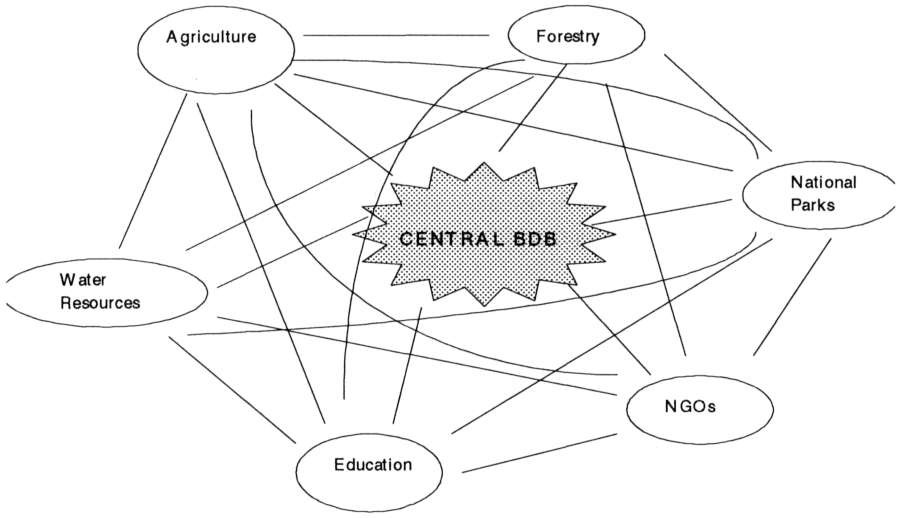

Figure 1: The biodiversity information network. Note that in some cases, the 'clearing house' may be missing all together, and sectoral data banks just share data amongst themselves. In other cases, the 'clearing house' may be responsible for disseminating the data and co-ordinating the activities. It is possible to have counties or districts in place of the departments.

Biological data banks with many recording centres spread over the countries include the Biological Records Centre (BRC) for the British Isles based in Monks Wood, Huntingdon; The Nature Conservancy (USA) with over 80 national and sub-national biodiversity information centres; among others.

Regional and International Biodiversity Data-banks

While there may be no clear-cut line distinguishing the regional and the international databases, I have preferred to consider them in different aspects. I will make the distinction clearer by considering what has been described as a *bioregion*, a land and water territory whose limits are defined not by political boundaries, but

by the geographical limits of human communities and ecological systems (WRI *et al*, 1992). It should be noted that concerted efforts in the conservation of cross-border ecosystems are essential for the maintenance of biodiversity integrity in these areas.

International biodiversity data-banks may involve more than one bioregion, e.g. a database of endemic bird areas (EBAs) or that of ethnobotanical plants of the world; or a database of groups of organisms found in protected areas of the world.

International biodiversity data-banks may range from holding a few species of special interest to many groups of organisms and ecosystems. In my view, it may not be practical to establish a global, or even a continental biodiversity data-bank involving all taxa. This, if it can be done, would be on a scale that may not be very meaningful for strategic planning of biodiversity. However, they are very useful in identifying areas where global conservation efforts can be intensified, e.g. a desire to protect all the endangered species of the world may call for a global database documenting where these species occur.

Organisations holding international databases include the World Monitoring Conservation Centre (WCMC) at Cambridge, UK, which holds data on trees of economic value, CITES-listed species, plant genetic resources, among others. WCMC also helps individual countries maintain and manage their own databases. Others are UNEP, IUCN and various secretariats of international conventions.

Meta-databases

Different in function from the fore-going, meta-databases contain references about the content and location of data and information holdings (McKenna, 1996). Meta-data are therefore high-level 'overview' or informational abstract that describe a particular dataset or institute that can provide access to the data. The meta-data can best be described as 'data about data'.

DATA/INFORMATION FLOW

Having examined the different types of biodiversity data-banks, it is important to consider how information should flow from one to the other. It should be stressed that data are not useful until they are transformed into information; and that information is not useful in it self unless it can be disseminated to the targeted audience at the appropriate time, and packaged in a way that the decision-maker will understand.

Figure 2 is a schematic representation of the relationships between the different data banks:

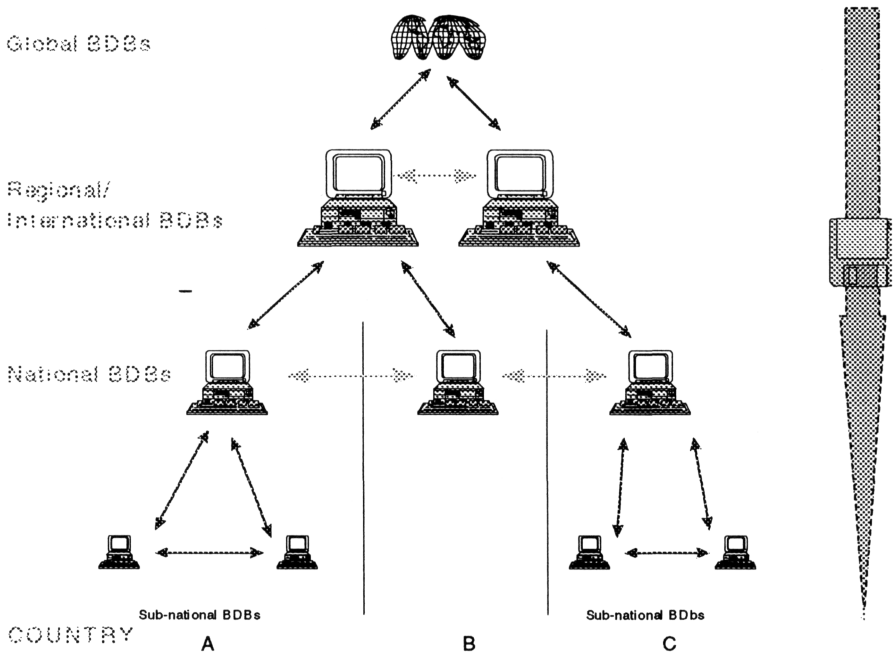

Figure 2. A schematic representation of the relationships within the various types of data-banks. Note that it is entirely possible for data to flow from any level to the other without necessarily passing through the intermediate systems. The arrows showing these relations have been left out for clarity.

FUNCTIONS OF A BIODIVERSITY DATABASE

Rational decisions regarding the use of resources, and indeed all other decisions, have to be made with the help of a sound information base. The information must be timely and easy to understand, and must be, to the best knowledge of the provider, appropriate to tackle the problem at hand.

Characteristics of a good information product are presented in Box 2.

Box 2
Characteristics of a well-designed information product

- Designed for a specific audience for a specific purpose.
- Relevant to decision-making needs.
- Available when the 'window of opportunity' for decision-making arises (i.e. timely).
- Easily and quickly understood.
- Delivered through recognised channels.
- Based on sound scientific principles.
- Areas of uncertainty and their significance are clearly identified.
- Accompanied by full acknowledgement of data sources and intellectual property.
- Available at minimal cost in terms of time, money and administrative overheads.

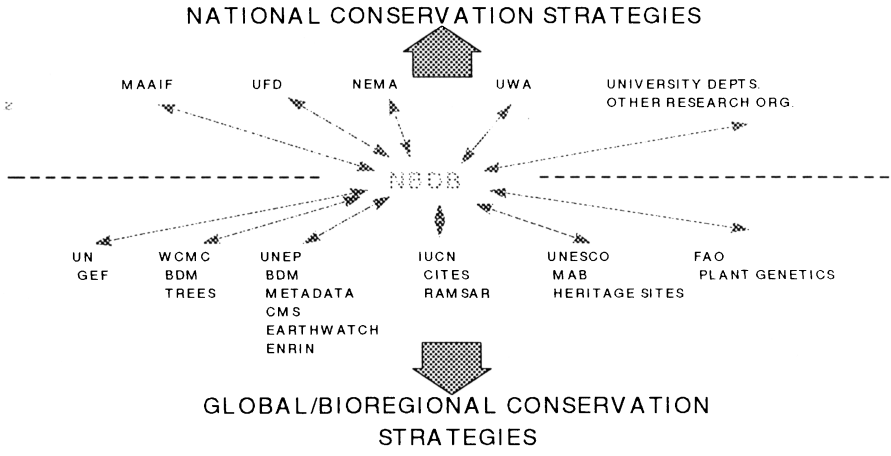

Figure 3. A schematic representation of the uses and the linkages between the NBDB and other databases/organisations.

ESTABLISHMENT OF A DATABASE

The establishment of a data-bank must first address the need for having one;the kind of product; the problem it will solve; and the targeted audience identified. It is important that a full needs analysis be carried out before the data-bank is produced.Ideally, representatives of all stakeholders involved in the problem for which the information system is intended to contribute towards the solution, should be involved in the initial planning of the information system, deciding on what kinds of data would be collected, how the product will be designed, and what problems the product will address.

The following basic questions should be thoroughly investigated:

- What is the problem?
- What kind of data is needed to provide the answers?
- Who will collect the data?
- When, where and how will the data be collected?
- What facilities should be used in the handling of the data and the dissemination of the information?
- Who is the target audience?
- How will the product be delivered?
- How sustainable will the system be to solve long-term needs (such as monitoring of biodiversity) or how suitable is it to provide short-term answers?

CONCLUSION

Biodiversity data-banks are quite useful in the conservation process of biodiversity, both for the present and the future generations. Today's data can provide information for the future on the state of the world's resources if kept in the appropriate way, in as much as earlier data are constantly finding their uses today.

National and international data-banks are both useful in their ways for the study and the conservation of biological diversity, albeit the fact that one type may be inappropriate to provide the necessary tools for strategic planning at different scales. National databases may be quite important in setting priorities for conservation in the country, but may be less effective in setting global priorities, most especially when data gaps exist in the neighbouring countries. On the other hand, global databases, such as those based on wide scales, may be inappropriate on setting national priorities for conservation. Nevertheless, data should not be disregarded at whatever scale or resolution, both in space and in time, for they may be quite useful in some other ways or in the future.

FURTHER READING

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